

**EVALUATION OF THE EFFECT OF INTEGRATED LOGISTICS
SYSTEM ON ESSENTIAL MEDICINE AVAILABILITY AT
HEALTH CENTRES AND DISPENSARIES IN TANZANIA:
A CASE OF MBEYA CITY COUNCIL**

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ESSENTIAL MEDICINE AVAILABILITY AT HEALTH CENTRES AND
DISPENSARIES IN TANZANIA:
A CASE OF MBEYA CITY COUNCIL**

By

Francis Lucia

**A Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree
of Master of Science in Health Monitoring and Evaluation (HME) of Mzumbe
University**

2017

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by Mzumbe University, a dissertation entitled “**Evaluation of the Effect of Integrated Logistics System on Essential Medicine Availability at Health Centres and Dispensaries in Tanzania: Case of Mbeya City Council**” in fulfilment of the requirements for award of the degree of Master of Science in Health Monitoring and Evaluation (HME).

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I, **Lucia Francis**, declare that this dissertation is my own original work and that it has not been presented to any other institute or university for a similar or any other degree award.

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ACKNOWLEDGEMENT

The completion of this dissertation was achieved through the help of various people to whom I am thankful to. Firstly, I would like to extend my heartfelt appreciation and thanks to my supervisor Dr Henry Mollel of Mzumbe University for his tireless support, constructive criticisms, comments and guidance which gave me confidence, knowledge and skills to write this dissertation report. Secondly, I am thankful to Dr Kihombo of Mzumbe University for his assistance, criticisms and remarks during the writing of this dissertation.

Similarly, I would like to give my thanks to my employer the Mbeya Regional Administrative Secretary for giving me permission to come and join the Master of Science in Health Monitoring and Evaluation course at Mzumbe University. Furthermore, I would like to acknowledge the Mbeya City Council Medical Officer with the support of District secretary for giving permission to conduct my evaluation study at their health facilities.

Lastly but not least, I am very grateful to my family for their moral support, prayers and tolerance of living without my presence during my study time at Mzumbe. My heartfelt appreciation also goes to my mother Dorah Mwita and my father Francis Mkumbo for their encouragement, understanding and prayers. I also say thank you to all those who helped me in one way or another although their names are not mentioned here with no exception of my classmates. Thank you very much indeed.

DEDICATION

This work is dedicated to my beloved parents Mr. and Mrs. Francis Mkumbo, together with my children Doreen and Gerson for their prayers, encouragement, understanding and moral support.

ACRONYMS

ALU	Artemether Lumafantrine
CHMT	Council Health Management Team
DD	Direct Delivery
DRP	Distribution Requirement Planning
EDI	Electronic Data Interchange
eLMIS	Electronic logistics management information system
ERP	Enterprise Resource Planning
HCWs	Health Care Workers
HMIS	Health Management Information System
HPSS	Health promotion and system strengthening
HSPP	Health Sector Performance Profile
HSSP	Health Sector Strategic Plan
ILS	Integrated Logistics System
M&E	Monitoring and Evaluation
MOHSW	Ministry of Health and Social Welfare
MSD	Medical Store Department
MSH	Management Sciences for Health
R&R	Report and Request
REPOA	Research and Poverty Alleviation
RHMT	Regional Health Management Team
TDHS	Tanzania Demographic Health Survey
USAID	United States Agency for International Development

OPERATIONAL DEFINITIONS

Logistics

Is the movement and supply of troops and equipment to achieve specified goal. (Oxford dictionary).

Information system

The system that provides specific information support to the decision making process at each level of organization (WHO, 2000).

Supply

Means to make something needed available to someone. In this evaluation it means make medicine and medical equipment available (Oxford dictionary).

Integrated logistics system

The Integrated Logistics System is a system for managing various categories of health supplies, using a single set of procedures (MOHSW, 2008).

Inventory control

Systematic management of the balance on hand of inventory items like essential medicines, involving the supply, storage, distribution, and recording of items (Mahoro, 2013).

Record keeping

This is the systematic procedure, by which the records of an organization are created, captured, maintained, and disposed of. This system also ensures their preservation for evidential purposes, accurate and efficient updating, timely availability, and control of access to them only by authorized personnel (Mahoro, 2013).

Stock out

Depicts a situation in which the demand or requirement for an item cannot be fulfilled from the current inventory (MSH, 2010).

Order fill rate

The percentage of individual items ordered from a supplier and issued (MSH, 2012).

Essential medicines

Are medicines that satisfy the priority health care needs of the population, selected due to disease prevalence, evidence on efficacy and safety, and comparative Cost effectiveness, intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality, and at price the individual and the community can afford (WHO, 2002).

Tracer medicines: These are essential medicines selected by the Ministry of Health of Tanzania to be available in all Government health institutions all the time (HSSPIV, 2015-2020).

ABSTRACT

In response to the problem of shortage and wastage of essential medicines, Tanzania introduced the supply chain system for reporting and requesting medicines and other medical supplies to the respective Government owned health facilities called integrated logistics system, despite ILS introduction the health facilities have continued to face the same problem. This evaluation study was intended to evaluate the effect of Integrated Logistics System activities and their contribution to essential medicines availability in the selected 11 Health Facilities in Mbeya City Council. The specific objectives were (i) To determine the stock status of essential medicine for the past 12 months and on the day of assessment. (ii) To examine the extent to which integrated logistics system activities i.e records keeping, store management, filling report and request forms are implemented as designed (iii) To explore factors influencing the implementation of integrated logistics system (iv) To examine the contribution of integrated logistics system activities i.e records keeping, report submission time, filling report and request forms on essential medicine availability.

The study employed explorative and descriptive study design where by both quantitative and qualitative methods of data collection were used. The study findings revealed that though the facilities had shortage of essential medicines (Tracer medicines) on average the availability on the day of assessment was found to be 87%, for the period 2015/2016 was 78% and for July 2016 to March 2017 was 92% which show improvement on availability compared to 2014 HMIS data which was 70% availability. The results suggested that ILS activities implementation as designed had an effect on essential medicines availability to health facilities. Its activities implementation depend on each other and if implemented as designed can contribute to the availability of essential medicines though other factors like availability of fund and medicines at MSD needs to be checked on which did not included in this study. The result found that ILS activities were not implemented as designed by the most of health facilities and this challenge had to be rectified by MoHCDGEC, Regional and district level together with their facilities.

