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SUPPLY CHAIN MANAGEMENT PRACTICES AND CHALLENGES OF HIV RAPID TEST KITS IN SELECTED PUBLIC HOSPITALS AND HEALTH CENTERS IN OROMIA REGION

By

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(GSD/7737/09)

A Thesis Submitted to the Addis Ababa University, School of Commerce for the Partial Fulfillment of the Requirements for the Degree of Master Arts in Logistics and Supply Chain Management

Advisor: **Shiferaw Mitiku (PhD)**

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DECLARATION

I, Jara Mekonnen, declared that this research paper entitles “Supply Chain Management Practices and Challenges of HIV Rapid Test Kits in Selected Public Hospitals and Health Centers in Oromia Region” in Partial Fulfillment of the Requirements for the Degree of Master Arts in Logistics and Supply Chain Management at Addis Ababa University School of Commerce, is my own work and I dare to say that it has not been produced by others in any other universities for any form. All references are duly acknowledged.

Declared by

Student name Jara Mekonnen

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Date _____

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SCHOOL OF COMMERCE

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By

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Approved by Board of Examiners and Advisor

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Certificate

This is to certify that **Jara Mekonnen** has carried out this thesis proposal on the topic entitled **"Supply Chain Management Practices and Challenges of HIV Rapid Test Kits in Selected Public Hospitals and Health Centers in Oromia Region"** under my supervision. Accordingly, I here assure that his work is appropriate and standard enough to be submitted for the partial fulfillment of the requirements for the award of the degree of Master of Art in Logistics and Supply Chain Management.

Shifera Mitiku (PhD)

Signature_____

Date _____

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LIST OF ABBREVATIONS AND ACRONYMS

AIDS: Acquired Immune Deficiency Syndrome

ART: Antiretroviral Therapy

ARV: Antiretroviral

CDC: Center of Disease Control

DTC: Drug and Therapeutic Committee

EDHS: Ethiopia Demographic and Health Survey

EFY: Ethiopian Fiscal Year

EPHI: Ethiopia Public Health Institute

PFSA: Pharmaceutical Fund and Supply Agency

EPSA: Ethiopia Pharmaceutical Supply Agency

FEFO: First-to-Expire, first-out

FIFO: First-in, First-out

FMOH: Federal Ministry of Health

FHAPCO: Federal HIV/AIDS Prevention and Control Office

HIV: Human Immunodeficiency Virus

HMIS: Health management information system

HTS: HIV Testing Service

IAPAC: International Association of Providers of AIDS Care

IFRR: Internal Facility Requisition Report

IPLS: Integrated Pharmaceutical Logistics System

LIAT: Logistic**s** Indicators Assessment Tool

LMIS: Logistics management information system

MARPS: Most at Risk Populations

MSH: Management Sciences for Health

NGOs: Non-Government Organizations

ORHB: Oromia Regional Health Bureau

PEFPAR: Presidents Emergency Plan for AIDS Relief

PITC: provider-initiated testing and counseling

PLHIV: People Living with HIV

PMTCT: Prevention from Mother to Child Transmission

RRF: Report and Requisition Form

RTK: Rapid test kit

SCM: Supply Chain Management

SDP: Service Delivery Point

SOP: Standard Operating procedure

SS: Supportive Supervision

USAID: U.S. Agency for International Development

UNAIDS: United Nations Program on HIV/AIDS

UNICEF: United Nations International Children's Emergency Fund

VCT: Voluntary Counseling and Testing

WHO: World Health Organization

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The researcher

Abstract

Ethiopia is on the way to achieve the three nineties. However, HIV testing has decreased by 8% (Oromia by 7%) in 2009 EFY (2016/17)when compared to performance of preceding year by major reason related to shortage/poor distribution of diagnostic test kits (FMOH, 2017). This study aimed to assess the supply chain management practices and challenges of HIV rapid test kits in selected public Hospitals and Health Centers in Oromia region, focusing on ten HIV hot spot towns. The study is descriptive and causal study design, employing cross sectional data and using quantitative and qualitative data collection techniques to gather the required data at certain point in time. Sample size determined as per the basis of LIAT for Antiretroviral drugs (USAID|DELIVER PROJECT, Task Order 1, 2009) using extreme or deviant case sampling, 25 public health facilities selected. Data was collected from a total of 120 staffs working at Voluntary Counseling and Testing, Prevention of Mother to Child Transmission (PMTCT), Laboratory, Pharmacy head and store using combined structured questionnaire (schedule) and observation checklist. At pharmacy store,73.9% of health facilities are using and updating bin card for Stat pack and SD Bioline, 69.6% for Abon and 56.5% for DBS kit. But at testing point only 29.5% of facilities are using and updating bincard. Inventory auditing is conducted by 87.5% of facilities. Most (73.9%) of facilities met at least 80% of standard storage guidelines. HIV rapid test kit is distributing through pharmacy store. Almost all health facilities received their HIV RTK quota system from THA. Except one facility, all are using HIV rapid test kits for non-MARPS clients also. Report and Requisition Form used by 70.8% and others are using letter to report and request the kit (29.2%). Testing point are using Internal Facility Report and Resupply form, to report and re-supply but with no testing data at most facilities. Stat pack, Abon, and SD Bioline were available at most of health facilities at the day of visit. But encountered stockout of Stat pack at 26%, Abon at 43.5% and SD Bioline in the last 6 months preceding this assessment. And, 37.5% of them placed emergency order. The respondents agreed moderately with quality of HIV RTK (mean 3.56), availability when customers' needs, get pharmacy professional working on distribution and received voucher upon issuing. Operational supply chain performance of HIV kits in terms of reliability, responsiveness and agility are moderately good. The most challenges of supply chain management of HIV rapid test kits identified were false positive i.e. when the 1st test positive and then 2nd test negative i.e. wastage of kits, and the shortage of kits. Support on recordings and reports at testing departments, storage space expansion, follow national supply chain system, and further and wider studies on supply chain management and on quality of HIV rapid test kits are recommended.

***Key words**: HIV, Inventory, Storage, LMIS*

CHAPTER ONE

INTRODUCTION

This chapter provides background of the study, statement of the problem, basic research questions, objective of the study, significance of the study, scope of the study, definition of terms, organization of the study and limitation of the study.

1.1. Background of the study

Over 35 years after it discovers, human immunodeficiency virus (HIV) is still a major public health threat. HIV/AIDS continues spread and now 36.9 million (31.1 million to 43.9 million) people were globally living with HIV. The end of AIDS phase represents the shifts from a chronic struggle with hopes pinned on a future vaccine or cure to a winnable public health battle. Although an unprecedented global response has provided HIV treatment for 18 million people by mid-2016, and on the same year estimates shows that only 60% of people living with HIV knew their status (*Granich et al,* 2017). In 2017, three out of four people (75%) know their HIV status. New HIV infections have been reduced by 47% since it peaks in 1996. In 2017, around 1.8 million were newly infected with HIV, compared to 3.4 million in 1996 (UNAIDS, 2018).

Knowledge of HIV status among people living, 19.4 million, with in Eastern and Southern Africa increased from 72% in 2015 to 76% in 2016 (UNAIDS, 2017). In 2017 people living with HIV in Eastern and Southern Africa are 19.6 million while 800, 000 people are newly infected, 380, 000 were AIDS-related deaths and only 12.9 million people accessing treatment in the same year. These figures show that there are more than half of the people living with HIV and nearly half of newly infected globally in 2017 were in Eastern and Southern Africa (UNAIDS, 2018).

In Ethiopia, in PEPFAR supported sites in FY 2013, 70% of the over six million tests were done through the PITC approach while the rest (30%) was done through VCT. Contrary to the expectation, HIV positivity rate was lower among PITC clients that of VCT (1.2% versus 2.7%) (FHAPCO, 2014).

Per 2016 EDHS estimate, adult HIV prevalence in Ethiopia is estimated to be 0.9%, decreased between 2011 and 2016 from 1.5%. There is a substantial prevalence variation by region (4.8% in

Gambella, 3.4% Addis Ababa, 0.7% Oromia and 0.1% Ethio-Somali).The HIV prevalence in Ethiopia is primarily associated with areas of urban concentrating and proximity to major transport corridors. According to 2016 EDHS, among men and women combined, HIV prevalence is seven times higher in urban areas than in rural areas (2.9 Vs 0.4%). Participating in HIV testing is slightly lower in the 2016 EDHS to than in the 2011. Beside this, HIV testing coverage in the 12 months before survey is higher in Diredawa (39% for women and 36% for men), medium in Oromia (15% for both women and men), and least in Ethio-Somali 9% for women and 8% for men)(EDHS, 2016).

The world is embarking on a Fast-Track strategy to end AIDS epidemic by 2030. To achieve this, the concept of three 90s (90-90-90) was developed that by 2020, 90% of people who are HIV infected will be diagnosed, 90% of people who are diagnosed will be on Antiretroviral treatment and 90% of those who received ART will be virally suppresses. The strategy will have a benefit of averting 21 million AIDS-related deaths and 28 million new infection by 2030(UNAIDS, 2014, WHO, 2016).

Ethiopia also plans to prevent more than half a million AIDS-related deaths and prevent up to 80,000 new infections by 2020. The focus objective is the proportion of people living with HIV who know their status from 60-65% to 90% by 2020 through intensifying targeted HIV testing to the identified target population groups for identification of majority of the HIV infection and through right based approach to respond to the created high community-based demand for testing(UNAIDS, 2014).

According to FMOH 2009 EFY (2016/17) annual report, HIV testing has decreased by 8% (Oromia by 7%) when compared to last year performance while the HIV positivity yield has increased by about 22%. The major reason for the low performance in the budget year is related to shortage/poor distribution of diagnostic test kits (FMOH, 2017).

This study aimed to assess the supply chain management practices and challenges of HIV rapid test kits in selected public Hospitals and Health Centers in Oromia region, focusing on ten HIV hot spot towns supported by PEFPAR to identify the possible gaps that exist in the supply chain of these supplies. Oromia region is selected for the study because half of the twenty HIV hot spot towns, selected to meet the country's target in 2020 plan, are available in Oromia. The study will

help decision makers and stake holders to have insight on supply chain of HIV Rapid test kits in other areas of Oromia. The study also has a significant role in the way of achieving the first 90 strategy the country planned by using limited resource effectively to reach all people living with HIV to know their status.

1.2. Statement of the problem

According to 2017 HIV estimates in our country, Ethiopia, there are 15,000 deaths, 16,000 new infections, and 610,000 adults and children living with HIV. Only 73% of people know their HIV status (UNAIDS, 2018). To be succeed in the three 90-90-90 strategy, the first, people living with HIV should know their status. To achieve the 2015-2020 strategic plan, Ethiopia has working on targeted and most at-risk populations. An effective and efficient HIV Rapid test kits supply chain management is needed to ensure the achievement of the set targets. In this plan, some of the activities mentioned to enhance this targets are: strengthening the quantification and procurement capacity of DTC in health facilities, improving logistics and supply chain management, particularly storage capacity and stock management in the health facilities and woreda health offices, expanding IPLS to all ART, PMTCT and counseling and testing providing health facilities, strengthening pharmaceutical management information system, and improve user level data of HIV commodities including HIV Rapid test kits(UNAIDS, 2014).

To solve the pharmaceutical supply Chain management system of the country's problems such as non-availability, unaffordability, poor storage and stock management and irrational use, in past, Ethiopia developed IPLS with the purpose of always ensuring the availability of pharmaceuticals at health facilities when customers need them. The system also strives to be effective, efficient, avoiding stocks, losses and expiry. All program products including HIV/AIDS commodities has been managed by this system in Ethiopia (PFSA, 2013). However, after WHO banned KHB kit in 2015, which was the first choice of the country to conduct HIV test, Ethiopia looked other options like First response kit and Beijing Wantai to serve in algorithm transition period. Finally, the country conducted assessment and decided to include stat pack, Abon and SD Bioline in the new algorithm test, which has been currently used since 1st quarter of 2011 EFY. This new algorithm test would be applied in places where there is low HIV prevalence rate. The main point of the strategy is; one examines can assure its HIV status after taking examination with three kits and if the result is positive in all tests (AllAfrica, 2018).

A number of allegations have surfaced regarding the procurement of the Kit in the last two years resulting in a severe shortage of HIV Kits in the country (the reporter, 2017). FMOH 2016/2017 (2009 EFY) annual report proofs that HIV testing has decreased by 8% when compared to last year while positivity yield has increased by about 22% due to shortage/poor distribution of diagnostic test kits (FMOH, 2017). There are also reported shortage problems from health facilities in the Oromia region at different times. The supply chain management practices and challenges of this HIV Rapid test kits has not been assessed formally.

Beside this, Ethiopia to achieve the 1st 90 strategy from current 73%, developed a policy to address largely the general population and will reach about 10% of adult population per year by VCT services particularly the low at-risk population through fee basis, which was not implemented the past two years due to shortage of kits for MARPS (UNAIDS, 2014).

Hence, the purpose of this study to assess in supply chain management practices and challenges of HIV test kits which helps health managers to make evidence-based decision to withstand the burden come due to new strategy on supply system particularly and achieve the 2030 targets in general.

1.3. Basic Research Questions

- What is the inventory management of HIV rapid test kits in selected public hospitals and health centers in Oromia region?
- What is the storage management of HIV rapid test kits in selected public hospitals and health centers in Oromia region?
- What is the distribution system of HIV rapid test kits within the facility in selected public hospitals and health centers in Oromia region?
- How is the LMIS practice of HIV rapid test kits in selected public hospitals and health centers in Oromia region?
- How customer service is being practiced for HIV testing in selected public hospitals and health centers in Oromia region?
- What is the supply chain performance of HIV rapid test kits in selected public hospitals and health centers in Oromia region?
- What are the challenges of SCM of HIV Rapid test kits in Oromia region?

1.4. Objectives of the Study

1.4.1. General Objective

The main objective of this study is to assess the supply chain management practices and challenges of HIV Rapid test kits in selected public hospitals and health centers in Oromia region.

1.4.2. Specific Objectives

1.4.2.1. To assess inventory management of HIV Rapid test kits

1.4.2.2. To assess storage management of HIV Rapid test kits

1.4.2.3. To assess distribution system of HIV Rapid test kits within the facility

1.4.2.4. To assess the practice of Logistics Management information system of HIV Rapid test kits

1.4.2.5. To examine customer service practices of HIV testing in the facility

1.4.2.6. To measure the supply chain management performance of HIV RTKs

1.4.2.7. To assess the challenges of HIV Rapid test kits' supply chain management

1.5. Significance of the study

The goal of a public health supply chain is much larger than simply making sure a product gets where it needs to go. Ultimately, the goal of every public health supply chain is to improve health outcome. Supply chain also determines the success or failure of any public health program. Ethiopia, to achieve the 1st 90 new strategic plans in 2020, envisioning to ending AIDS, by 2030 through test and treat strategy, sustainable supply of HIV rapid test kits needed at health facilities. This study helps supply chain, program and health managers at different levels to know possible gaps on supply chain of these HIV rapid test kits where to act.