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CHAPTER ONE

BACKGROUND INFORMATION

1.1 General Overview

Medicine supply management system is an important key element that ensures essential medicine availability in health facilities. Medicines need to be managed properly to prevent all types of wastage including overstocking, pilferage and expiry. The wastage reduces the quantity of medicines available to patients hence the quality of services provided by health facilities. Therefore, managing medicines flow helps to secure a continuous supply. Both under stocking or overstocking and expiry of medicines signal problems within the supply chain (Godeliver & Kagashe, 2012).

Most of the countries globally are faced with the shift of burden of diseases, moving away from acute diseases (communicable diseases) to chronic diseases (non communicable diseases). This shift has repercussion on medicine supply and its use. The most critical challenge for health delivery system is to find medicines supply systems which are better and more cost-effective for delivering medicines and related health care to the growing number of people with chronic conditions, particularly in the urbanizing areas of the developing world (WHO, 2011).

In both developed and developing countries, the management of supply chains determines how services will be delivered. Therefore, effective supply chain management leads to effective service delivery. For supply chain to be effective there must be smooth flow of information within the supply chain itself. In East Africa, health sector service delivery management is still faced with several challenges, most of which are attributed to supply chain information management systems (Int. J Sup. Chain Mgt, 2014).

Supply chain management is an important element for delivery of quality health services, without which health facilities will be seriously limited in their ability to provide adequate health care services to the community in need. To ensure availability

of essential medicines and medical devices, Tanzania introduced the supply chain system for reporting and ordering medicines and other medical supplies to the respective Government owned health facilities. The system is known as Integrated Logistic System (ILS) whereby a health facility reports the utilization of medicine and other medical supplies and requests the resupply on quarterly basis (MOHSW, 2008).

1.1.1 Tanzania Supply Chain Overview

In Tanzania, the Medical Stores Department (MSD), which is under the Ministry of Health, Community development, Gender, Elderly and children has the responsibility of procuring, storing, and distributing drugs and related medical supplies to health facilities. In the early 1990s, medicines and other medical supplies were centrally provided in a form of standard, pre-packed kits to all public health facilities and some Non Governmental health facilities (excluding hospitals) from the Medical Stores Department (MSD), in what was called the push system. The standardized kits made medicines in some areas to run down at a faster rate (causing stock-outs) or to become overstocked (and risk expiration) due to differences in geographical areas and disease burdens (Lopez *et al.*, 2014).

Upon recognizing the problem of push system in the year 2000, the Ministry of Health (MOH) and DANIDA transformed the pre-packed kit system into an ordering system, whereby health facilities would determine their own drug needs and place orders to MSD on quarterly basis. In this system, vertical programmes such as family planning and specific disease control programmes including sexually transmitted infections, malaria and HIV remained independent and developed their own individual supply chains (URT, 2002; Lopez *et al.*, 2014). But by having their own supply chain, the vertical programmes were uncoordinated; each group of facilities had separate procedures for ordering supplies from the Medical Stores Department (MSD).

In the year 2002, the Ministry of Health embarked on a plan to integrate the logistics systems of many of its vertical programmes (JSI/Deliver, 2005). The MOH developed strategies for the development and implementation of the integrated logistics system for essential health commodities with the long term goals and objectives, as well as the

intermediate term strategy and objectives. The long term goal was to ensure availability of essential health commodities at all levels of the public sector health care delivery through an integrated supply chain (URT, 2002).

The Integrated Logistics System (ILS) for reporting and requesting supply of health commodities was introduced in the year 2005, with training for the last region being completed at the end of 2009 (USAID/Deliver, 2010).). The ILS requires health facilities to request resupplies on a quarterly basis using Report & Request forms through the district pharmacist, who reviews and submits the forms to Medical Store Department through electronic management information system. Upon receipt of the R&R form, MSD prepares package for each facility based on the amount requested in the R&R form as well as funds available for each facility. (USAID/DELIVER, 2010) These packages are delivered to the health facilities by MSD (for direct distribution). Previously, MSD was delivering the packages to the district which was then responsible for delivering the pre-package to its health facilities (indirect distribution)

1.2 Problem Statement

Despite the introduction of the ILS, the country is still facing erratic supply of essential medicines and some medical equipment and other commodities. The World Health Organization report on the World Health Statistics (2014) reveals that in the United Republic of Tanzania, the median availability of selected generic medicines in public outlets was 23.4%, the percentage was double in private outlets which were 47.9% (URT NAO, 2014). Also, according to HSSP IV, the availability of key medicines in health facilities remains low, with no clear trend of improvement during HSSP III.

It has been observed that for most of the healthcare sectors in developing countries, the supply chain is not recognized as a central role in the overall strategy of the health care organizations (Mungu, 2013). The annual CAG report for the financial year 2010/2011 on the audit of Tanzania Public Authorities (PA) and Other Bodies (OBs) revealed several weaknesses in relation to inventory management which is the part of supply chain activity and these problems were encountered to seven Public Authorities (Medard, 2012) .Also a lack of awareness of the methods of inventory control was found

in public hospitals in Tanzania the study reveals that most of the staff (65%) in Dar es Salaam hospitals did not know any of the inventory control methods used in inventory management (Kagashe & Masawe, 2012). However, similar studies have not been conducted in Mbeya City Council and likewise it is not certain whether the same health facility challenges face Mbeya City Council.

In Mbeya Region for example, annual plan 2015/2016 one of the issues observed was shortage of medicine, medical equipment and supplies as reported by 70% of districts (i.e. 7 out of 10 districts councils reported inadequate stocks of medicine, medical equipment, and supplies). According to HMIS data in 2014, it was shown that the mean number of tracer's availability was 7 out of 10 in Mbeya City Council. This indicates that shortage of medicine is a problem in Mbeya City Council.

Even after the establishment of the integrated logistics system, still there is a problem of shortage of medicine and there is no evidence of the cause of this problem. Therefore, there is a need to understand the probable cause of shortage of medicine in health centres and dispensaries. ILS has activities implemented for its performance, the effects of implementing its activities record keeping, store management and filling of report and request forms need to be further looked on. Therefore, because of the fact that record keeping, report submission time, store management and filling of report and request forms (ordering) have not been examined; the question comes: what is the effect of ILS on essential medicines availability? This evaluation intends to evaluate the effect of integrated logistics system on essential medicines availability so as to see the implementation of ILS activities in the selected health centres and dispensaries and its influence on essential medicine availability.

1.3 Evaluation Questions and Objectives

1.3.1 Main Evaluation Question

To what extent has the integrated logistics system improved the availability of essential medicine in health centres and dispensaries?

1.3.2 Specific Evaluation Questions

1. What is the stock status of essential medicine for the past 12 months and on the day of assessment?
2. To what extent are Integrated Logistics System activities i.e records keeping, store management, filling report and request forms implemented as designed?
3. What are the factors influencing implementation of Integrated Logistics System?
4. To what extent does the Integrated Logistics System activities i.e records keeping, store management, filling report and request forms contribute to availability of medicines?

1.3.3 Evaluation Goal

The goal is to evaluate the effect of integrated logistics system on essential medicine availability in health centres and dispensaries at Mbeya city council.

1.3.4 Evaluation Specific Objectives

1. To determine the stock status of essential medicine for the past 12 months and on the day of assessment.
2. To examine the extent to which integrated logistics system activities i.e records keeping, store management, filling report and request forms are implemented as designed.
3. To explore factors influencing the implementation of integrated logistics system.

4. To examine the contribution of integrated logistics system activities i.e records keeping, store management, filling report and request forms on essential medicine availability.

1.4 Significance of the Evaluation

The findings of this evaluation study contributed to the increase of the general knowledge on supply chain management and integrated logistics system in particular and its influence in essential medicine availability in public health facilities. It helped health facilities on the best way to improve performance of integrated logistics system activities for essential medicines (tracer medicines) and other health commodities. The district benefited by exploring the findings of the evaluation and uses them for improvement of ILS activities implementation also for planning, budgeting and decision making.

Furthermore the evaluation results generated inputs to inform policy makers and policy implementers on the status of implementation of integrated logistics system activities in health sector assisting in decision making, budgeting and planning.

Finally, this evaluation enabled the evaluator to attain Master of Science Degree in Health Monitoring and Evaluation in which the evaluation study was a requirement for each student.

1.5 Description of the Programme (integrated logistic system)

The system manages various categories of health supply using a single set of procedures. For this system to perform well and be successful, it must observe six rights of supply management that is, the Right Item, in the Right Quantity, of the Right Quality which is available at the Right Place, at the Right Time, for the Right Cost (MOHSW, 2013). In this system, public health facilities request medicines and other supplies on quarterly bases and they are grouped in three groups which are A, B, and C and the groups reflect their reporting and requesting schedule.

In November 2013, Tanzania improved the ILS by introducing the first release of the central level web based electronic logistic management system (elmis) where districts enter into the system the Report and request form from the lower level health facility and directly sent to Medical Store Department (MSD). Order quantities are based on the quantities of supplies that are used to serve clients, quantities received in the previous quarter and the quantities of stock held by the facility at the time the order is placed. The orders are sent to MSD which is the main supplier of health commodities. After receiving requests, MSD packs and delivers health commodities directly to the health facilities.

1.5.1 Main Goal and Objectives of Integrated Logistics System

Main Goal

Ensure availability of essential health commodities at all levels of the public sector health care delivery system through an integrated supply chain (URT, 2002).

Objectives

- To improve essential health commodity management at all levels of the public sector health care delivery system by designing and implementing a fully operational logistics system and logistics Management Information System that can manage increased volumes of commodities (URT, 2002).
- To build individual and organizational capacity and capabilities for logistics system management and use of logistics Management Information System data at all levels of the Tanzanian public health sector (URT, 2002).

1.5.2 Tanzania Health Commodities Target and Indicators

According to HSSPIV, the target focus is on ensuring 100% stock availability of essential medicines in all primary health facilities in the country through the implementation of the following initiatives: Improved governance and accountability to the health commodity supply chain, Eliminating frequent stock outs and pilferages, Strengthening the management of MSD's working capital and complementing MSD in the procurement and distribution of medicines through engagement with the private

sector, and therefore improving accountability, introducing an ICT mobile application platform, expanding the SMS reporting system, Scaling up Total Quality Management initiatives to the primary facility level using the 5S-KAIZEN approach (HSSPIV, 2015-2020).

Medicines Performance Indicator According to HSSPIV (2015-2020)

The main medicine performance indicators according to HSSPIV are stock availability and order fill rate. For Stock availability (HMIS), the indicators are Percentage of facilities with availability of each key medicine and Percentage of facilities with availability of all 10 key medicines. For the Order fill rate, the indicator is Percentage of items ordered that are actually received by HF.

Strategies for Ensuring Proper Pharmaceutical Supply Chain Management (HSSP IV 2009-2015) are to:

1. Ensure accessibility at all levels of safe, efficacious pharmaceuticals, medical supplies and equipment
2. Strengthen control of quality, safety and efficacy of pharmaceuticals, medical supplies and medical equipment
3. Ensure gender sensitive, equitable availability and rational use of quality pharmaceuticals, medical supplies and equipment in health facilities
4. Enhance harmonization and coordination and information management of procurement, stocking and distribution of medicines and supplies for specific health programmes

The above strategies are complemented by HSSP IV (2015 -2020) strategic direction for pharmaceutical supply chain management that emphasizes essential medicines and health products that are of higher quality, rightly priced, efficiently delivered through MSD, and complemented by decentralized procurement while engaging the private sector. National stewardship and regulatory oversight will be coupled with custodianship from local government and mechanisms for public accountability. The appropriate use of medicines will improve through quality assurance.

Therefore, this evaluation dealt with the government target to reach 100% stock availability of essential medicines in all primary health facilities through the implementation of the initiative, improved governance and accountability to the health commodity supply chain and pharmaceutical strategy of Strengthening control of quality, safety and efficacy of pharmaceuticals, medical supplies and medical equipment.

1.5.3 Stakeholders Involved in Integrated Logistics System

A stakeholder can be defined as any person, or group, who has an interest in the project or could be potentially affected by its delivery or outputs. Stakeholders may be existing or potential customers or end-users of the product, employees, suppliers, shareholders, or those that define policies or have financial leverage. The key stakeholders in the ILS are as follows: MOHSW, MSD, RHMT, CHMT, HMT, Health care workers, implementing partners (JSI) and community at large.