The final report will be shared with visited health facilities and their respective town health administrations, regional health bureau and PFSA to use this information as an input to for decision makings regarding SCM of HIV Rapid Test kits. I believe that even, if the corrective actions will be taken in these HIV hot spot towns in Oromia region, the study helps highly to achieve the 1st 90 strategy as it is identified by PEFPAR that targeted populations (MARPS) concentrated in these towns. The study will also help for further and wider assessments.

1.6. Scope of the Study

The scope of the study was assessment of supply chain management practices and challenges of HIV Rapid test kits only in public Hospitals and health centers. The study did not include private and NGO health facilities due to time and budgetary constraints. The study focuses only in towns i.e. did not include zones or rural health facilities.

1.7. Limitation of the Study

In our country, Ethiopia, selection of these HIV Rapid test kits has been conducted by EPHI and FMOH. The program drugs including these kits have been procured nationally and distributed by EPSA (PFSA) for health facilities. Hence the selection, procurement, and transportation components of supply chain management of HIV Rapid test kits were not assessed majorly in this study.

1.8. Definition of Terms

1.8.1. Conceptual definitions

- **Supply chain management**: it encompasses the planning and management of all activities involved in sourcing and procurement and all logistics management activities (JSI, 2017). Supply chain management is the coordination of production, inventory, location, and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served (Michael, 2003).
- **Integrated Pharmaceutical Logistics system**: is the single pharmaceuticals reporting and distribution system based on the overall mandate and scope of the PFSA. It aims to ensure that patients always get pharmaceuticals they need. To be successful, the system must fulfil the six rights of supply chain management by ensuring the right products, in the right quantity, of the right quality, at the right place, at the right time and for the right cost (PFSA, 2013).
- **Logistics Management information system**: is a system to collects, organizes, and reports data that enables people to make logistics decisions (PFSA, 2013).
- **Inventory Control System**: is a system designed to inform personnel when and how much of a pharmaceutical to order and to maintain an appropriate stock level to meet the needs of patients (PFSA, 2013).

1.8.2. Operational definitions of Terms

- **HIV Rapid test kits:** HIV test kits which have been used for HIV testing algorithm in Ethiopia currently. HIV Rapid test kit allows results of the test to be ready 5 to 30 minutes and it allows testing, counseling, and referrals to be done in one visit (UNICEF, 2008).
- **Dry Blood Serum (DBS) kit:** is kit used to collect and transport the sample of infants under 18 months in order to conduct virologic test unlike the adults to diagnose HIV, due to maternal HIV antibodies cross placenta causing positive serologic tests in HIV-exposed infants (UNICEF, 2008).
- **Program drugs:** are drugs/supplies used to diagnose, treat and rehabilitate HIV/AIDS (including HIV RTK and DBS kit), Malaria, TB and Leprosy, EPI and MCH, and they are procured and distributed through PFSA by "free"(PFSA, 2013).
- **Reporting and Ordering Form (RRF)**: is a form used to report and ordering program drug including ARV drugs and HIV rapid test kits every two months at Hospital and Health centers in Ethiopia (PFSA, 2013).
- **Distribution**: the refilling of HIV rapid test kits from immediate supplier to health facilities and within facilities. It doesn't include the central EPSA distribution. The transportation raised here is within this distribution only.
- **Internal Facility report and resupply form (IFRR)**: is the form by which drugs is issued within the facility to maintain a record of the products that are issued and received.
- **Stock out**: when the product is not available in Health Facilities dispensing units and in store for greater than three days in the last six months and at the day of visits.
- **Refill time**: the time interval RRF is reported and PFSA delivery products to Health facilities. The ideal set is three weeks (PFSA, 2013).
- **On time report**: Health Facilities send RRF to PFSA before 10^{th} days in the reporting period.
- **Break down**: the quota system distribution.

1.9. Organization of the Study

This final research paper is organized into five chapters, the introductory chapter contains background of the study, statement of the problem, research question, research objectives, significance of the study, scope of the study, definition of terms, organization of the study and limitation of the study. Chapter two discusses the review of related literature on basic concepts on

background of study, principles of supply chain, studies done in different areas, supply chain system in Ethiopia. Chapter three deal with description of the study area, research approach, research design, population and sample, data sources and types, data, collection procedures, ethical consideration and data analysis. Chapter four covers the findings of the study, interpretation and discussion of the findings by comparing with the existing literature. Chapter five has summary and conclusion of the study and put recommendation from the findings.

CHAPTER TWO

RELATED LITERATURE REVIEW

2.1. Introduction

This chapter provides the summary of related literature reviewed on theoretical, empirical literature review and accordingly conceptual frame is developed.

2.2. Theoretical literature review

2.1.1. Epidemiology of HIV/AIDS

Over 35 years after it discovers, human immunodeficiency virus (HIV) is still a major public health threat. After coming to attention in 1985, the HIV pandemics has infected 77.3 million (59.9 million- 100million) people, and 35.4 million (25million to 49.9 million) people have already died from AIDs-related illnesses since start of epidemic (*Granich et al,* 2017). Even the challenges continued to developed countries also, for example, according to CDC's recent estimates suggest that about 38,000 new infections occur each year and that 1.1 million persons in USA are now living with HIV. Of these, an estimated 15%, or 1 of 7 persons, remain unaware of their infection (CDC, no date, p.3).

The disease is also the threat to developed countries. But still is the burden for developing countries. There are more than half of the people living with HIV and nearly half of newly infected globally in 2017 were in Eastern and Southern Africa (UNAIDS, 2018). South Africa has the highest number of people living with HIV in the world, with half of all new HIV infections in the country concentrated in 19 municipalities (UNDP, 2017).

In Ethiopia, HIV infections were first found in 1984. At the end of 1999, an estimated 3 million people were infected with HIV virus, making this the largest infected population worldwide after South Africa and India, and an estimated 380, 000 people had died of AIDS (Kloos, Helmut, 2001). Ethiopia has been taking different interventions to tackle HIV/AIDS. Now, Ethiopia is a country in low HIV prevalence rate. According to 2016 EDHS estimate, adult HIV prevalence in Ethiopia is estimated to be 0.9%, decreased between 2011 and 2016 from 1.5%. There is a substantial prevalence variation by region (4.8% in Gambella, 3.4% Addis Ababa, 0.7% Oromia and 0.1% Ethio-Somali). The HIV prevalence in Ethiopia is primarily associated with areas of urban

concentrating and proximity to major transport corridors. According to 2016 EDHS, among men and women combined, HIV prevalence is seven times higher in urban areas than in rural areas (2.9 Vs 0.4%). Participating in HIV testing is slightly lower in the 2016 EDHS to than in the 2011(EDHS, 2016). And also, the 2017 HIV estimates in our country, Ethiopia, indicates that there are 15,000 deaths, 16,000 new infections, and 610,000 adults and children living with HIV. Only 73% of people know their HIV status (UNAIDS, 2018).

2.1.2. Strategies to end AIDS epidemic

The world is embarking on a Fast-Track strategy to end AIDS epidemic by 2030. To achieve this, the concept of three 90s (90-90-90) was developed that by 2020, 90% of people who are HIV infected will be diagnosed, 90% of people who are diagnosed will be on Antiretroviral treatment and 90% of those who received ART will be virally suppresses. The strategy is an attempt to get the HIV epidemic under control and is based on the principal "Universal testing and treating". Before this strategy, ART treatment was initiated based on CD4 and WHO clinical stage. This test and treat approaches identify people early on in their infection, and start treatment so they become virally suppressed, the onward transmission of HIV will be prevented, and this will impact on HIV incidence at population level. The strategy will have a benefit of averting 21 million AIDS-related deaths and 28 million new infection by 2030 (UNAIDS, 2014, WHO, 2016).

A major gap in the HIV care continues occurs at the very beginning, with the diagnosis of HIV infection, which serves as the gateway to HIV treatment for those who test positive. Not only does a late HIV diagnosis increase the risk of illness, disability, and death, but evidence suggests that undiagnosed HIV infection contributes disproportionately to the number of new infections. Thus, the 1st 90 strategy addresses HIV testing. The availability of a new and easy self-testing option that specifically responds to the documented preferences of many people at risk of HIV infection is part of the solution to ending AIDS as a major public health problem. It can substantially increase the proportion of PLHIV who know their HIV status (the first 90 of the 90–90–90 targets), sharply lower the rates of late HIV diagnosis, alleviate stigma and discrimination, bolster HIV prevention efforts, and contribute toward an increase in the proportion of PLHIV who achieve viral suppression(IAPAC, 2017).

To meet this goal, Ethiopia developed strategic plan from 2015 -2020 (FHAPCO, 2014). Global Fund donates 99% for HIV-Rapid test kits procurement and PEFPAR 1% though host country's contribution is unknown. PEFPAR provides nearly 100% of non-comedized HIV donor assistance in Ethiopia. PEFPAR has been support the government by targeting most at risk populations in twenty HIV hot spot towns. Of which tens town are in Oromia region (PEFPAR, 2018).

To achieve this plan the sustainable supply of HIV related commodities including test kits, is critical issue and good supply chain system should be ensured. The ultimate goal of every public health logistic system is to help ensure that every customer has commodity security. Commodity security exists when every person is able to obtain and use quality essential health supplies whenever he or she needs them. Health program cannot succeed unless the supply chain delivers a reliable, continuous supply of health commodities to its customers (FMOH, FHAPCO, 2007).

2.1.3. Pharmaceutical Supply Chain Management in Ethiopia

Supply chain management includes the logistics activities plus the coordination and collaboration of staff, levels, and functions, with the ultimate goal of aligning supply and demand. A public health supply chain is a network of interconnected organizations or actors that ensures the availability of health commodities to the people who need them (JSI, 2017).

According to supply chain council, there are five attributes of supply chain performance. Supply chain reliability: the performance of the supply chain in delivering the correct product to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation. Supply chain responsiveness is the speed at which supply chain provides products to the customer. Flexibility is the agility of a supply chain in responding to market place changes to gain or maintain competitive advantage. A supply chain cost is associated with operating supply chain. Finally, asset management if the effectiveness of an organization in managing assets to support demand satisfaction. This includes the management of the both assets: fixed and working capital as quoted by Natnael (Natnael, 2016).

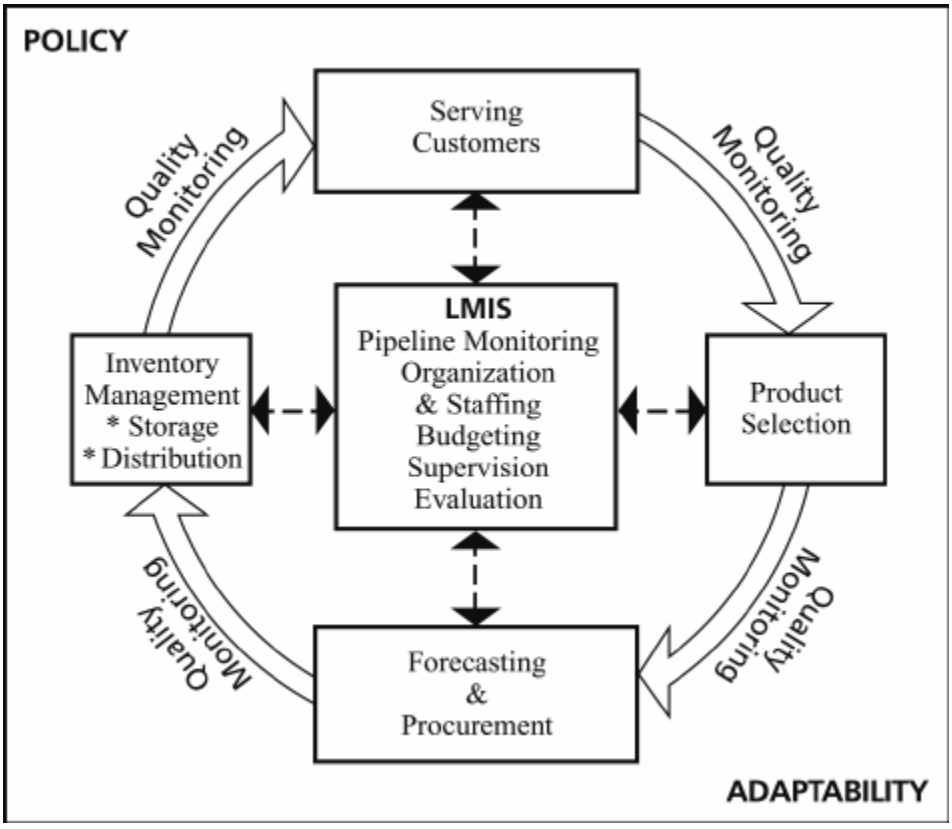
Ethiopia, in the past, the pharmaceutical supply Chain management system of the country had several problems including non-availability, unaffordability, poor storage and stock management and irrational use. To solve these problems in public health facilities, Pharmaceuticals Fund and Supply Agency (PFSA) was established in 2007 by Proclamation No. 553/2007. The Agency is mandated to avail affordable and quality pharmaceuticals sustainably to all public health facilities

and ensure their rational use. So as to execute its mandate in the area of pharmaceuticals supply in an efficient and effective manner, integrated pharmaceuticals logistics system (IPLS) was developed and it is under implementation currently (PFSA, 2013).

IPLS aims to ensure that patients always get pharmaceuticals they need. To be successful, the system must fulfill the six rights of supply chain management by ensuring the right products, in the right quantity, of the right quality, at the right place, at the right time and for the right cost in that the system is reliable, responsive and flexible. The IPLS integrates the management of essential pharmaceuticals including the following pharmaceuticals that were used to be managed vertically: HIV/AIDS, Malaria, TB and Leprosy, EPI, MCH and purchased essential drugs (PFSA, 2013).

Ethiopia developed the pharmaceutical supply management cycle in which includes five basic functions.

Figure-1. Pharmaceutical Supply Management Cycle



Source: JSI, USAID|DELIVER PROJECT, 2011

2.1.3.1.Selection

Products selected for use will impact the logistics system, so the logistics requirements must be considered during the product selection. Selection of medicines involves reviewing the prevalent health problems, identifying treatments of choice, and deciding which medicines and supplies will be available at our hospitals or health centers. Selection helps to have limited medicines list which has enormous advantage in supply chain management of medicines (JSI, 2011, PFSA, 2016). This includes easier procurement, lower amount of stocks, improved quality assurance and easier dispensing among others. In Ethiopia, all health facilities expected to develop their facility specific medicines list (PFSA, 2016).

2.1.3.2.Quantification

After products have been selected, the required quantity and cost of each product must be determined. Quantification is the process of estimating the quantity and cost of the products required for a specific health program (or service), and, to ensure an uninterrupted supply for the program, determining when the products should be procured and distributed (JSI,2011). Quantification, a critical supply chain management activity, links information on medicines demand from the health facility level with program policies and plans at the national level to estimate the quantities and costs of the medicines required for a health program. Quantification is important for informing supply chain decisions for financing, procurement, and delivery. It is not a one-time exercise; it should be exercised in a regular manner depending on the medicines to be determined.

Health facilities are required to forecast their need (estimating the quantity and cost of each product that will be dispensed or used for the next year) and adjust their expected budget for revolving drug fund (PFSA, 2016).

Program pharmaceutical quantification is managed in centralized way. Plan for quantification is first discussed and Technical Working Group (TWG) is established. The TWG is composed of experts from government and non- government stakeholders. Then the teams will start working on preparatory phase and work throughout forecasting and supply planning phase as well. Program pharmaceutical quantification is managed in centralized way. This includes programs like ART/HIV test kits, TB, FP, Malaria and Vaccines. Though quantification is done centrally, health

facilities are the main source of data. Therefore, health facilities should maintain and provide quality data that can be used as an input for more accurate forecast outputs (PFSA,2013).

2.1.3.3. Procurement

After a supply plan has been developed as part of the quantification process, quantities of products must be procured. Health systems or programs can procure from international, regional, or local sources of supply; or they can use a procurement agent for this logistics activity. In any case, procurement should follow a set of specific procedures that ensure an open and transparent process that supports the six rights (JSI, 2011). Program drugs procured by PFSA centrally and distribute for facilities based on their needs. Health facilities should procure budget drugs preferentially through PFSA, products which are not found at PFSA can be procured from private suppliers using stock out certificate (PFSA, 2013).

2.1.3.4. Inventory Management

The decision to hold inventory provides organizations with a means to balance supply and demand. The purpose of an inventory control system is to inform personnel when and how much of a medicine to order and to maintain an appropriate stock level to meet the needs of patients. A well designed and well operated inventory control system helps to prevent shortages, oversupply, and expiry of medicines (JSI, 2017).

2.1.3.5.Storage condition

The drugs must be handled in a structured way to ensure that it will be protected from harmful environmental conditions or handling and is available, accessible, and in good condition while posing no risk of injury to workers. To meet this requirement a combination of interventions requiring both physical infrastructure and structured procedures must be maintained. About thirteen general storage guidelines were developed for pharmaceuticals (JSI, 2017, PFSA, 2013).

2.1.3.6. Distribution

After the drugs procure it transported to the system. In Ethiopia, PFSA is mandated to delivery program drugs including HIV Rapid Test kits up to health facilities based on their requisites. But the facilities expected to collect by his vehicle upon procuring budget drugs.

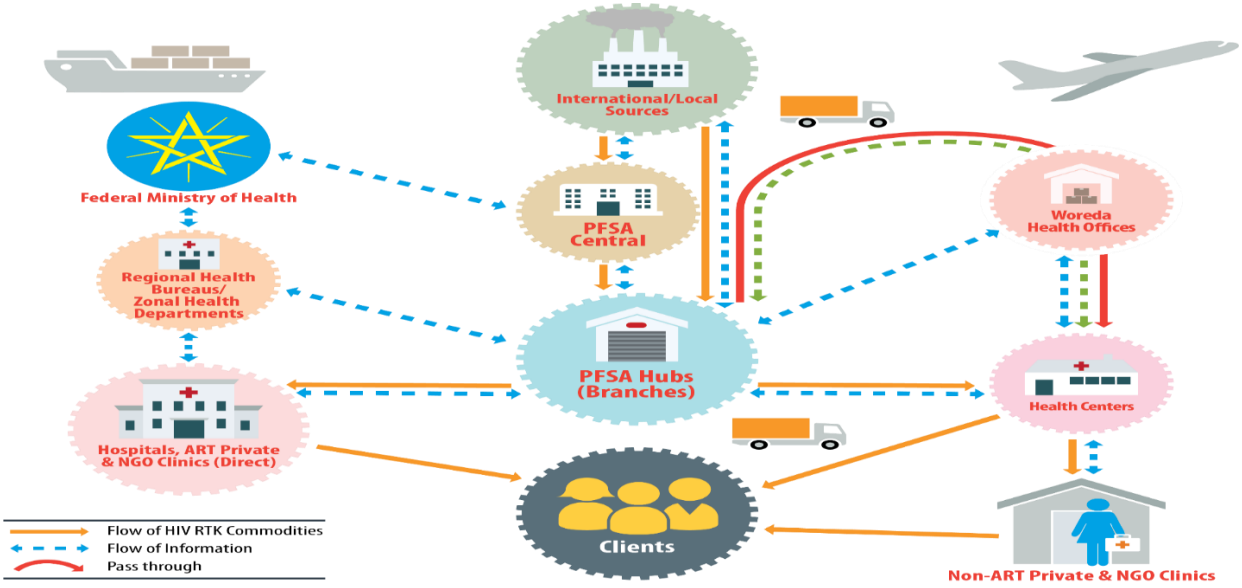
The pharmaceuticals used by a facility should be stored in the pharmacy storeroom. When pharmaceuticals are issued from the storeroom to dispensing unit (DU), the dispensing unit staff will provide essential logistics data on the Internal Facility Report and Resupply Form (IFRR) (PFSA, 2013).

2.1.3.7. Logistics Management Information System (LMIS)

An LMIS collects data about the supply and demand for commodities and these are most often used for routine operations, such as ordering and replenishing supplies for health facilities. Logistics data are used for making informed decisions about activities within the logistics cycle (JSI,2017). The purpose of a Logistics Management Information System (LMIS) is to collect, organize, and report information to other levels in the system in order to make decisions that govern the logistics system and ensure that all six rights. A well-designed logistics management information system will include records and forms that collect and report the three essential data items (stock on hand, consumption and loss/adjustment) as they relate to store in inventory, moved between facilities, and used to provide health services to patients (PFSA, 2013).

Oromia region also follows the IPLS system for quantification, procurement, distribution and storage.

Figure-2. Flow of Information and Flow HIV RTK commodities in IPLS



Source: FHAPCO, PFSA, FMOH (2018). Supplementary Standard Operating Procedure Manual for HIV RTKs Logistics system.

2.2. Empirical Review

2.2.1. Professionals working at pharmaceutical SCM and their capacity building

Health work force, specifically pharmacy professionals are one of cores necessary in pharmaceutical supply chain management implementation at all levels. The study done at inventory management in health facilities of Ghana indicates that 61% inventory managers are professionals, and 94.4% are trained in health commodity management (Annor, 2012). In health facilities of Metropole, South Africa, ARV drugs managed by pharmacist and Post Basic Pharmacists' Assistant (Alice,2013). But the study in Lesotho, in 2007, there were a severe shortage of pharmacists and pharmacy technician (Pharasi B., 2007).

The survey of IPLS in Ethiopia, 2014, shows that 87% pharmacy personnel received training on how to order quantities (PFSA, 2015). The study in East Wollega, Oromia region indicates that only 60.7% facilities had pharmacy professionals working at pharmacy units, of which 75.8% had received IPLS training (Kefyalewu and Taddesse, 2018). The assessment in Addis Ababa, Ethiopia, in 2014, also shows that 72.7% of health facilities' staff working on pharmacy units were trained IPLS, and 51.5% of facilities' pharmacy trained laboratory commodity management (Tilahun*et al*, 2016). Similar study in same year in Addis Ababa implies that 78.9% of store managers in health centers and 75% in hospitals had on job training on IPLS (Eyurasalem, 2014).

2.2.2. Inventory management

In Ghana, only 25% of inventory managers update their stock weekly, while 43.75% quarterly. 47.64% of inventory managers use economic order quantity to keep optimal level of inventory (Annor, 2012).

The study at public health facilities of Metropole in South Africa indicates only 6.7% of them weekly, and 66.7% stock taking monthly. The average total percentage of variation between stock cards and physical counts for ARV products are 51.7% (Alice, 2013).

2.2.3. Logistic Management information system (LMIS)

The assessment conducted by Alice, in South Africa, only 32.9% of health facilities in Metropole updating stock cards monthly with 21.9% record keeping accuracy (Alice, 2013). In health facilities of Tanzania, 56.4% use ledgers and 17.9% use stock cards for keeping track of laboratory reagents and supplies. Hence, majority of laboratory information system was not integrated within Integrated Logistics System; the laboratories missed important information to support decisions in

determining orders or procurement quantity, forecasting, or monitoring system performance (Gibson*et al*, 2018). In Lesotho, 53% facilities had stock cards to keep track reagents, and only 17% had stock status reporting forms. But none of the laboratories assessed had stock exchange forms (Pharasi B., 2007). The study in Ghana, by Annor, indicates that 73.9% of inventory managers issued commodities by approved requisition in Ghana (Annor, 2012).

According to the study done in 2014, in Addis Ababa, only % 61.5% of facilities used and updated bin card, and only 57.7% of facilities used bin card for KHB but 19% updated, 12.1% used and 11.5% of facilities updated for DBS kit (Tilahun*et al*, 2016). Similar study also indicates that 52.6% of health centers and 50% hospitals had bin card for selected HIV test kits (Eyurasalem, 2014). The survey of IPLS in Ethiopia, 2014, 60% of facilities updated bin card for selected products (PFSA, 2015).

The study done by Tilahun in 2014 indicates that 84.6 and 82.3% of health facilities completed and reported IFRR and RRF in Addis Ababa. The discrepancy in ending balance record between RRF data and bin card record was seen in 60% of health facilities (Tilahun*et al*, 2016). While in East Wollega, 97% of facilities report RRF with 64.6% accurate (Kefyalewu and Taddesse, 2018). The survey of IPLS also indicates that completeness of RRF was found to be good; while the exact accuracy was in average 46% (PFSA, 2015).

2.2.4. Distribution

The study done in Lesotho indicates that there is push system of distribution is used in the vertical medicine supply chain for the specific commodities, which are mostly HIV/AIDS related which Ethiopia has did on the last two years on HIV Rapid Test kits. On the other hand, a pull system of distribution is used for general medicines (Pharasi, B. 2007).

The study done by Annor in 2012, 66.7% of health facilities in Ghana, receive their commodities between 2 to 4 weeks after an order is placed, and 27.8% of them receive in less than a week (Annor, 2012). 60% of health facilities in South Africa, fully supplied in their last order placed, in which 66.7%, 6.7%, 13.3% and 13.3% of them received within three, one, two and seven days after order placed respectively, unlike that of Ghana (Alice,2013).

The assessment done on SCM of ART drugs in public health facilities in Eastern Ethiopia, 2014, indicates 60% facilities were received sometimes and 30% of them received always all quantities of ARV drugs that they ordered (Tesfaye and Tadesse, 2017). 80% of health centers and hospitals received products within one month or less (PFSA, 2015).

2.2.5. Storage

The study done by Pharasi in Lesotho found that lack of temperature control poses a serious threat to the stability of some medicines. The stores are equipped with shelves and, in some facilities, pallets. Seventy-five percent of facilities still store supplies on the floor and 33%of facilities failed to adhere a general standard storage guideline for storage (Pharasi, B. 2007). None of the health facilities in Metropole, South Africa adhere to FEFO for ARV at day of visit and 80% of them met standard storage guideline (Alice, 2013).

The study done by Tesfaye and Tadesse, shows that only 50% of health facilities in Eastern Ethiopia had sufficient storage space for existing ARV products, and only 70% of ARV products stored at the appropriate temperature (Tesfaye and Tadesse, 2017). The other assessment done on LMIS in Eastern Ethiopia, 2015, indicates that 55% of facilities met at least 80% the storage criteria (Daniel T, 2015). Similarly, the study done in Addis Ababa shows that 54.4% of facilities had sufficientstoreroom for existing products (Tilahun*et al*, 2016). The study conducted in Addis Ababa, 2013, indicates that though mean storage condition was 71.8%, the size of stores in most of the HCs was not adequate which leads to stacking of products one over the other, and make FEFO arrangement, easy picking of products and cleaning difficult (Mezid M., 2014). The survey of IPLS in Ethiopia results shows that 55% of facilities met at least 80% of storage criteria (PFSA, 2015).

2.2.6. Customer Service

In his study, Annor found also that, 77.7% of health facilities in Ghana, experienced stockout before the study, and 22.2% have never experienced stockout. To solve stockout, 34.8% of health facilities in Ghana placed an emergency order while 26.1% of inventory managers borrow from other health facilities (Annor, 2012). However, in South Africa, only 6.1% of logistics tools have stockout information and at the day of visit no stock out observed at health facilities. Health facilities borrow from others in case of stockout like that of Ghana (Alice, 2013).

The study done in two districts of Tanzania, in 2011, shows that all respondents from the Clinics reported to have experienced stock-outs of rapid tests to diagnose HIV in the year preceding the study. The stock-outs lasted for an average of 5.6 weeks (range: 1 week - 3 months). At the time of the survey, one clinic had both HIV diagnostic tests in stock, while (42%) and (25%) Care and treatment centers did not have Bioline or Determine, respectively (Daniel *et al*, 2015). But at the study on laboratory commodity SCM in eight districts, in 2013 in the same country, there is an

improvement of HIV test kits availability. The assessment shows that the stock out of the first (Determine) and the 2nd (Unigold) HIV test kit were 28.2% while the 3rd (SD Bioline) test was only 5.1%. And, 66.7% of health facilities reported to have made at least one emergency order within 12 months before the study (Gibson*et al*, 2018).

The assessment done by Tilahun, in 2014, found that 29.2% and 33.3% of health facilities in Addis Ababa were stock out KHB while 56.3% and 60% of facilities were stock out of DBS kit at day of visit and any time in the last 6 months respectively (Tilahun*et al*, 2016). The assessment in the same city, only 36.8% of health facilities was fully stocked, others were stock out of one or more selected HIV test kits. Six months preceding to the study, 70% of health centers and 50% of hospitals stopped VCT service due to lack of adequate supply. They only doing for emergence cases or PMTCT purpose at the time of shortage (Eyurasalem, 2014).

According to the national IPLS survey, 68% of hospitals and 43% of health centers place at least one emergency order in the 3 months preceding the survey (PFSA, 2015). 75% of health centers had one or more and all hospitals placed more than three times an emergency order of HIV test kits in the past 6 months (Eyurasalem, 2014).

The assessment done on patient level of satisfaction at Mwananyamala hospital in Dares Salaam, Tanzania, indicates that client satisfaction on quality of care is only 53% in which one of the tangible reasons was lack of essential drugs in hospital (Kudra&Bernand, 2014). Similar study in public health facilities of Nigeria shows that 33% of patient dissatisfied due to non-availability of drugs in facilities (Ogbeyi, Adekwu and Amede , 2018). The frequently reported trends of stockout of HIV test kits in Tanzania is likely to compromise patient's access to HIV testing services causing a barrier in implementation of HIV/AIDS care and program in the country (Gibson*et al*, 2018).