1.5.4 Role of Stakeholder in the Programme

Table 1.1: Shows role of each stakeholder in the programme

NAME OF STAKEHOLDER	ROLE IN THE PROGRAMME
MOHSW	Developing policies, strategic and operational plans Allocating fund for health facilities
MSD	Procure (and clear), store, and distribute drugs and related medical supplies
RHMT	Overseer of the programme in the region. Conducts Supportive supervision, mentoring and coaching, Coordinates health activities translates and disseminates policies and guidelines
CHMT	Conducting Supportive supervision , mentoring and coaching
HCWs	Provision of services including Selection, forecasting, ordering ,storing and dispensing of health commodities to clients
Implementing partners	Conducting Supportive supervision, mentoring coaching and training
Community	Compliance and adherence to the service provided (Beneficiaries). Community sensitization

1.5.5 Benefits of ILS

- Each facility determine its own requests
- Assists in managing drug finances
- Reduces the number of forms previously used in vertical systems
- Enhances record keeping
- Facilitates supervision
- Promotes a more rational use of medicines and transportation
- Enables data collection for planning and budgeting
- Minimizes wastage and pilferage

(MOHSW, 2013)

1.5.6 Integrated Logistics System Activities and Resources

Activities

The major activities conducted in ILS are: product selection, quantification, storing, inventory control and ordering of health commodities according to the consumption data and fund available by health facilities. MSDs have the responsibility of procuring, storing and distributing health commodities directly to the health facilities.

Resources

The ILS procedure manual of 2008 shows that one of the major concerns in an integrated logistics system is that the cost of needed supplies may exceed the value of allocated funds. The government continues to decentralize responsibility for collecting funds which is being transferred to lower levels. The districts are responsible for raising part of funding needed for essential medicines. Also, the complementary funding mechanisms have been introduced, these include: Government allocation, basket fund and Council/facility own source such as user fee and insurance fund like NHIF/CHF/TIKA (MOHSW, 2008).

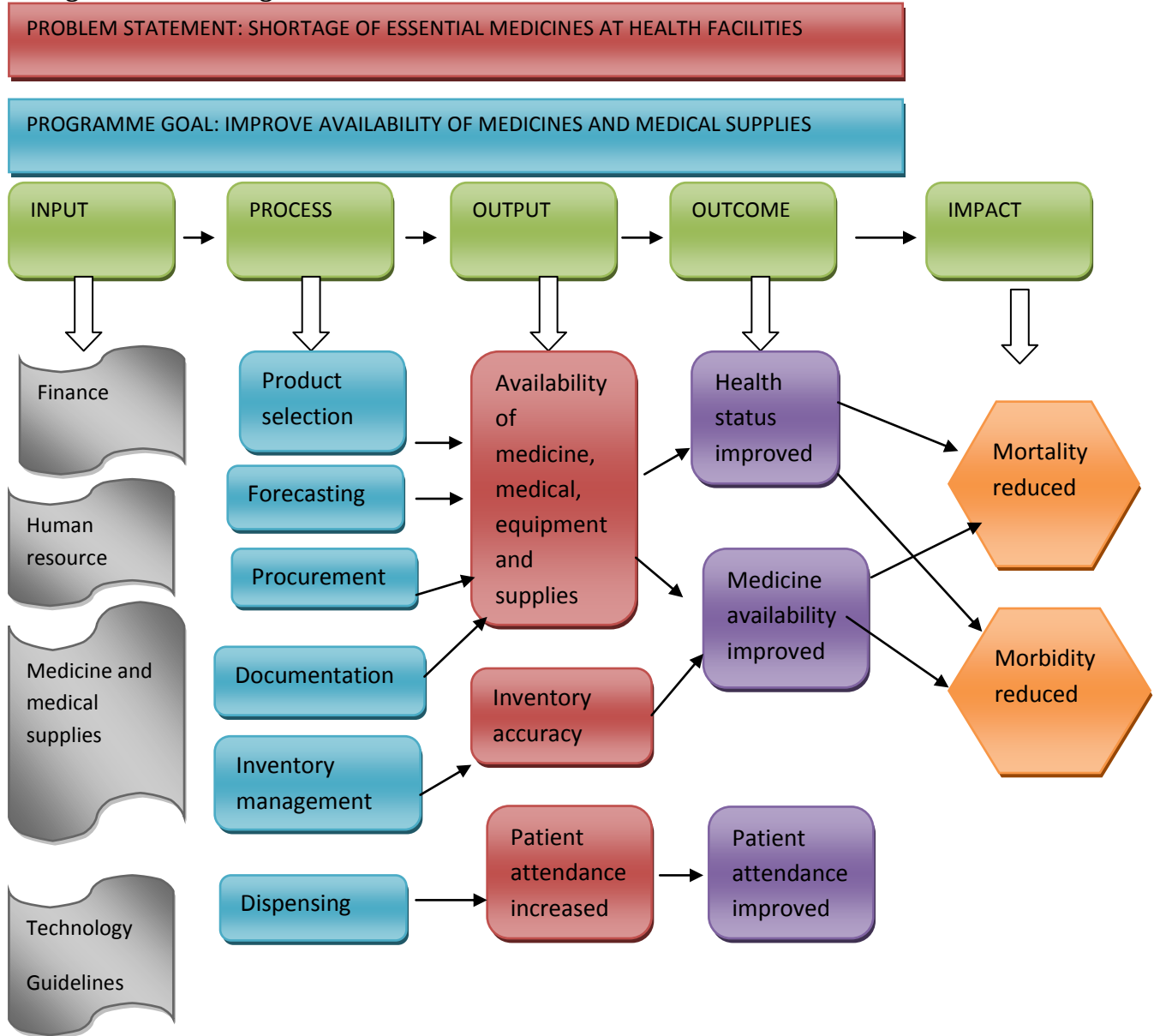
1.5.7 Stakeholder Analysis

Table 1.2: Stakeholders' participation and Role in Evaluation and Means of Communication among them

Stakeholders	Role in the programme	Interest or perspective on Evaluation	Role in Evaluation	Means of Communication	Level of importance
MOHSW	Developing policies, strategic and operational plans	Providing funds and support	Regulating and setting standards of health services	Advocacy meeting Mail	High
Implementing partners	Financial and technical support	Ensure quality service delivery	Capacity building	Advocacy meeting Mail	
MSD	Procure (and clear), store, and distribute drugs and related medical supplies	Ensure the availability of health commodities	Ensure availability of health commodities	Face to face, Advocacy Meeting, Mail, and Latter.	High
RHMT	Supervision	Ensure quality care provided	Supportive supervision and mentoring/Couching	Face to face ,Meeting ,Mail, Latter	Medium
CHMT	Supervision /mentoring and planning	Ensure quality care is provided/store commodities	Supportive supervision mentoring and planning	Face to face ,Meeting ,Mail, Latter	Medium
HCW	Selection, forecasting, ordering ,storing and dispensing	Service provision	Ensure availability of health commodities	Face to face ,Meeting ,Mail, Latter	Medium
Community	Adherence/Compliance	Receiving the services	Community sensitization	Face to face and Meetings	Low

1.5.8 ILS Logical Model

Figure 1.1: ILS Logical Model



The figure above shows the ILS' logical model indicating inputs, process, output, outcome and impact of the system if done as designed.