The assessment done at Jimma Hospital in 1999, indicates that one of the most frequently faced problems affecting utilization on the day of visit leading to dissatisfaction is failure to obtain prescribed medications (only 33.3% secured) from hospital pharmacy (Lemessa and Solomon, 2001). The similar study done at Jimma Hospital, 2010, also shows that one of the factors for dissatisfaction was lack of medicine (only 30% obtained) from hospital pharmacy which is same result with study conducted before ten years (Fekadu *et al*, 2011). At Yekatit 12 hospital medical college, one of the most frequent identified problems was lack of adequate drugs and supplies (Tirhas*et al*, 2018).

2.2.7. Challenges of pharmaceutical supply chain management

The study done in Cross River State, Nigeria, identified that several reasons were given for the inability of the supply system in successful management of ART and laboratory commodities. Main reasons are products forecasted on the basis of targets such as prevalence rate will result in over estimation of commodity requirements and subsequent cases of expiry when consumption is constant; poor cold or cool chain system; poor inventory management usually from wrong forecasting and quantification, multiple source of commodities supply. Using FEFO may not properly work in the absence of forecasting, selection, and storage in the midst of unpredictable consumption by stigma-stricken people living with HIV/AIDS. And, instability in a sector: health sector conflicts and industrial strike actions contributes to reasons why health care workers neglect their duty and subsequent drug management systems (Samson *et al*, 2017).

The study in East Wollega, identified challenges of influencing pharmacy activities as the shortage of pharmacy professionals levied burden on the available staff. Low staff commitment because of poor infrastructure, job dissatisfaction, lack of technologies, and inadequate incentives particularly a limited opportunity for further education discouraged the workers not to execute their task properly. In majority of health facilities, top level-managers were not considering LMIS as a basic pharmacy service. And, poor communication between the health facilities and PFSA was among the challenges that affect logistics management information system (Kefyalewu and Taddesse, 2018).

The assessment done in Addis Ababa in 2014 indicates that lack of standard inventory control practice for reagents, erratic distribution practices for HIV lab reagents, multi-tier distribution system and long distribution channel for TB and RTK laboratory reagent, and the resulting frequent stock out remains cause of poor product availability (Tilahun*et al*, 2016).

2.2.7. Monitoring and evaluation

Most of the facilities are receiving supportive supervision from higher levels (PFSA, 2015). In Addis Ababa, 79.25% of health centers reported to have had supervision on the pharmaceutical logistics quarterly (Mezid M., 2014). The study result in Eastern Ethiopia shows 86% of facilities received supportive supervision quarterly (Daneil T, 2015).

2.2.8. Supply chain management performance

According to Githew, has led to faster supply chain response time and few respondents agreed that accurate fulfillment of orders. There is also good line item fill rate (Githew, 2014). The study done on Moha Soft drinks in Addis Ababa indicates that firm's supply chain performance is moderately good (Natnael, 2016).

2.2.8. HIV Rapid Test kits Supply Chain Management in Ethiopia

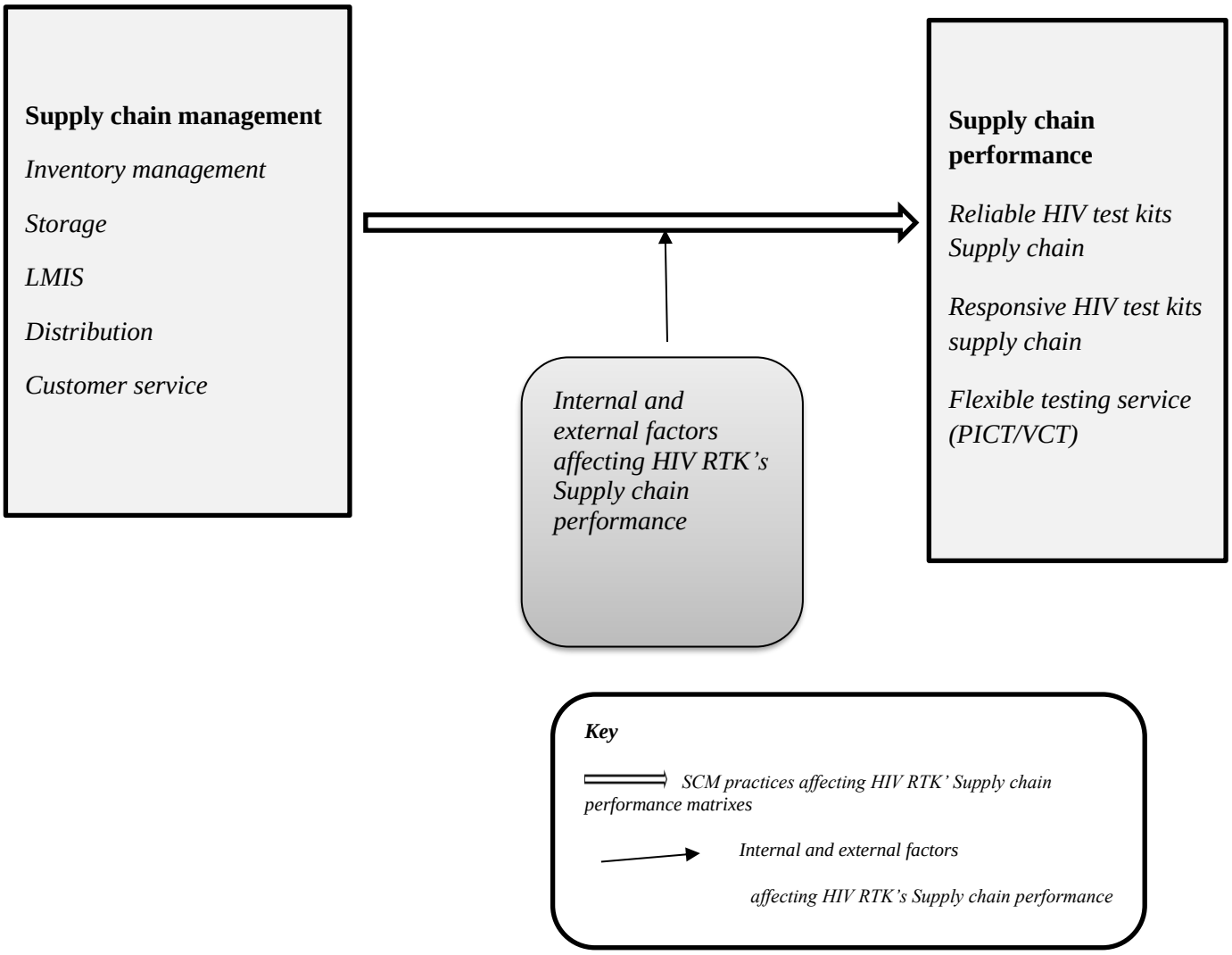
HIV rapid test kits is one the program drugs. It managed by IPLS in similar to other drugs. Selection of the testing algorithm will be done at central level unlike other products. Other than this, the quantification, procurement, transportation, distribution, inventory management, storage and LMIS activities are managed as to other pharmaceuticals.

Based on the consumption data and the targets of HIV testing, quantification has been done at central level though health facilities prepare and send for EPSA this purpose annually. Procurement also conducted by EPSA. EPSA central receive the kits, store and distribute for PSA branches based on the consumption or distribution plan sent based on the target, if any case, from regional health bureaus. The integrated pharmaceutical logistics system of the country implies that PSA distribute directly for health facilities or through pass woredas integrate with other program drugs.

However, in the past two years, due to algorithm shifts, HIV Rapid test was distributed by quota system, not by LMIS, through zonal health departments. Due to this and other reasons, there was shortage and low HIV testing in country as well as Oromia region (FMOH, 2017).

2.3. Conceptual Framework of the study

Figure 3. Conceptual framework for the study



Source: Modified from JSI, USAID|DELIVER PROJECT, 2011, & Supply chain council as quoted by Natnael, 2016

Pharmaceutical supply chain management elements include selection, forecasting and procurement, inventory management, storage, distribution and service customers at a top, and having in the heart LMIS, pipeline monitoring, organization, staffing, supervision and evaluation (JSI, USAID|DELIVER PROJECT, 2011). However, according to guideline of IPLS in Ethiopia, program drugs selected, forecasted, procured, distributed, and transported by PFSA (PFSA, 2013). In similarly, selection of these HIV Rapid test kits has been conducted by EPHI and FMOH. Hence, selection, procurement, and transportation components of supply chain management of HIV Rapid test kits was not assessed mainly.

According to supply chain council, supply chain attributes presents five attributes supply chain performance are: supply chain reliability, responsiveness, flexibility, costs and asset management as quoted by Natnael (Natnael, 2016). However, this study doesn't include cost and asset management attributes as HIV test kits is program health products.

CHAPTER THREE

METHODS OF STUDY

3.1. Introduction

This chapter deal with description of the study area, research approach, research design, population and sample, data sources and types, data collection procedures, ethical consideration, data analysis, validity and reliability of the study.

3.2. Description of the Study Area

Oromia is the largest region in Ethiopia having 20 Zones, 19 town health Administrations, 81 functional 81 Hospitals, 1375 Health centers and 6647 Health post. There are 410, public health 1456 facilities providing ART, PMTCT and HIV testing (VCT) respectively. According to 2016 EDHS, the HIV prevalence of the region is 0.7% and only 15% of male and female only tested HIV in last 12 months before the survey conducted (EDHS, 2016). In 2009 EFY, 2, 693, 661 (only 58% from budget year plan) persons were tested HIV and received their results in Oromia. While 13, 783 persons were positive (0.5% positivity). There is the decrease (7%) from last year but increase in positivity due to shortage/poor distribution of HIV rapid Test kits (FMOH, 2017).

All program drugs including HIV/AIDS has been managed by IPLS and PFSA is the sole supplier. But unlike the long years back, in the past two years HIV Rapid test kits has been distributing based on the quota system the region makes break downs for zonal health departments and town health administrations. There are eight PFSA branches serving health facilities of Oromia region. Oromia regional health bureau also developed its pharmaceutical supply chain management and pharmacy services monitoring and evaluation to ensure product availability and rational use. In this PSCM &PS M&E, HIV Rapid test kits is also one of tracer drug availability monitored quarterly by health facilities though this monitoring and evaluation implementation is low.

Global Fund and PEFPAR are the major donors of Ethiopia on HIV/AIDS prevention and control (PEFPAR, 2018). PEFPAR selected twenty HIV hot spot towns (ten in Oromia) to support by considering that most-at-risk populations are concentrated, to work on them in ending HIV/AIDS by 2030. There are 44 public health facilities in these towns. Oromia health bureau has been monitoring 29 public, 3 private and 3 NGO priority health facilities to achieve three 90s. Regular

supportive supervision of SCM of HIV/AIDS has been provided for these 35 facilities in collaboration with stake holders.

3.3. Study Approach

The study used both qualitative and quantitative approaches. Specifically, quantitative approach was used more to assess the current supply chain management of HIV rapid test kits by using standard logistics indicators modified from Logistics Indicator Assessment tool(USAID | DELIVER PROJECT, Task Order 1, (2009) while qualitative approach was used to support quantitative findings, especially the reasons on LMIS data quality by interviewing the staff working at health facilities' program drug store mans and through observations.

3.4. Study Design

This study is descriptive and causal study design, employing cross sectional data and using quantitative and qualitative data collection techniques to gather the required data at certain point in time from March 5, 2019 to April 19, 2019.

3.5. Study population

All public health centers and hospitals providing HIV testing services in ten towns selected by PEPFAR in Oromia region was sources. There are 44 public health facilities serving populations in these towns which are located at major transport corridors, having high industrial areas and most commercial works and that expected populations most at risk concentrated in Oromia region. From these, 5 are University Hospitals (Jimma University Specialized Hospital, Assela Hospital, Ambo University Hospital, Goba Hospital, and Wollega University Hospital). While there are 8 hospitals and 31 health centers owned by Oromia regional health bureau. Of 44, ORHB selected 29 facilities (9 hospitals and 20health centers) to monitoring their performance and has been supporting on SCM of HIV/AIDS commodities regularly.

3.6. Sources of Data

The sources of data for the study was health facility records, reports, and staffs working at pharmacy program store, pharmacy head, laboratory head, HTS/VCT focal person, and PMTCT focal person in each health facilities.

3.7. Sample Size determination

Sample size determined as per the basis of LIAT for Antiretroviral drugs (USAID|DELIVER PROJECT, Task Order 1, 2009) which recommended a minimum of 15% sample size. But ensuring stratification by type of facilities, location, patient load and performances. For this study, all health facilities categorized under their towns (strata). From each town, type of facility (hospital and health center), and PEPFAR and non-PEPFAR site included for comparison purpose. Hence, according to the following table by using extreme or deviant case sampling a total of 25 health facilities was selected for this study. Once the sample size per towns determined, individual facilities was selected using lottery method during data collection.

Health professionals included in this study was selected purposely those working directly on HIV Rapid test kits SCM, and those that are assigned to supervise, monitor and report HIV testing services and other working on mother and children health which are top priority health programs. 5 relevant staffs at each facility: pharmacy program store, pharmacy head, HTS/VCT focal person, and PMTCT focal person working at each facility were included. Thus, data planned to be collected from a total of 125 staffs using structured questionnaire (schedule) from sample health facilities.

Table 1: Health Facilities Sampling and summary

s.no	Town	Number of Public HFs available		HFs monitoring by ORHB		**Selected HFs for this study**				Total selected HFs for this study
						From HFs monitoring by ORHB		From HFs non-monitoring		
		Health centers	Hospitals	Health centers	Hospitals	Health centers	Hospitals	Health centers	Hospitals	
1	Adama	7	1	4	1	2	1	1	0	**4**
2	Ambo	2	2	1	1	1	1	1	0	**3**
3	Asela	2	1	1	1	0	1	1	0	**2**
4	Bishoftu	5	1	3	1	1	1	1	0	**3**
5	Goba	1	1	0	1	0	1	1	0	**2**
6	Jimma	4	2	3	1	1	1	1	0	**3**
7	Modjo	2	1	2	0	1	0	0	1	**2**
8	Nekemte	2	2	2	1	1	0	0	1	**2**

9	Shashemenne	4	2	2	2	1	1	1	0	**3**
10	Woliso	2	0	2	0	1	0	0	0	**1**
Total		31	13	20	9	9	7	7	2	**25**

3.8. Data collection methodology

Data was collected through questionnaire, reviewing record and report, physical observation and interviewing respondents.

3.9. Data collection instrument

A combined structured questionnaire(schedule) and observation checklist was used to collect data on receiving, storage, distribution, transfer, bi-monthly report, bin-card, internal facility reports, daily testing registration and questionnaire checklist used to seek the reasons.

3.10. Data analysis method

The collected data was checked for completeness manually. The quantitative data entered and analyzed by using excel and SPSS version 23. The descriptive summary statics used to describe a set of data in terms of its frequency of occurrence, its central tendency. Reliability test examined through employing inferential statistics. The indicators related to SCM performance of HIV Rapid Test kits was calculated and discussed with standard expected on this.

Qualitative data analyzed in its thematic areas to describe the reasons and challenges responded from staffs. The qualitative results discussed in relation to the quantitative results.

3.11. Validity and Reliability

The content validity of data collection tool checked by supply chain management experts of Oromia regional health bureau. Prior to data collection, data collection tool was pretested at Modjo Health center. During observation sample bin cards, reports and products were seen.

The reliability test of customer service and supply chain management performance matrixes: reliability, responsiveness and agility greater than Cronbach's alpha 0.7 which is acceptable according to Cronbach and Shavelson (Cronbach and Shavelson, 2004).

Table 2: Reliability test

Variables	Number of variables	Reliability
Supply chain management element		
Customer service	4	0.726
Total	4	0.726
Supply chain management performance		
Reliability	4	0.703
Responsiveness	3	0.701
Agility	4	0.728
Total	11	0.835

Source: (Survey data, 2023)

3.12. Research Ethics

Prior to launching the survey, ethical committee of Public Health Emergency Management and Health Research Directorate at the Oromia RHB was informed about the study. The region wrote letter for ten towns and promised me by signature to submit one copy of final paper. During data collection, data collectors was told the respondent the purpose, scope, and expected outcome of the study. Any respondent not interested in participating in the survey could decline; during the interview, if the respondent does not want to answer specific questions or discontinue the interview, they could. All data was anonymous; no individual or facility was identified in any reports or any publication based on this study.

CHAPTER FOUR

RESULTS, DISCUSSION INTREPRETATION

4.1. Introduction

This chapter covers the findings of the study, interpretation and discussion of the findings by comparing with the existing literature.

4.2.Response rate, general information of health facilities and HIV Testing services

4.2.1. Response rate

A total of 125 questionnaire planned to distribute at 25 health facilities. But 1 facility was not accepted the questionnaire due to the security issue at the time of data collection in the town. In 24 health facilities 120 questionnaire distributed for staffs and 118 (94.4%) responded. The four respondents working as HTS/VCT and PMTCT focal persons were those working in other departments (ART, delivery and family planning).

Table-3: Response rate

s.no	name of departments	number of questionnaires distributed	number of questionnaires collected	number of questionnaire uncollected
1	Pharmacy heads	24	24	0
2	Pharmacy store mans	24	24	0
3	HTS/VCT focal persons	24	22	0
4	PMTCT focal persons	24	24	2
5	Laboratory heads	24	24	0
	Total	120	118	2

Source: (Survey data, 2023)

Data was collected from 15 PEPFAR (monitoring site by ORHB) and 9 non-PEPFAR health facilities. From a total of these 24 (96%) facilities assessed, 8 were hospitals while the rest 16 were health centers.

4.2.2. General information of health facilities and HIV Testing services

Table-4: General information of health facilities and HIV Testing services

HIV counseling and testing services given in this facility	frequency	percent
Less than 2 years	5	20.80
2-5 years	3	12.50
5-10 years	6	25.00

Above 10 years	10	41.70
HIV Testing Algorithm used in facility	**frequency**	**percent**
For screening-Stat pack	24	100.00
For confirmatory- Abon	24	100.00
For tiebreaker-SD Bioline	24	100.00
other (Wantai Beijng algorithm)	1	4.17
Type of HIV Testing service given in the facility	**frequency**	**percent**
PICT	24	100.00
PMTCT	20	83.33
VCT	23	95.83
Campaign	6	25.00
Other (index, PNS)	1	4.17
HIV Testing provided in the facility at departments	**frequency**	**percent**
Outpatient case teams	24	100.00
TB clinic	24	100.00
Inpatient wards	8	33.33
VCT room	24	100.00
ANC	24	100.00
Laboratory	6	25.00
other (youth friendly service (YFS))	2	8.33
Facility providing VCT services for all volunteers (other than MARPS)	23	95.83

Source: (Survey data, 2023)

From these health facilities 5 had been offering HIV counseling and testing services for less than 2 years, 10 facilities for 10 and above years and the others had been offering from 2 to 10 years. All health facilities were using HIV testing algorithm of Stat pack for screening (1st test), Abon for confirmatory (2nd test), and SD Bioline for tiebreaker (3rd test). However, one facility was using also the older algorithm: Wantai Beijing, Unigold and Vikia as 1st, 2nd and 3rd test respectively since the facility had few tests in stock before fully shifted to the new algorithm.

Except four health facilities in which PMTCT were not yet started, others were providing PMTCT service. HIV testing campaign were also done by 6 facilities. All the 24 health facilities were providing HIV testing of PICT and VCT services. 95.8% of facilities were giving HIV testing services for non-MARPS populations. Of total health facilities HIV testing services were given in outpatient cases, TB clinic, inpatient wards (only hospital), VCT and Antenatal Care rooms. In addition, 54% of facilities also test HIV at laboratory unit during night and weekends in supporting emergency room. Beside this, laboratory unit were checking quality of HIV rapid test kits during entry of new batches or products.

Table-5: Percentage of six months performance of HIV tests prior to assessment

Test performance	N	Minimum	Maximum	Mean	Std. Deviation
percentage of 6 months HTS performance	13	42	100	77.48	20.25
percentage of 6 months positive performance	15	9	158	71.14	37.20

Source: (Survey data, 2023)

The minimum of six months HIV testing performance were 42% while some facilities achieved a maximum of 100%, and HIV positive performance were 9% minimum and goes to maximum of 158% from their last 6 months' plan.

Table-6: Percentage of six months performance of HIV positive tests with site monitored

Type of Facility	percentage of 6 months HTS performance			
	N	Minimum	Maximum	Mean
PEPFAR	8	60.32	96.78	86.66
Non-PEPFAR	5	42	158	74.37

Source: (Survey data, 2023)

The performance of testing was high at PEPFAR sites with mean of 86.78 its minimum was 60.32% which was greater than non-PEPFAR sites having mean of 74.37. The testing performance were also higher at Hospital with minimum 83.76% and mean 85.13, and std. deviation 1.92, than that of health centers' performance which the minimum performance of 42% and mean 71.49, and std. deviation 23.62.

4.3. Demographic Profile of respondents

From a total 24 health facilities 118 staffs (94.4%) working on pharmacy head, VCT, PMTCT, laboratory and pharmacy store was responded.

Table-7: Profile of respondents working on pharmacy units

	pharmacy		store manager	
Gender	***frequency***	***%***	***frequency***	***%***
Male	12	50.00	13	54.17
Female	12	50.00	11	45.83
Total	24	100.00	24	100.00

Work experiences of respondent at current position				
Less than 2 years	4	16.67	9	37.50
2-5 years	6	25.00	13	54.17
5-10years	10	41.67	2	8.33
Above 10 years	4	16.67	0	0.00
Total	24	100.00	24	100.00
Profession of the respondent				
Pharmacy technician	1	4.17	1	4.17
Druggist	4	16.67	5	20.66
Pharmacist	19	79.17	17	70.83
Nurse	0	0.00	0	0.00
Other(health officer)	0	0.00	1	4.17
Total	24	100.00	24	100.00
Trainings taken by respondents				
Integrated Pharmaceutical Logistics System	22	91.67	19	79.17
Overview of Supply chain management	6	25.00		
Supply Chain Management M&E	3	12.50		
Laboratory Commodity Management	2	8.33		

Source: (Survey data, 2023)

In pharmaceutical supply chain management role of pharmacy professionals are core in its implementation, including SCM of HIV RTKs. In this assessment, all pharmacy heads (100%) at health facilities were pharmacy professionals and except one store manager, all store managers (95.3%) were also pharmacy professionals which is similar with that of health facilities of Metropole, South Africa (Alice, 2013). But higher than the study done East Wollega in which only 60.7% facilities had pharmacy professionals and study done in health facilities of Ghana that shows only 61% inventory managers were professionals (Annor, 2012). Male and female respondents were almost 1:1 ratio. Of the total pharmacy respondents, 27% have 1-2 years, 39.58% 2-5 years while 33.33 of them have 5-10 and above years' work experience at their position. This implies the workforces working on supply chain management of HIV RTK are pharmacy professional with an experience which can manage in good way for supply chain performances.

Integrated Pharmaceutical Logistics System (IPLS) is the basic training for supply management of pharmaceuticals in health facilities of Ethiopia. Of total health facilities assessed 91.6% Pharmacy heads and 71.9% of store managers trained IPLS which similar to the assessment conducted in Addis Ababa (72.7%), in 2014, (Tilahun*et al*, 2016), similar study in the same year indicates 78.9% and 75% of store managers trained IPLS in health centers and Hospitals respectively (Eyurasalem,

2014), and less similar to the assessment conducted in East Wollega (75.8% pharmacy trained IPLS) (Kefyalewu and Tadesse, 2018). But study done in health facilities of Ghana indicates that 94.4% of inventory managers trained health commodity management which is higher than pharmacy professionals working at store this assessment (71.9%). In addition, only 25%, 8%, 8% of pharmacy heads trained overview of supply chain management, SCM monitoring and Evaluation and Laboratory commodity management which is more less than the study done in East Wollega where 51.5% of facilities' pharmacy trained Laboratory commodity Management (Kefyalewu and Tadesse, 2018). Greater number of pharmacy professionals trained the basic training to manage the supply chain management into expected though still the other trainings should give them for better performance of SCM.

Table-8: Profile of respondents working on VCT, PMTCT and Laboratory departments

Gender	***frequency***	***%***
Male	33	47.14
Female	37	52.86
Total	70	100.00
Work experiences of respondent at current position		
Less than 2 years	14	20.00
2-5 years	15	21.43
5-10years	25	35.71
Above 10 years	16	22.86
Total	70	100.00
Working department of the respondent		
HIV focal person/VCT	20	28.57
PMTCT	22	31.43
Laboratory	24	34.29
Other(ART, delivery, Family planning)	4	5.71
Total	70	100.00

Source: (Survey data, 2023)

In these 24 health facilities assessed, 70 (97%) staffs working at testing points were responded; of which 20 were from VCT, 22 from PMTCT, 24 from Lab and 4 were from other units (ART, delivery and Family Planning units). Of these respondents, 33 were male and 37 females. Only 14 (20%) of respondents had less than 2 years of experience at their position while 58.7% had an experience above five years.

4.4. Workforce and Supportive supervision at pharmacy units

Total work force working at pharmacy units were 2 at nine non-PEPFAR health centers except one with 3 staffs and 3 at five PEPFAR health centers, except one with only 2 staffs without including cashiers, porters and pharmacy accountants. Hospitals had a minimum of 10 and maximum of 24 work force working at pharmacy units without including supportive staffs.

Table-9: Supportive supervision received in last 6 months preceding assessment

Supervision	Facility is types in tier and monitoring			
	PEPFAR (N=15)	Non-PEPFAR (N=9)	Health center (N=16)	Hospital (N=8)
Facility received Supportive supervision on SCM of HIV RTK in last 6 months	13	4	11	6
Percentage	86.67	44.44	68.75	75.00

Source: (Survey data, 2023)

A greater number of facilities assessed were received supportive supervision in last 6 months prior to assessment; of which (86.7%) of PEPFAR site supervised by ORHB, THA and partners while 44.4 of non-PEPFAR received supervision from THA. Half of them received every quarterly basis while 29. % supervision was irregular. This is study is almost similar with the study done in Addis Ababa (79.25%) (Mezid M., 2014). But the study results in Eastern Ethiopia shows 86% of facilities received supportive supervision quarterly (Daneil T, 2015) which much higher than the time interval this study found (50%).

4.5. HIV Rapid Test kits Inventory Management Practices at pharmacy unit

Of the total facilities assessed, 87.5% of them were conduct inventory auditing of HIV RTK in the store.

Table-10: Inventory auditing conducted and its frequency, and HIV RTK transferrin at facilities

Frequency inventory auditing conducted (N=24)	**Frequency**	**Percent**
monthly	6	25
every two months	2	8.3
quarterly	4	16.7

bi-annually	1	4.2
annually	7	29.2
Other	1	4.2
Total	21	87.5
Inventory auditing of HIV RTK conducted in the store	21	87.5
Facility transfer HIV RTK in last 6 months	8	33.33

Source: (Survey data, 2023)

Most of health facilities (87.5%) assessed was conducting inventory auditing of HIV RTK. They conducted monthly 5%, unlike that of health facilities in Metropole, South Africa which 66.7% stock taking monthly, 8.5% bi-monthly, 29.2% annually, and 16.7% quarterly.

Only 8 (33.3%) of facilities were transfer HIV RTK in or to other health facilities in last 6 months due to shortage, stock out or overstocked.

Table-10: Utilization of records of HIV RTK transaction at testing departments (VCT, PMTCT and Laboratory), and from where they are receiving HIV RTK

Table-11: Recording of transactions and issuing of HIV RTK by testing departments

Testing departments using HIV RTK record (N=70)	frequency	percent
Bin card used and updated	18	25.71
Tally sheet	17	24.29
HIV testing register	32	45.71
Receive HIV RTK from Pharmacy store	56	80.00
Receive HIV RTK from laboratory unit	2	2.86
Receive HIV RTK from other unit (ART, VCT)	3	4.29

Source: (SPSS,2023)

In the most of the facilities' VCT, PMTCT and Laboratory departments were using HIV testing registers (45.7%) for monitoring of HIV RTK transactions though the register has no place to record the supply parts they had notes when there is repeat and known status case occurred. Only 25.71% and 24.29% of them used and updated bincard, and tally sheets respectively. However, in the store, 73.9%, 69.6%, 73.9% and 56.5% of facilities used bin card for Stat pack, Abon, SD Bioline, and DBS kit respectively which is higher than that of facilities in Lesotho (53% used stock cards) (Pharasi B., 2007), and Tanzania (17.9% used stock cards)(Gibson*et al*, 2018). This results

also slightly higher than that of the facilities in Addis Ababa, in 2014, using bin card (52.6% of health centers and 50% of hospitals) (Eyurasalem, 2014). But much higher than that of other similar study done by Tilahun in Addis Ababa in similar year (19% update bin card for KHB, 11.5% for DBS kit) (Tilahun*et al*, 2016). Inventory management at pharmacy stores of health facilities were good which helps to decide how much and when to order HIV rapid test kits. However, the source of data for consumption is at testing departments that in this assessment transaction is poorly managed.

4.6. HIV Rapid Test kits storage

Storage guideline checklist was used to observe storage of HIV Rapid test kits and store in general. Twenty three's health facilities stores were observed.