CHAPTER TWO

LITERATURE REVIEW

Introduction

Medicines are commodities of a peculiar importance because they can save lives and improve health and promote trust and participation in health services (MSH, 2012). They are costly which makes them different from other products; and because of this, improvement in supply chain and inventory management system is necessary. Various literatures were reviewed to conceptualize and get wider perspective of the topic and identify gaps within the reviewed literatures. The reviewed literature covered medicine availability, supply chain management, inventory management and ordering procedures.

2.1 Medicine Availability

In depth assessment of medicines supply management system in Tanzania revealed that Median availability for 20 tracer medicines in the zonal stores was found to be 82.5%, while that value for the health facilities was 88.9%. Although availability of tracer medicines was high at health facilities, the same facilities also presented a considerable number of stock-out days. Some medicines were out of stock for 4 months. In fact, the median number of stock-out for the 20 tracer medicines was 135.6. On the other hand, the median number of stock-out days for zonal stores was 0, as there were no stock-out days for more than half of the medicines considered (MOHSW, 2008). These findings made a reason why there was a need to do evaluation on supply chain management in relation to medicine availability, to identify the cause of the problem of the availability of tracer medicine in public health facilities especially the lower level health facilities where the majority of population obtain the services.

A study done by REPOA (2014) on the Tanzanian health sector as buyer and user of medicines and other essential supplies showed that the availability of supplies was much lower in the health centres and dispensaries visited. Among the tracer medicines, only paracetamol was available in *all* lower level health facilities. Availability of the tracer

medicines was 62% on average. In fact, the availability was lower in the public sector facilities and higher in the faith-based facilities

HSPP Report (2011) indicates that data on availability of nine tracer commodities on the day of survey were obtained and on average, tracer commodities were available on the day of survey at 74% of health facilities (9 tracers over 10 quarters, in 500 facilities). Items with low availability were dextrose infusion (average 64%) and artemether lumefantrine 4X6 tabs (ALu; average 67%). Items with high availability were cotrimoxazole tablets (average 85%) and amoxycillin capsules (average 79%). According to HSSP IV, the availability of key medicines in health facilities remains low, with no clear trend of improvement during HSSP III.

The study done by GIZ in the year 2011 in Mtwara, Lindi, Mbeya and Tanga on the availability and management of medicines and medical supplies reveals that Primary care public health facilities (dispensaries and health centres) in the four Regions face severe stock-outs of essential medicines and medical equipment. One of the major challenges observed was incomplete supply of medicine requests from health facilities by MSD, with average MSD order fulfilment rates of 65% in Tanga and Mbeya Regions. In Mbozi District, for example, only 54.6% of the District orders could be supplied. While the highest level of order fulfilment was found in Rungwe District, at 76.6% availability, in general MSD order fulfilment rates in Mbeya Region varied between 54.6% and 76.6%. The study was not conducted in Mbeya city and Ileje district council.

Sauti za wananchi findings reported the following concerning medicine availability in Tanzania Brief No 5 Titled STOCK OR IN STOCK? The first concerns are accountability: when stocks of essential medicines run out, public facilities should be able to refill them at the right time. If this is not done the case might be due to insufficient funds in health facilities to procure medicines or a supply problem at Medical Stores Department level or facilities may also fail to order in time because of the system is leaking in which either funds or drugs are ending up outside the system, e.g. in private pharmacies; or a combination of these factors. (sauti za wananchi, 2013).

This study mentioned that accountability might be among the causes of stock-outs; therefore, it was important to know if the medicines were being managed properly by health facilities in Mbeya city Council.

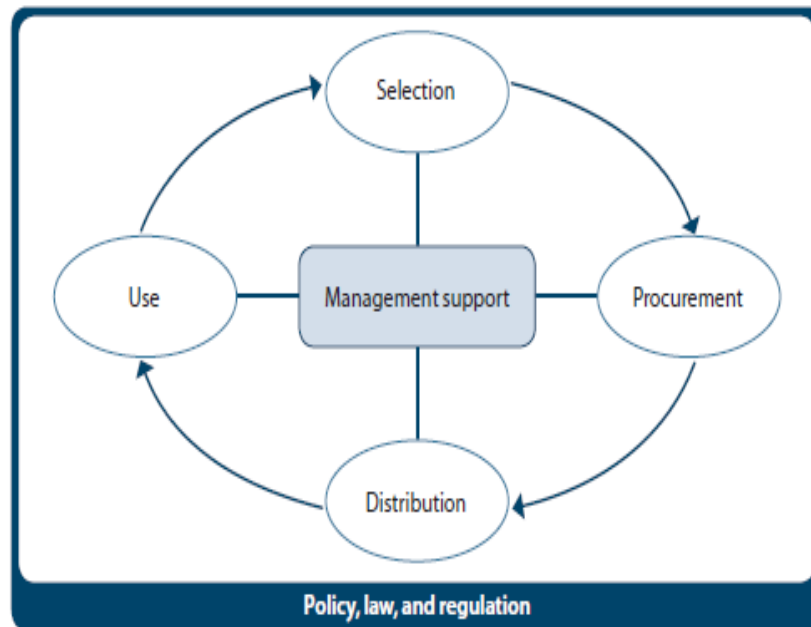
A Twaweza survey conducted in 2013 found that 41% of the patients were not able to get the medicines they needed directly from a public health facility. Instead, they often turned to private pharmacies and private health facilities for medicines due to shortages of such in public facilities. This entails that, paying a premium for essential medicines that should be available at a discount from public facilities especially in urban areas and in rural areas, where private facilities are fewer, means paying for transport and medicine costs or simply going back home without needed medicines. (Joseph *et al*, 2014) These results paved a way for this study to find out the cause of shortage of medicines in public health facilities if it is the system, the design of activities or any other factors the survey did not take into account.

2.2 Supply Chain Management

Supply chain management is a clearly recognized scientific discipline, but it has not well been utilized especially in developed countries for improving public health supply chains. As a result, this has made the supply chains that serve patients in developing countries to remain weak and ineffective, in turn putting treatment programmes at risk therefore reducing the health system's ability to respond to health care needs of the community (Yadav *et al*, 2015).

The management of medicine supply is organized based on the four basic functions of the supply management cycle namely: selection, procurement, distribution and use. At the centre of the Medicine supply management cycle (MSM) there is management support systems which includes organization, financing and sustainability, information management and human resource management (MSH, 2012). The success of the cycle depends upon the ability to reliably and consistently supply the drugs and good management of medicines to health facilities at all levels of the health system.

Figure 2.1: Pharmaceutical (medicines) Management Framework



Source : (MSH, 2012) Mds 3 Managing access to medicine and health technology

The above framework elaborates that managing medicine supply needs five important insights which are presence of national medicine policy which guides for action, wise medicine selection, effective management and good governance in relation to procurement and distribution, rational use of medicine and systematic assessment and monitoring of medicines.

The study done in Uganda by Kitaka (2010) in two health centres revealed that the existing Logistics and supplies management systems were delaying the delivering of supply with situations of under supply or over supply at both Health commodities as opposed to a quality logistics management system that would ensure getting the right quantities of the right items to the right place at the right time in the right condition at the right cost. It was revealed that disregarding orders or ignoring them by the supplier Joint Medical Store was very common thus leading to a supply of what was not ordered for. This evaluation study also reveals the situation in health facilities if they receive medicine they ordered from Medical Stores Department.

Logistics management information system is vital to supply chain. On this regard, the case study on National Medical Store in Uganda came up with the following conclusions: supply chain information management contributes positively to service delivery among public health sector organizations. In the light of these conclusions, the paper serves as a platform for supply chain managers to comprehend the importance of information management within the supply chain process. Secondly, it contributes to the existing board of knowledge as far as supply chain information management is concerned (Int. J Sup. Chain. Mgt, 2014).

2.3 Inventory Management

Accurate and updated stock records are essential to good inventory management. They are source of information used to calculate needs as inaccurate records produce inaccurate needs estimation (WHO, 2011). The importance of inventory management in the public sector is based on the need to: demonstrate accountability for public resources; improve transparency and credibility of information used for making policy choices; and improves efficiency (National treasury South Africa, 2009).

Good storage practices in the pharmaceutical storage are often overlooked. The warehouse should always be kept clean and dry. Health commodities should be stored according to the principles of “first expired, first out.” There should be regular inspection of medicines so that damaged or expired stock is disposed of safely. (<http://apps.who.int/medicinedocs/documents>)

Improvement of inventory management in health facilities can lead to:

- Release up of resources to be used to elsewhere due to reductions in stock held in inventory
- Reduces losses due to theft, wastage, damage, spoilage or misuse (National treasury S.A, 2009).

The challenge of inadequate storage and inventory control makes many medicines to expire before they can be used or they are used irrationally (Adzimah et al, 2014). It is important to reduce resource wastage given the limited resource availability especially in

developing countries like Tanzania by ensuring the procured medicines are appropriately received, stored and distributed while maintaining their quality. This will help in improving quality of services delivered by health facilities (Kagashe & Massawe, 2012)

A number of studies done verified the improper inventory control practices in Health facilities. From the study done in Jordan to assess pharmacy and inventory control in ministry of health hospitals, the results showed that medication quantification requirements were not estimated according to actual hospital needs and standard procedures, also there were improper stock recording practices in some hospitals. A lack of awareness of the methods of inventory control was found in public hospitals in Tanzania where 65% of staff in four hospitals in Dar es Salaam did not know any of the inventory control methods used in inventory management (Kagashe & Masawe, 2012)

From the results of study done in South Africa, poor record keeping was generally observed; the accuracy of records was low, since only 21.9% of the records were found to be accurate. This result shows non evidence based decisions on ordering frequency and quantities, as ordering decisions is based on weak ground information which has cost implications (Mahoro, 2013). Basing on this, the study in Mbeya City Council was done to observe if the same cases were facing the facilities or not as all facilities order medicines themselves according to ILS procedures.

A cross-sectional survey done to six public and 32 private medicine outlets in Uganda by using semi-structured questionnaires showed that medicine expiries in both public as well as private facilities and the contributing factors included neglect of stock monitoring and a lack of knowledge of basic expiry prevention tools. On the other hand, an effective drug supply management system has been reported in Zimbabwe, where stock management of essential drugs (EDs) at health facility level was good. Inventory control system based on monthly ordering was a key success to supply management, medicines were ordered when their stocks reached the ordering point, which was set at three months' consumption. (Mahoro,2013).

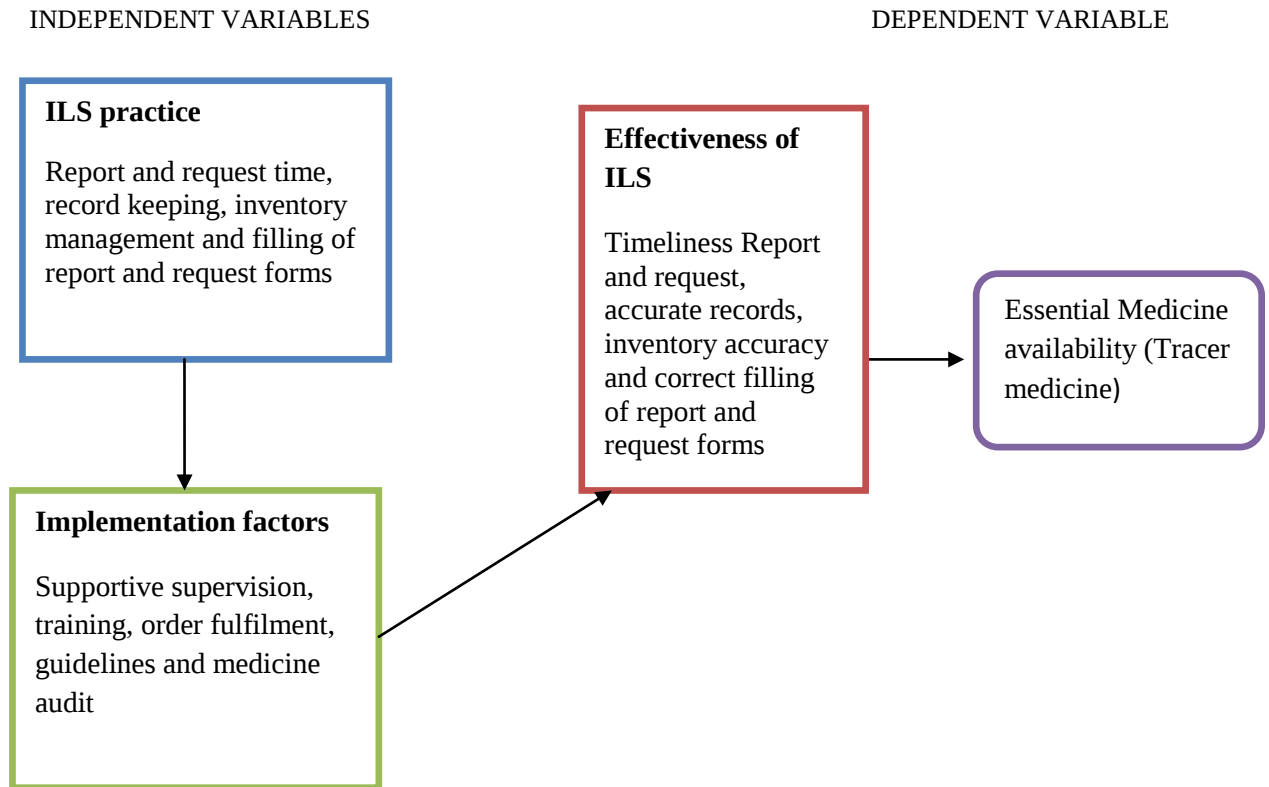
2.4 Ordering Procedures (Report and request forms filling)