Table-12: Storage guideline in the facilities at the day of visit

Storage condition (description)	Frequency	percent
Products are arranged on shelves with arrows pointing up, and with identification labels, expiry dates, and manufacturing dates clearly visible.	21	91.30
HIV Rapid test kits are stored and organized to FEFO procedures and are accessible for counting and general stock management.	21	91.30
Outer cartons are in good condition (not crushed, perforated, stained, or otherwise visibly damaged).	21	91.30
Damaged and expired products are separated from usable products in the storeroom, and procedures exist for removing them from inventory.	22	95.65
HIV Rapid test kits are stored in a dry, well-lit, well-ventilated storeroom. *(Visually inspect roof, walls, and floor of storeroom.)*	21	91.30
Cartons and products are protected from direct sunlight.	23	100.00
There is no evidence of rodents or insects in the storage area. *(Visually inspect the storage area for evidence of rodents [droppings] or insects that can damage or contaminate the products.)*	20	86.96
Storage area is secured with a lock and key but is accessible during normal working hours; access is limited to authorized personnel.	22	95.65
HIV rapid test kits are stored at the appropriate temperature according to product temperature specifications (8°–30°C).	20	86.96

Roof is maintained in good condition to avoid sunlight and water penetration.	22	95.65
Storeroom is clean, with all trash removed, no evidence of food and drinks, products stored on sturdy shelves/bins, and boxes organized neatly.	20	86.96
Current storage space is sufficient for existing products and planned program expansion.	5	21.74
HIV Rapid test kits are stored separately from insecticides, flammable products, and chemicals.	20	86.96
Fire safety equipment is available and accessible. *(Any item identified as being used to promote fire safety should be considered.)*	5	21.74
Products are stacked at least 30 cm away from the walls and other rows or stacks of products (to prevent contact with outer walls and allow access to products).	20	86.96
Products are stacked no more than 2.5 m high.	19	82.61
Products are stacked at least 10 cm off the floor (on pallets or other materials that elevate the products off the floor).	18	78.26
Mean	18.82	81.83

Source: (Survey data, 2023)

Of total health facilities assessed, only 73.9% of them met at least 80% storage criteria which is similar with study done in Addis Ababa 2013 in which 71.8% (Mezid M., 2014), and less than number of facilities met than health facilities in Metropole, South Africa where 80% of them met standard storage guideline (Alice,2013). But this result is higher than that of study done in Lesotho only 66.67% met (Pharasi, B. 2007), than in Eastern Ethiopia 55% (Tesfaye and Tadesse, 2017), and the survey of IPLS in Ethiopia conducted in 2015 when only 55% of facilities met at least 80% criteria (PFSA, 2015). However, only 21.7% of health facilities assessed had the sufficient storage space for existing and planned products and fire safety equipment. None of hospitals most probably due to bulk amount of products and wider health service programs and initiatives, and none of non-PEPFAR health facilities in which may be these facilities were new with limited blocks and rooms had sufficient storage space. But the study done in Eastern Ethiopia where 50% (Tesfaye and Tadesse, 2017), and study in Addis Ababa 54.4% of health facilities had sufficient storage space (Tilahun*et al*, 2016).

Table-13: Storage space sufficiency and fire equipment availability and accessibility at the time of visit by facility type (tier and monitoring)

Storage criteria	Type of Facility by tier and monitoring site			
	PEPFAR (N=14)	Non-PEPFAR (N=9)	Health center (N=15)	Hospital (N=8)
Current storage space is sufficient for existing and planned products	5	0	5	0
Percent	35.71	0	33.33	0
Fire safety equipment available and accessible	4	1	3	2
Percent	28.57	11.11	20	25

Source: (Survey data, 2023)

The storage space for available and planned products was met only by 35.71% of PEPFAR sites and 33.33% of health centers while none of non-PEPFAR and hospital met criteria. The availability and accessibility of fire safety equipment was low at all facilities.

Table-14: Mean of storage criteria with type of facilities (tier and monitoring sites)

Mean of total storage criterion computed (N=23)	Type of Facility by tier and monitoring site			
	PEPFAR	Non-PEPFAR	Health center	Hospital
73.91	1	0	1	0
78.26	5	0	3	2
82.61	2	3	4	1
86.96	1	2	3	0
91.30	3	1	1	2
95.65	2	0	1	1
100.00	1	2	2	1
Total	15	8	16	7
Facilities met criteria greater than 80%	60.00	88.89	75	62.5

Source: (Survey data, 2023)

Of the total health facilities observed, 75% health center, 62.57% hospitals, 60% of PEPAR site and 88.89 %of non-PEPFAR site met 80% storage guideline. The products managed in good manner at health center than hospitals and at non-PEPFAR site than PEPFAR site. As observed during assessment, this was due to high amount products in line with high programs and patient loads at hospitals and PEPFAR sites. In contrast to this, storage space is low at non-PEPFAR sites.

The storage of HIV rapid test kits was good as almost all facilities met 80% of criteria which is acceptable. But the storage space was not sufficient to properly managed the available products and to add any programmatic scale up. Beside this, fire safety equipment is the critical issue which has a risk of loosing the products, store and the life. During this observation, HIV rapid test kits were organized in HIV product categories.

Table-15: Availability, records and reporting of HIV RTK at pharmacy store

Items (N=23)	Stat pack		Abon		SD Bioline		DBS kit	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Available at the day of visit	18	78.3	20	87	20	86.96	18	78.26
Used and updated bincard	17	73.9	16	69.6	17	73.91	13	56.52
Stock out in last 6 months	6	26.1	10	43.5	9	39.13	2	8.696
discrepancy between record and report (N=7)	2	28.6	2	28.6	1	14.29	1	14.29

Source: (SPSS,2023)

One of the customer services is availing products at the time they need. In this assessment, 78.3%, 87%, 87%, and 78.3% of health facilities had Stat pack, Abon, SD Bioline and DBS kit at the day of visit respectively which less than the study done in South Africa where no stock out at day of visit (Alice,2013). DBS kit was available at all facilities at the day of visit. But better than the study done in Addis Ababa, in 2014, which found that 29.2% and 56.3% of health facilities stockout of KHB and DBS kit respectively at the day of visit (Tilahun*et al*, 2016). At the day of visit 91.8% of respondents from PMTCT, VCT and Laboratory departments were testing HIV.

In last 6 months prior to this assessment, 26%, 43.5% and 39.1% of health facilities encountered stockout of Stat Pack for 5- 30 days (mean score 13), Abon for 5-60 days (mean 30 days), and SD Bioline for 5-60 days (mean 30.33 days) respectively. The stockout of Stat Pack (1st test) is similar with the study done in eight districts of Tanzania in 2013 where 1st and 2nd test stock out at 28.2% of facilities but the 3rd test only 5.1% stock out (Gibson*et al*, 2018) which much less than this assessment. The study done by Tilahun in Addis Ababa, in 2014, indicates almost similar results in case of HIV RTK (33.3% stock out) while stockout of DBS kit in Addis Ababa (Tilahun*et al*,

2016), was much higher than this study in which only two facilities encountered stockout due to expiry. Only 28.6% of respondents from VCT, PMTCT and laboratory departments were interrupted HIV testing service due to stock out of HIV RTK which much less than the study conducted in Addis Ababa where 70% of health centers and 50% of Hospitals stopped VCT and doing emergency cases or PMTCT purpose (Eyurasalem, 2014).

In order to solve shortage or stock out, 37.5% health facilities assessed placed an emergency order of which 29.2% once and 8.3% twice in last 6 months preceding the study which is similar to that of Ghana in which 34.8% placed emergency order (Annor, 2012). But the study in Addis Ababa shows higher number of facilities placed emergency order of any program drugs in 6 months, all Hospitals and 75 % of health centers (Eyurasalem, 2014). The survey of IPLS in Ethiopia also exceeds this study in that 68% of Hospitals and 43% of health centers placed emergency order of any program drugs in three months preceding the survey (PFSA, 2015). In this study only 33% of facilities transferred HIV RTK during shortage or stock out or overstocked which is slightly higher than facilities in Ghana where 26.1% of inventory managers borrowed from other health facilities (Annor, 2012).

4.7. HIV Rapid Test Kits Distribution practices

All facilities got HIVRTK from THA in their last refill, except one facility differently from its last 6 months, received from Pharmaceutical Supply Agency.

Table-16: Supplier, distribution of HIV RTK for facilities and LMIS reporting formats in last 6 months prior assessment

who is responsible to transport HIV RTK for facility (N=24)	Frequency	Percent
EPSA vehicle	2	8.3
THA vehicle	4	16.7
facility vehicle	15	62.5
other	3	12.5
Total	24	100
Who supply HIV RTK last 6 months (N=24)	Frequency	Percent
EPSA	1	4.2
THA	23	95.8

Total	24	100
The interval HIV RTK received from THA		
interval	Frequency	Percent
monthly	7	29.2
bi-monthly	6	25
quarterly	8	33.3
other	3	12.5
Total	24	100

who is responsible to distribute HIV RTK for testing units

Units	Frequency	Percent
lab unit	5	20.8
pharm store man	19	79.2
Total	24	100

Source: (SPSS,2023)

According to their supplier (THA), health facilities supposed their HIV RTK reporting schedule and they report also to their minimum stock level. However, 29.2% of facilities received HIV RTK monthly, 25% bi-monthly, 33.3% quarterly and other as irregularly.

During the assessment almost all facilities received HIV RTK from THA based on the quota system like that of facilities in Lesotho (Pharasi, B. 2007). The time interval to receive HIV RTK was different from facility to facility based on their THA. Of total facilities assessed 33.33%, 29.2%, and 25% of them received quarterly, bi-monthly and monthly respectively. This indicates that THA has their own specific schedule to distribute i.e. no national standard as IPLS was. Since the distribution of HIV RTK was not through the country's supply chain system (IPLS), most of the facilities received in 1 or 2 to 3 days from THA. Only when the stockout encountered before the next quarter's quota they waited up to 60 days to refill (especially for Abon and SD Bioline in last 6 months). This is similar to health facilities in South Africa (Alice,2013) which received their fully supplied last order in 1 to 3 days unlike that of facilities in Ghana (Annor, 2012), and in Ethiopia according to IPLS for others program drugs (PFSA, 2015), whom waiting for 2 to 4 weeks to refilled.

Most of the health facilities were used their own vehicle (62.5%) to receive HIV RTK, and others used THA's vehicle (16.7%), EPSA's vehicle (8.3%) and some used Bajaj rent while one facility was in same compound with THA's store. In IPLS system, for most facilities it had been EPSA who refilled program drugs up to the health facilities by its own vehicle unless and otherwise when emergency order placed by facility and EPSA's vehicle was unavailable.

Almost all the assessed facilities were collecting HIV RTK from THA, which the system of IPLS is not. The FMOH with EPHI gave direction when the former algorithm was changed to new to minimize shortage due to low stock in the supply chain system.

Before this algorithm (during Wantai and First response algorithm), the direction was given for all facilities that laboratory unit was responsible to distribute HIV RTK by checking quality. In Oromia region, wrote letter for all zonal health departments, and town health administrations to be through pharmacy store and laboratory should do quality test in every new arrival of batches. Later, FMOH also endorses to be managed through IPLS but added to the formats of IFRR and RRF the testing of HIV data (service data) beside to supply chain reports. Accordingly, 79.2% of health facilities distribute HIV RTK for testing points through pharmacy store while 20.8% still distributing through laboratory unit.

4.8. Logistics Management Information System (LMIS) practices of HIV Rapid test kit

Almost in all health facilities assessed, store manager (87.5%) were responsible to report and order HIV RTK, while pharmacy head also had responsibility to report and order HIV RTK at 3 facilities.

Table-17: Reporting, resupplying and ordering formats using by health facilities in the last 6 months

Departments (person) responsible to distribute for testing units	Frequency	Percent
lab unit	5	20.8
pharm store man	19	79.2
Total	24	100
LMIS format used to report and order HIV RTK in last 6 months		

RRF	17	70.8
letter	7	29.2
Total	24	100.0
Format testing units used to report and resupply HIV RTK		
IFRR	21	87.5
letter	3	12.5
Total	24	100

Source: (SPSS,2023)

Of the total assessed, 70.8% of facilities used RRF to report and re-order HIV RTK, and the other used letter (29.2%). This is indicated that a smaller number of facilities used RRF than the study done in Addis Ababa, in 2014, (Tilahun*et al*, 2016). Recently to time during data collection, 91.7% of health facilities reported HIV RTK, of which 79.2% reported on time, 84.2% reported data element of HIV RTK stock on hand, 73.8% consumption data, 57.89% data of loss adjustment and only 26.3% reported HIV testing data (service data). In last 6 months, 37.5% of facilities placed an emergency order due to shortage or stock out of HIV Rapid test kits which is less than that of study done in Addis Ababa, in 2014, (Eyurasalem, 2014).

Although the facilities report and re-order HIV RTK as above explained, they were supposed to report, according to their supplier, monthly (41.7% of facilities), bi-monthly (37.5%), quarterly (16.7%) and one facility as needed. Of total facilities assessed, 7 (29.2%) and 2 (8.3%) facilities placed emergency order once and twice respectively.

The country' pharmaceutical logistics system was practiced though their major supplier was not EPSA, and there is a shortage and stock out of HIV rapid test kits.

Testing points used IFRR format to report and resupply HIV RTK in 87.5% of facilities which slightly higher with the study done in Addis Ababa (82.7%) (Tilahun*et al*, 2016), and 12.5% used letter. However, most of health facilities were using IFRR which is the same format to report other products i.e. it was not the format designed only for HIV RTK purpose (which additionally has place to report HIV testing data). In other ways, these departments were not using bin card for HIV RTK transaction, the IFRR reported may not has quality to use for decisions.

Most of the facilities hadn't enough documents of date and quantity order and received, and they were not monitoring the quantity requested and received because of that their Town Health

Administration refilled them based on the quota not what facilities need as observed during assessment. Stat pack, Abon and SD Bioline was received in average of within 4 days. Most of them received when town remind them to collect their breakdown within one or two to three days. However, most of the time when the facilities encountered shortage or stockout the gap between date of order and received will reach maximum of 60 days. DBS kit was refilled through EPSA within 15 to 25 days. But one facility received DBS kit from other health facility within a day through facilitation of THA due to expiry.

Unlike that of study conducted in Addis Ababa (60%), the discrepancy between data reported and record of HIV RTK is lower. In this assessment, Stat pack and Abon discrepancy was observed only in 28.6%, and SD Bioline and DBS kit in 14.3% of health facilities.

The qualitative results for the reason of discrepancy between the data of recorded on bincard and report was analyzed. From total 23 health facilities observed, at 5(21.7%) health facilities there were discrepancy and for these an interview for the reason was conducted for 5 pharmacy store mans. The discrepancy for Stat pack was at 2 facilities and the reason was due to workload after issuing to the testing departments not updated at bincard. While the 2 discrepancy was for Abon, and 1 for SD Bioline. The reason for discrepancy for Abon and SD Bioline was that all respondents said since the report calculated the consumption from issue data which is low due to shortage, they wanted to add the quantity to get more. Beside this, one respondent said that since there is ashortage and stockout frequently, and the refill is not based on the report no need of using bincard.

Except two facilities, all facilities received DBS kit quantity they ordered or above that. Almost all health facilities informed their HIV RTK quota to raise order to THA. Hence, in most health facilities quantity of ordered and received didn't varied as the shortage of HIV RTK frequently happened. However, 66.7%, 46.46%, and 40% of facilities received Stat Pack, Abon and SD Bioline; DBS kit received what they ordered except at 2 facilities. This was slightly higher than the facilities in Eastern Ethiopia (60% sometimes and 30% always received quantity ordered) according the study in 2014 (Tesfaye and Tadesse, 2017). In other way, Stat pack is more available than Abon and SD Bioline while DBS kit almost no problematic due to this kit lasted a long and there was stock in the system at all levels unlike theses HIV RTK which lasted only 6 months.