A study done in Tanzania on the review of the health facility report and request forms at MSD zonal stores 2010 found that many districts did not submit R&R forms in their appropriate delivery groups. It was revealed that between February and April 2010, nine out of 16 districts submitted R&R forms, of these nine districts, only four (Ulanga, Kibaha DC, Kibaha TC and Mkuranga) submitted all R&R forms in the correct delivery group. The rest of the districts either submitted incomplete numbers of R&R forms for the appropriate delivery group (Ilala, Morogoro MC, Kisarawe and Mafia), or submitted forms for facilities that were not in the appropriate delivery group for that month (USAID/DELIVER PROJECT, 2010). The study did not look at other ILS activities like inventory management procedures only report and request forms and Mbeya region was not involved in the study.

A study done by REPOA (2014) on the Tanzania health sector as buyer and user of medicines and other essential supplies showed that the availability of supplies was much lower in the health centres and dispensaries visited, only paracetamol was available in all lower level health facilities. It was revealed that availability of the tracer medicines was 62% on average, lower in the public sector facilities and higher in the faith-based facilities. This study indicated that some health facilities did not order the medicines. Therefore, this study evaluated the Mbeya city health facilities availability of all essential medicine needed by facilities and the status of implementation of ILS activities (report submission time, R&R forms filling, store management and record keeping) which can facilitate medicine availability.

Figure 2.2: Conceptual Framework

The figure below shows the independent and dependent variables that influence the medicine availability in Integrated Logistics System.



The above conceptual framework assumed that independent variables can influence essential medicines availability in health facilities. The framework indicates that when proper practice of the ILS activities and other implementation factors the ILS will be effectively implemented and may contribute to essential medicine availability in Health facilities. ILS practices in health facilities were determined quantitatively using questionnaire and observational checklist while implementation factors were obtained qualitatively by individual interview to explore health workers' perception on ILS and factors that can influence its performance.

CHAPTER THREE

EVALUATION METHODS

Introduction

This chapter addresses the evaluation design that was employed to investigate the evaluation topic. It focuses on the study area, evaluation design, study duration, evaluation approach, population and the characteristics of the sample. Furthermore, the procedure and measuring instrument used to gather the data for the evaluation are also discussed.

3.1 Study Area

The study was carried out in Mbeya Region in the southern highland zone of Tanzania. Mbeya region has seven District Councils but the study was conducted in Mbeya city. Conveniently, Mbeya city was chosen as a source population for the Evaluation study due to easy accessibility of health facilities, logistics reasons, also for the fact that it would represent other districts as all districts implement ILS. Mbeya City Council covers a total area of 214sq km and is surrounded by Mbeya District Council in all directions (Mbeya city CCHP, 2013/14). Mbeya city has the total number of 14 Government health facilities (3 Hospitals, 8 Dispensaries and 3 Health centres).

3.2 Evaluation Design

The study employed explorative and descriptive study design. Exploratory study design was employed to get the insight, perception and challenges of the ILS system from health care workers. The evaluation was descriptive because it employed both qualitative and quantitative elements. Therefore, both qualitative and quantitative methods of data collection were used.

3.3 Study Duration

This evaluation was conducted starting December 2016 to May 2017. It commenced with proposal write up then data collection after acquiring approval from both Mzumbe University and Mbeya City Council officials and lastly data analysis and reporting.

3.4 Evaluation Approach

Formative evaluation approach was used to evaluate Integrated Logistics System. Formative or process evaluations focus on the quality of programme design and implementation (Gorgens, 2009 pg 365). Formative evaluation is carried out after a project has been under way for some time but still directed mainly at improving the project's activities and design. It is formative evaluation because the study specifically intended to provide feedback on performance to improve and accelerate integrated logistics system activities implementation to health facilities.

The evaluation was intended to identify stock status, record keeping and stock management performances and finally suggest solutions. The assessment was led by store keepers who were responsible for the store's overall performance, in collaboration with other health facility staff. The evaluation results will be used by health facilities themselves, Council health management team, Regional health management team and the Ministry of Health as the policy maker. Utilization focus approach was used.

3.5 Focus of Evaluation and Dimensions

The main focus of the study was to evaluate the effectiveness of integrated logistics system implementation by looking at record keeping, filling of report and request forms together with store management (inventory management) of essential medicines in relation to essential medicine availability in public health facilities. The focus of measurement of programme theory was process evaluation which was done to see how the integrated logistics system activities were implemented in order to provide feedback to the health facilities and higher levels at large. The evaluation focused on:

- Determining stock status of essential medicine (tracer medicines)

- The implementation of integrated logistics system activities by health facilities
- Exploring factors influencing implementation of the system at health facilities
- Examining the influence of Integrated Logistics System to essential medicine availability

Independent Variables

- Stock status
- Integrated logistics system activities (Record keeping including report and request, inventory accuracy, storage, ordering, issuing and distribution procedures)
- Implementation factors perceived to influence ILS

These dimensions were measured using the following indicators adopted from WHO inventory indicators (2011).The indicators measurement are as follows:-

Stock Status

Percentage of products in stock: “Measures the system's effectiveness in maintaining a range of commodities in stock (at the time of the assessment)” (WHO, 2011).

Stock out Rates

According to WHO inventory indicators (2011), this indicator measures the percentage of health facilities that experienced a stock out of a specific product that the site is expected to provide, at any point, within a defined period of time (e.g., the past six or 12 months) (WHO,2011).