4.9. Customer service

The respondents filled their responses to these questionnaires designed using 5-point Likert scale by selecting the extent they agree from chooses: 5 for strongly agree, 4-agree, 3-neutral, 2-disagree and 1 for strongly disagree. The mean computed in table-2 with result of score 1-1.5 indicates the respondents were strongly disagree, 1.5-2.5 the respondents were disagreed, 2.5-3.5 they were neutral, 3.5-4.5 were agree and 4.5 and above they were strongly agreed as quoted by Natnael (Natnael, 2016).

Table -18: Intermediate customer service

Customer service	N	Mean	Std. Deviation
HTS service provider respond to whether HIV rapid test kit has quality	70	3.56	1.002
HIV RTK available on time when customer needs	60	4	1.025
the staff working on HIV RTK distribution available when the respondent need to get RTK	59	4.19	0.9
the respondent receive voucher (model-22) on time	59	4.29	0.811
Grand mean		4.01	0.811

Source: (Survey data, 2023)

All the respondents of customer service (intermediate) agree on quality HIV RTK, its availability on time when customer need, the staff working on distribution of HIV RTK available when needed to issue, and the respondents receive voucher of issue (grand mean 4.01). However, the Laboratory department whom is responsible to do quality disagree (mean 3.33), and of total respondents (N=70), only 62.85% agree and strongly agree with quality while 83.60% of respondents were agree and strongly agree with availability when customer needs. The frequently reported trends of stockout of HIV test kits in Tanzania is likely to compromise patient's access to HIV testing services causing a barrier in implementation of HIV/AIDS care and program in the country (Gibson*et al*, 2018). The study done at Mwananyamala Hospital in Dare Salaam; Tanzania nearly similar in that only 53% of in quality of care not a product. The study conducted in Nigeria shows that 33% of patients dissatisfied due to lack of drugs which higher dissatisfaction than this study (16.4%) disagree. Other assessments conducted in Jimma Hospital (Lemessa and Solomon, 2001)

and Yekatiti 12 Hospital (Tirhas*et al*, 2018) were about satisfaction of end user customer while the respondent in this study was intermediate.

4.10. Operational Supply Chain Performance

The questionnaire designed in way the respondents could fill their responses using 5-point Likert scale by selecting the extent they agree from chooses o 5 for strongly agree, 4-agree, 3-neutral, 2-disagree and 1 for strongly disagree. The mean computed in table-3 below with result of score 1-1.5 indicates the respondents were strongly disagree, 1.5-2.5 the respondents were disagreed, 2.5-3.5 they were neutral, 3.5-4.5 were agree and 4.5 and above they were strongly agreed. In this assessment the respondents agree for operation supply chain performance of reliability (grand mean is 4.19): facility provide right quantity of HIV rapid test kit for testing units with correct packaging, by keeping its quality and giving voucher for receivers with complete information. However, providing right quantity was agreed and there are respondents with strongly disagree also. Respondents were agreed on operational supply chain performance of responsiveness (grand mean 4.24) and agility (grand mean 4.24). This indicates that the operation supply chain performance of HIV RTK is moderately agreed by respondents (grand mean greater than 4) which similar with the study on Moha Soft drinks in Addis Ababa, which was that firm's supply chain performance is moderately good (Natnael, 2016).

Table -19: Operational supply chain performance of HIV RTK

Reliability (N=24)	Mean	Std. Deviation
facility provide right quantity of HIV RTK for testing units as per their request	3.63	0.924
facility provide HIV RTK with correct packages for testing units	4.21	1.062
facility provide high quality of HIV RTK for testing units	4.08	0.717
facility give issue voucher with complete information for testing units during issuing of HIV RTK	4.83	0.381
Grand mean	4.19	
Responsiveness (N=24)		
facility issue HIV RTK for testing points as per their schedule	4.17	0.963
facility provide HIV RTK for testing units after their requisition	4.42	0.83

facility provide item of HIV RTK requested for testing units	4.12	0.85
Grand mean	4.24	
Agility (N=24)		
facility provide HIV RTK for testing units timely	4.29	0.955
facility provide HIV RTK for non MARPS purpose	4.17	0.963
facility adapt quickly to a system of stock managing when new HIV RTK arrived	4.25	0.794
facility provide HIV RTK for testing units when they encountered stockout	4.25	0.989
Grand mean	4.24	

Source: (Survey data, 2023)

4.11. Supply chain management challenges of HIV RTK

To assess internal and external challenges of HIV rapid test kits' the supply chain management in health facilities open-ended questionnaires was used. The results of the responses identified the challenges from pharmacy unit and testing departments.

Table-20: Internal and external challenges of HIV rapid test kits' supply chain management at pharmacy unit

External challenges of HIV RTK SCM at pharmacy unit	Frequency	Percent
Shortage of HIV RTK	15	78.95
Abon Package not suitable for distribution	1	5.26
Orientation not given on new kit	1	5.26
Frequently algorithm changes	1	5.26
no challenge	1	5.26
Total	19	100
Internal challenges of HIV RTK SCM	**Frequency**	**Percent**
Data quality problem of IFRR from testing units	1	7.69
IFRR not reported on time	2	15.38
IFRR reporting rate from testing units is low and not continues	4	30.77
Lack of vehicle	1	7.69
Quality of HIV RTK is not done sometimes	1	7.69

Workload	3	23.08
No challenge	1	7.69
Total	13	100

Source: (SPSS,2023)

From the pharmacy unit, 76.47% (N=15) of store managers responded that their external challenges were shortage of HIV Rapid test kits, while the others said that Abon package is not suitable for distribution, from the higher level orientation was not given on new HIV rapid tests and frequently changing of algorithm. The shortage of HIV rapid test kit indicates that low stock is available in the system which is similar with that of the study done in in Addis Ababa, in 2014, (Eyurasalem, 2014). The results from the observation indicates similar challenges in that Stat pack, Abon and SD bioline were stockout at 26%, 43.5% and 39.1% of facilities respectively.

Major internal challenges for pharmacy unit was internal reporting from testing departments (reporting rate 30.77% (N=4), on time reporting 15.38% and quality of report 7.6%) which is related with the study done in East Wollega (Kefyalewu and Taddesse, 2018). The other internal challenges were workload, quality of HIV rapid test kits not done sometimes and lack of vehicle to report and collecting the kit. In country's pharmaceutical supply chain challenge of lacking vehicle from health facilities not as such since it is EPSA who refilled health facilities. But as explained above, almost all of the facilities were supplied HIV RTK from town health administrations. The data of transaction records at testing departments were low in that only 25% of them using and updating bincard which has impact on IFRR quality.

Table-21: Internal and external challenges of HIV rapid test kits' supply chain management testing departments

External challenges of HIV RTK SCM at (testing departments)	**Frequency**	**Percent**
Shortage of HIV rapid test kits	12	27.27
False Positive (1st test positive, 2nd test negative)	14	31.82
False Positive (1st test positive, 2nd test negative), and shortage of HIV RTK	12	27.27
Stat pack (1st test kit) is highly sensitive	1	2.27
Known status and false positive	1	2.27

Lack of training for all testing units	1	2.27
Package of Abon of is not suitable to distribute	1	2.27
No challenge	2	4.55
Total	44	100.00

Internal challenges of HIV RTK SCM at Testing departments	Frequency	Percent
Abon & SD not available at testing point	3	21.43
Improper sample collection & not stick to standard time	1	7.14
Lack of commitment	1	7.14
No training for HTS	2	14.29
Poor recording and reporting of SCM	1	7.14
Quality control not done sometimes	1	7.14
Store manager is not available always	1	7.14
HIV RTK is not distributed timely for testing unit, RTK audit is not done	1	7.14
Workload	1	7.14
no challenge	2	14.29
Total	14	100.00

Source: (Survey data, 2023)

Of the total respondents from testing departments 31.82 % (N=14) of them responded that their external challenges were false positive (Stat Pack positive and Abon negative). The challenges of being positive by 1st test and negative by 2nd test results in wastage of HIV rapid test kits as the algorithm guides to repeat both tests in this case which means two kits consumed for a single person. Beside this, the service provider (intermediate customer) being losing confidence on product. In this assessment, 27.27% of them said shortage was challenges and also the other 27.27% respondents said that both false positive and shortage were challenges for them. Of respondents, whether with other challenges or alone, a total of 54.54% raised shortages and 61.26% false positives challenges. The few respondents' challenges were raised Package of Abon (if it was packed by 20 tests than 40 tests to reach other departments). Known status and false positive (the testing of known HIV positive results in consuming kits which planned to test unknown status and results in shortage also), and lack of training were the other challenges. In connection of the shortage of Abon though not totally stock out in the facility, most respondents said that they used by placing Abon and SD Bioline at department center to many others. For example, the store man of one of the Hospital said that *"we had 26 potential testing points in the hospital, but we got only 5 boxes of Abon (800 tests) from THA for third quarter quota. That means*

we can't distribute one box for each testing units. Rather by discussion we put these Abon at 5 departments which are center to share with others. If the package would be of 20 tests at least we distribute with responsibility to low testing points".

Internal challenges at these testing points were that Abon sharing (21.43%) with other departments which make that the customer should have wait to get 2nd test and wastage of buffer. Improper sample collection and not sticking to standard time of HIV testing was also the challenges. While lack of staff commitment, quality not done for all new batches, poor record and reporting of HIV RTK transactions, and no training for new staff were also challenges from respondents in which some of them were similar to the study done in East Wollega (Kefyalewu and Taddesse, 2018) and in Addis Ababa in 2014 (Tilahun*et al*, 2016).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter deals with summary of findings, conclusions of the study, and put recommendations from the findings.

5.2. Summary of findings

According to the previous data analysis the summary of major findings of the study are:

Twenty-four health facilities assessed for this study. Almost all staff working in pharmacy units are pharmacy professionals and most of them trained IPLS.

At pharmacy store of most health facilities used and update bin card for HIV RTK, but at testing departments bincard used and updated only in 25.71% of facilities. Inventory auditing was done by 87.5% of facilities monthly, bi-monthly, quarterly, and annually.

Of totally assessed health facilities, 73.9% of them met at least 80% of standard storage guidelines. The fire safety equipment and sufficient storage space was fulfilled only in 21.7% of health facilities.

Most of the facilities (91.2%) distribute HIV RTK through pharmacy store while some still use laboratory unit to distribute for testing points. Due to shortage of 2nd and 3rd tests, some testing departments shared together from center of their departments. Almost all health facilities received their HIV RTK quota system from THA. Except one facility, all were used HIV RTK for non-MARPS clients also.

Majority of health facilities report HIV RTK to their respective THA by using RRF (70.8%) and letter (29.2%). They reported stock on hand (84.2%, consumption (73.8%), loss adjustments (57.89%) and rarely HIV testing data (service data) (26.3%). However, they received not based on their consumption but by quota system. Testing units used IFRR to report and re-supply but with no testing data at most facilities.

Stat pack, Abon, and SD Bioline were available at most of health facilities at the day of visit. But they encountered stock out of Stat pack 26%, Abon 43.5% and SD Bioline 39.1% of health facilities last 6 months preceding this assessment. Abon and Sd Bioline last from 5 to 60 days with mean score 30 days stock out. DBS kit was available at all health facilities at the day of visit. Of total facilities, 37.5% of them placed emergency order once and some twice. And only 33% of them transferred or received HIV RTK to other health facilities.

The respondents from VCT, PMTCT and laboratory departments agreed moderately with quality of HIV RTK (mean 3.56), available when customers' needs, get pharmacy professional working on distribution to HIV RTK and received model-22 upon issuing. But alone, laboratory unit did not agree well with quality of HIV RTK.

Operational supply chain performance of HIV RTK: reliability, responsiveness and agility is moderately good (all their average mean score is greater than 4).

The most challenges of supply chain management of HIV RTK identified were false positive (1st test positive and 2nd test negative) and the shortage of kit.

5.3. Conclusions

Based on the results of the assessment inventory management of HIV Rapid test kits is practiced in most of the facilities store while HIV testing departments are not record HIV RTK transactions on bin card.

Most of the facilities met at least 80% of standard storage guidelines. However, fire safety equipment availability and accessibility, and storage space for available products and planned were great challenges for most health facilities, especially, for Hospitals and non-PEFPAR sites in that none of them had sufficient storage space.

Almost all facilities received HIV Rapid test kit from Town health administration by their vehicle based on the schedule of THA by quota system. The time interval for refilling is differs from town to town health administrations. The majority of facilities distribute HIV RTK through pharmacy store by using IFRR. But the IFRR used is not that designed for HIV RTK at most facilities. In addition, there are facilities still distributing through laboratory unit. In high testing point facilities and shortage of HIV RTK share Abon (2nd test) by putting at department center to others.

Though most health facilities received their HIV RTK from town health administration they report stock on hand, consumption, loss adjustments and rarely HIV testing data (service data) by using RRF and letter. The discrepancy between data of HIV RTK on record and report is insignificant. Most of the facilities receive Stat pack, quantity of ordered from THA but Abon and SD Bioline received not even a half of ordered.

Stat Pack, Abon and SD bioline was available at the day of visit in most facilities but it was not in enough amount. The availability here is not the stock in store but even if only at testing points. At most facilities, especially Abon and SD bioline was not stored more than a week due to shortage. The HIV RTK distribute for facilities were used also for non-MARPs client in almost all places. All the intermediate customers agreed to the quality and availability moderately. Regarding HIV RTK quality, laboratory department whom is responsible to test quality of new batches were not agreed well.

The operation supply chain performance of HIV RTK's reliability, responsiveness and agility is moderately good with lower in reliability.

However, the supply chain management of HIV RTK consisting of good inventory management, storage, distribution, LMIS and good customer services, and the operational supply chain performance is reliable, flexible and agile, the shortage is one of the most challenges of health facilities. Hence, my conclusion for shortage of HIV rapid test kits is the plan to test non-MARPS through availing kits through procurement by government budget and offering by fee but those people were tested at this health facilities from program kit preplanned for MARPS. The other reason for shortage since this algorithm is new, the safety stock of these kits in the system is low or none. While my third reason is the great efforts increased by governments and stakeholders to achieve the three nineties by 2020 through different initiatives, increased the awareness, and need of testing by clients which in turn boosted up the consumption though it will be exactly measured in the annual report at the end of this budget year.

Most the challenges of HIV RTK supply chain managements are false positive (1^{st} test negative and 2^{nd} positive) and shortage of kits especially Abon and SD Bioline. Some others are poor recording and reporting, refilling by quota system, lack of vehicle to collect kit, lack of staff

commitment, frequently changing of HIV testing algorithm within short time interval, lack of orientation on new algorithm and storage space insufficient.

5.4. Recommendations

The following recommendations are proposed to alleviate the challenges identified:

- Though the inventory management practices were good at most health facilities, based on the report of inventory auditing transfer of HIV rapid test kits be encouraged. And all testing departments should use bincard for transactions.
- Storage of most facilities is good. However, the health facilities and stake holders should do more on storage space expansion and fire safety equipment as these criteria are basic for the available and future program expansion.
- The system of reporting and distribution of HIV RTK should strongly return to IPLS and through EPSA.
- The rate of reporting and resupplying within the facility by IFRR, and ordering by RRF are good. But, since most of testing department did not using bincard, and IFRR report did not included the service part at most health facilities, more have to done by professionals and health managers.
- Customer (intermediate) service response is moderately agreed on quality, availability of HIV kits, distribution and documentation. However, the response on quality is less agreed (especially by laboratory units). Hence, the quality of HIV Rapid test kit should assess by EPHI and stake holders.
- Supply chain performance of HIV rapid test kits is reliable, responsive and agile, regular supportive supervision should continue at these facilities to enforce and technically support in recording of HIV RTK transaction at testing points. To solve the problem of shortage, I recommend FMOH/ORHB should avail HIV RTK by procuring in government budget as already written in five years plan for VCT. I will not recommend as per the plan to offer kit by money for VCT rather I prefer that HIV RTK offered through fee exempted service by health facilities as to maternal and child health services. Because, even though Ethiopia's five years is to offer HIV testing through PICT for MARPS to achieve the three nineties, and conversely, the nine months report of 2011 EC indicates that positivity yield

of VCT is three times that of PICT at these ten towns and FMOH, and even four times at ORHB regional level report.

- Further study should be done on the supply chain management of HIV RTK for wider health facilities of the region and at algorithm selection, quantification, procurement and distribution at higher levels.

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ANNEX-1 Questionnaires for data collection

School of Commerce
MA Program in Logistics and Supply Chain Management

Dear Sir/ madam;

My name is Jara Mekonnen conducting a study on "Supply Chain Management Practices and challenges of HIV Rapid Test kits in selected public hospitals and health centers in Oromia region". The study helps to identify possible gaps, develop intervention and improving supply chain management of HIV test kits practice, challenges and its impacts on achieving of the 1st 90 strategy of 2020.

I am, therefore, seeking your assistance to fill the questionnaires. The questionnaire will take about ten to twenty minutes to complete. Participation in this study is voluntary, and all who participate will remain anonymous. Your name is not needed. All information offered will be treated confidentially, and the results will be presented in such a way that no individuals may be recognized.

Thank you in advance for the available information you are sharing and the precious time you are going to spend for this purpose.

If you have any enquiry, please don't hesitate to contact the researcher on:

- Name: Jara Mekonnen
- Email: jaramek@gmail.com
- Phone: 0949115995

A QUESTIONNAIRE TO BE FILLED BY HTS/VCT FOCAL PERSON ONLY

General information on Health Facility, HIV counseling and testing service

No	Question	Responses/codes
1	Health Facility Name	
2	Facility type	Health Center Hospital
3	Name of Town	
4	How long have HIV counseling and testing services been offered at this facility?	Less than 2 years 2-5 years 5-10 years Above 10 years
5	What is the HIV testing algorithm followed at this facility currently?	For screening-Stat pack For confirmatory- Abon For tiebreaker-SD Bioline (if other, specify) _____
6	What service of HIV testing being provided at this facility?	PICT PMTCT VCT Campaign Other (specify)_____
7	Do you provide VCT services for all volunteers (other than MARPS)?	Yes No
8	Where is HIV testing performed at this facility?	Outpatient case teams TB clinic Inpatient wards VCT room ANC Laboratory Others (specify)_____
9	Percentage of HIV testing performance of past six months (up to 2nd quarter) from your facility's EFY2011 six-month plan	Number of total tests = HTS Plan for 6 months=
10		Number of confirmed positives = Expected positive for 6 months=

	Percentage of confirmed positive performance of past six months (up to 2nd quarter) from your facility's EFY2011 six-month plan	

A QUESTIONNAIRE TO BE FILLED BY HTS/VCT/ PMTCT/LABORATORY FOCAL PERSON

HIV Rapid test kits recording, reporting, and HTS services

No	Items	Responses/codes
1	Working department	HTS/VCT PMTCT Laboratory Other_____
2	Gender	Male Female
3	How long have you worked in your current position?	Less than 2 years 2-5 years 5-10years Above 10 years
4	Does the HIV testing service (HTS) given at this department?	Yes No If other, _____
5	If No, for question "4" go to Question "13"	
6	From which unit do you get the HIV RTKs currently?	Pharmacy store Laboratory unit Other (specify)_____
7	Do you use and updated bin card for HIV RTKs?	Yes No
8	If No for question No "7", what formats do you use to monitor HIV RTK utilization during testing?	Tally sheets HTS Register for HIV RTKs Other (specify)_____
9	Do you provide HIV Testing service (HTS) today?	Yes No
10	Did you interrupt HTS in last 6 months?	Yes No

11	If yes for question "10", how many times you stop delivering HTS in the last 6 months?	Once Twice Three times Four and above Not interrupted
12	What was the reason to stop delivering HTS in the last 6 months?	HIV kits stock out in the facility Kits available but not issued Other (specify)_____
13	Do you use DBS kit at this department?	Yes No
14	If No, for question "13" go to Question "19"	
15	Do you have DBS kit today?	Yes No
16	Did you encounter stockout of DBS kit in last 6 months?	Yes No
17	If yes, for question "16" how many times you stocked out?	Twice Three times Four and above
18	What was the reason for stocked out of DBS kit in past 6 months at this unit?	DBS kit stockout in the facility Kits available but not issued Other (specify) _____ _____
19	What are the challenges of HIV Rapid Test kit Supply Chain Management? (on availability quantification, distribution, storage, reporting, transportation of these kits, HTS customer service)	External challenges: Internal challenges:

Customer service

With regard to customer service, please thick the appropriate box to indicate the extent to which you agree or disagree with each statement. The item scales are five-point Likert type scales with 5 = strongly agree, 4 = agree, 3= neutral, 2= disagree, 1 = strongly disagree.

		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree

1	Customer service	5	4	3	2	1
1.1.	You as an intermediate customer (service provider), HIV Rapid test kits have quality					
1.2.	HIV Rapid test kit is always available on time when customer need					
1.3.	You get the staff working on HIV RTK distribution (store man) when you need to refill test kits					
1.4.	You receive voucher (model-22) on time					

Additional general ideas (if any):_____
_____-
_____

A QUESTIONNAIRE TO BE FILLED BY PHARMACY HEAD

Supportive supervision Practices and workforce at pharmacy units

No	Items	Responses/codes
1	Gender	Male Female
2	What is your profession?	Pharmacy technician Druggist Pharmacist Nurse Other(specify)_____
3	How long have you worked in your current position?	Less than 2 years 2-5 years 5-10years Above 10 years
4	How many staffs are working in Pharmacy units?	
5	Which training do you take?	IPLS Overview of SCM SCM monitoring and Evaluation Laboratory commodities management I hadn't taken SCM related trainings
6	Did you receive supportive supervision on management of HIV Rapid test kits in last 6 months?	Yes No
7	If yes, for question "6" who provide support?	ORHB Town health administration Partners Other(specify)_____
8	If yes for question "6" how often in the last 6 months?	Monthly Quarterly Bi-annually Irregular

		Other _____
9	Did the supervision help you to improve SCM of HIV Rapid Test Kits?	Yes No

Additional general ideas (if any)

_____

_____

____

QUESTIONNAIRE TO BE FILLED BY PHARMACY STORE MAN

Inventory management practices at pharmacy units

No	Items	Responses/codes
1	Gender	Male Female
2	What is your profession?	Pharmacy technician Druggist Pharmacist Nurse Other(specify)_____
3	How long have you worked in your current position?	Less than 5 years 5-10years Above 10 years
4	Did you have Integrated Pharmaceutical Logistic system (IPLS) training?	Yes No
5	Do you conduct inventory auditing of HIV RTK in the store? *(hint: Inventory auditing is doing physical count and check balance with records (bin card/stock card))*	Yes No
6	If yes for question "5" how often do you conduct inventory auditing?	Monthly Bi-monthly Quarterly

		Bi-annually Annually Other (specify) _____
7	What is minimum stock level the facility used to re-order HIV test kits?	Monthly Bi-monthly Quarterly Other (specify)_____
8	Did you transfer HIV Rapid test kit to and/or from other health facilities in last 6 months due to shortage, stock out or over stocked?	Yes No

Logistics Management Information System (LMIS) practices at pharmacy units

No	Items	Responses/codes
9	Who did supply HIV RTK is the last 6 months is supplying you?	EPSA (the former named PFSA) Town health offices Zonal health department Other, _____
10	What is LMIS format do you use to report and order HIV test kits in last 6 months?	RRF Letter No available Other (specify)___
11	Who report and order HIV Rapid test kits in this facility?	Store man Pharmacy head Other (specify)___
12	How often do you supposed to report HIV Rapid test kits?	Monthly Bi-monthly Quarterly

		Other (specify) _____
13	Did you submit your report of HIV RTK recently?	Yes No
14	If yes for question “13”, on the last report of HIV RTK do you report on time?	Yes No
15	If yes for question “13” What HIV Rapid Test kits data are reported on LMIS?	Stock on hand Consumption Loss/adjustments HIV testing report Other (specify)___
16	If no, for question “14”, what is the challenges unable you to report on time?	Workload no need of report for resupply Difficulties in transmitting reports other (specify)_____
16	How many emergency orders for HIV Rapid Test kits were placed in the past 6 months?	Never One Two Three Four and above Other (specify)_____

Distribution and transportation practices at pharmacy units

No	Items	Responses/codes
		EPSA

17	From where you got HIV Rapid test kits in your last refill?	THAs ZHD Other (specify)___
18	How often do you receive supplies?	Monthly Bi-monthly Quarterly Other (specify) _____
19	Who is responsible for transporting HIV Rapid test kits to your facility?	EPSA vehicle THAs vehicle Facility vehicle Other (specify)___
20	Who is responsible to distribute HIV Rapid test kits for testing unit currently?	Laboratory unit Pharmacy store man HTS/VCT focal person Other (specify)___
21	By what LMIS format does testing units report and resupplied HIV Rapid test kits?	IFRR Letter Orally Other (specify)___
22	What are the challenges of HIV Rapid Test kit Supply chain Management (SCM)? (on quantification, distribution, storage, reporting, transportation of these kits)	External challenges: Internal challenges:

Operational Supply chain performance

With regard to supply chain performance of your health facility, please thick the appropriate box to indicate the extent to which you agree or disagree with each statement. The item scales are five-point Likert type scales with 5 = strongly agree, 4 = agree, 3= neutral, 2= disagree, 1 = strongly disagree.

		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	Reliability	5	4	3	2	1
1.1.	You provide the right quantity of HIV RTK for testing units as per their request					
1.2.	You provide the HIV RTK with correct packaging for testing units					
1.3.	Providing HIV RTK which has high quality					
1.4.	You give vouchers (model-22) having complete information for testing units during issuing of HIV RTK					
2	Responsiveness					
2.1.	You issue HIV RTK for testing units as per their schedule					
2.2.	You provide the HIV RTK on time after their requisition					
2.3.	You deliver the item of HIV RTK testing units requested					
3	Agility					
3.1.	You provide HIV RTK for testing units timely					

3.2.	You provide HIV RTK for VCT (not for most at risk populations service (MARPS)					
3.3.	You adapt quickly to a system of stock managing when new HIV test kits arrived					
3.4.	You provide HIV RTK for testing units when they encounter stock out					

Additional general ideas (if any)

_____

_____

_____

OBSERVATION CHECKLIST

On storage management practices at pharmacy units

SECTION II: Storage Management				
No	Items	Yes	No	Comment
	Storage condition (description)			
1	Products are arranged on shelves with arrows pointing up, and with identification labels, expiry dates, and manufacturing dates clearly visible.			
2	HIV Rapid test kits are stored and organized to FEFO procedures and are accessible for counting and general stock management.			
3	Outer cartons are in good condition (not crushed, perforated, stained, or otherwise visibly damaged).			
4	Damaged and expired products are separated from usable products in the storeroom, and procedures exist for removing them from inventory.			
5	HIV Rapid test kits are stored in a dry, well-lit, well-ventilated storeroom. *(Visually inspect roof, walls, and floor of storeroom.)*			
6	Cartons and products are protected from direct sunlight.			
7	There is no evidence of rodents or insects in the storage area. *(Visually inspect the storage area for evidence of rodents [droppings] or insects that can damage or contaminate the products.)*			
8	Storage area is secured with a lock and key but is accessible during normal working hours; access is limited to authorized personnel.			
9	HIV rapid test kits are stored at the appropriate temperature according to product temperature specifications (8°–30°C).			

10	Roof is maintained in good condition to avoid sunlight and water penetration.			
11	Storeroom is clean, with all trash removed, no evidence of food and drinks, products stored on sturdy shelves/bins, and boxes organized neatly.			
12	Current storage space is sufficient for existing products and planned program expansion.			
13	HIV Rapid test kits are stored separately from insecticides, flammable products, and chemicals.			
14	Fire safety equipment is available and accessible. *(Any item identified as being used to promote fire safety should be considered.)*			
15	Products are stacked at least 30 cm away from the walls and other rows or stacks of products (to prevent contact with outer walls and allow access to products).			
16	Products are stacked no more than 2.5 m high.			
17	Products are stacked at least 10 cm off the floor (on pallets or other materials that elevate the products off the floor).			

Stock status of HIV Rapid Test kit

S.No	Kits	Unit	Available now (Y/N)	Has Bin card (Y/N)	Bin card updated(Y/N)	Stock out in last 6 months (Y/N)	Number of stock outs in last 6 months	Total number of days stock out in last 6months	Remark
1	Stat pack	test							
2	Abon	test							
3	SD Bioline	test							
4	Capillary EDTA tube	tube							
5	Blood lancet	pcs							
6	DBS kit	test							

c. LMIS Data Quality: Stock on hand on Bin card and LMIS report at the day of report

S.No	Kits	Unit	Stock on hand at LMIS at report day	Stock on hand at bin card at the day of LMIS report	Discrepancy	Reason for discrepancy
1	Stat pack	test				
2	Abon	test				
3	SD Bioline	test				

4	Capillary EDTA tube	tube				
5	Blood lancet	pcs				
6	DBS kit	test				

d. The difference between quantity ordered and received of HIV Rapid Test kit

S.No	Kits	Unit	Date last ordered	Quantity last ordered	Date last received	Quantity Last received	Remark
1	Stat pack	test					
2	Abon	test					
3	SD Bioline	test					
4	Capillary EDTA tube	tube					
5	Blood lancet	pcs					
6	DBS kit	test					

General comments (if any)

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_____
_____
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Thank you!!