Inventory Accuracy Rate

This indicator “measures whether stock balances recorded on a stock ledger, bin card, or automated systems are similar to the actual inventory on hand. This indicator can be calculated for any facility that manages the items in question and can be calculated whenever a physical inventory is taken” (WHO, 2011).

3.6 Population and Sampling

3.6.1 Target Population and Source Population

The population refers to the entire group of people from which data can be sourced and investigated and from which the researcher can make references (Narkotey 2012). The target population was Mbeya region which has seven District Councils but conveniently Mbeya city was chosen as source population for the Evaluation study. Mbeya city was chosen because of accessibility of the Health Facilities and also due to logistics reasons. Mbeya city has the total number of 14 Government health facilities (3 Hospitals, 8 Dispensaries and 3 Health centers). Facilities implementing ILS totally are Health centers and Dispensaries.

3.6.2 Study Population

Mbeya city health facilities were the study population from which data were collected.

3.6.3 Study Units and Sampling Units

Study units were the Mbeya city council health facilities through which the sampling unit was selected. Sampling units: During sampling, health facilities implementing ILS were selected as sampling units.

3.6.4 Sample Size

The study focused on determining the proportion of health facilities that adheres to ILS implementation in health centres and dispensaries in Mbeya City Council. The sample size for the study comprised of a total of 11 health facilities. The sample size was determined using the formula for Sample size calculation for a single proportion with specified precision with the assumption that confidence interval is 95%, population size is 11 health facilities, marginal error ± 0.05 and estimated proportion is 50% representing the estimation of the problem in the study population (estimation was used because of lack of actual problem estimation). The formula used is:

$$n = (Z^2 \times P(1 - P))/e^2$$

Where n - Sample size

Z =desired confidence level ($Z=95\%$ CI)

$P = 50\%$

Marginal error(desired precision)= ± 0.05

Population = 11 health facilities

Where: n = desired sample size z = CI (95%)

p = Estimated proportion of the target population which represented the estimation of the problem in the study population.

3.6.5 Sampling Procedure/Technique

Health workers dealing with ILS activities were purposely included in the study to determine how these activities were done in their Health facilities. Also the health facilities in charges were involved in the study as they were the supervisors (managers) of these activities. Therefore the Sampling unit was Mbeya city Government health facilities. Sampling frame in which the sample was drawn were Mbeya City list of health facilities implementing ILS and the sample size was the selected health facilities implementing ILS which was determined using sample size formula.

3.6.6 Inclusion and Exclusion Criteria

Inclusion criteria for the facilities were those health facilities implementing the ILS and for the respondents were those health workers working as store keepers/ store in charge responsible for reporting and requesting medicines. The health facilities in charge were involved in the study as they were the ones responsible for supervising ILS activities. Exclusion criteria were all facilities not implementing ILS.

3.7 Data Collection Methods

Data were collected using administered questionnaire and observational checklist together with individual interview. The study adopted the questionnaire method because it enabled the collection of a large amount of data on the variables that were considered

important to the study also it was economical and convenient to the respondents. Retrospective record review using observational checklist was conducted to check for stock availability, stock control processes, use of logistics management tools and store management. The use of documentary review and observation was a supplementary approach to the answers that were obtained using structured questionnaires. Also the interview method helped to know factors influencing ILS implementation.

3.7.1 Development of Data Collection Tools

Administered structured questionnaire and observation checklist were developed and tested before the start of data collection. Data collection tools were piloted to some health workers and modification was made on the observation made. After testing the questionnaire and observation checklist, then the tools were used for data collection.

The questionnaire and observation checklist looked at the information about implementation of integrated logistics processes in health facilities specifically on record keeping, inventory accuracy, filling of R&R forms, usage of inventory management tools, ordering procedures, stock status of essential medicine on the day of assessment and past 12 months of 30 essential medicines also known as tracer medicines. Also the interview guide was developed for qualitative data to explore the factors that could influence the implementation of ILS in health facilities.

3.7.2 Data Collectors

Data were collected by the principal evaluator by visiting and collecting data from the selected health facilities implementing integrated logistics system.

3.8 Data Management and Analysis

This section explains what happened after data were collected from the field work.

3.8.1 Data Entry, Cleaning and Analysis

After data had been collected from field, the quantitative data from questionnaire and observation checklists, variables were labelled and then entered into the excel spreadsheet, cleaned before being entered into the statistical software. Data analysis was done with the support of stata analytical software. Descriptive statistics was used to represent the data showing the relationship between variables and the effect of ILS activities on medicine availability.

For the qualitative data, the respondents were recorded and then transcription was done, data were analysed with the support of Atlas ti software. Content analysis was used as a qualitative data analysis technique in order to identify important themes and provide rich description of the reality of the implementation factors influencing ILS in the selected health facilities. The analysis began with repeated reading of the transcripts, memos were written down in the process representing observations in relation to the implementation factors influencing ILS.

Interview transcripts were coded and analysed for the major themes. Themes were established both by frequency of occurrence and by their importance. Patterns in responses and codes were analysed to explore and develop relevant themes useful for presenting findings of the study.

3.8.2 Data Quality

Data were tested and verified before analysis to observe if they were of appropriate quality to ensure the findings of the study are realistic and technically sound. The data were tested for reliability and validity.

Reliability

According to Gorgens 2009, Reliability occurs when data are measured and collected consistently and do not change according to who is using them and when or how often they are used. Data reliability is concerned with consistency of data collection

instruments in terms of producing the same responses to the questions (Saunders, Lewis & Thorn, 2003).Also Kothari (2008) states that a measuring instrument is reliable if it provides consistent results (accuracy and precision of procedures).

The study was designed to ensure that data were reliable for similar study. Reliability of the questionnaires was determined by pilot testing of the questionnaires to the selected health facilities and it was observed if the responses were similar.

Validity

According to Kothari (2008), “Validity refers to the extent to which a test measures what we actually wish to measure”. The study questionnaire was designed such that the difference that was observed was due to differences among those tested. To ensure this, the questionnaire was pilot-tested to the respondents to see if they understood the questions and thus be able to respond to questions as wished by the evaluator.

3.9 Ethical Considerations

Ethical approval was obtained from Mzumbe University. A written consent was obtained from health workers dealing with ILS activities of medicines and health facility in charges upon understanding the purpose of the study. Participation in the study was voluntary, healthcare workers who consented to participate in the study signed the consent form; participants were assured that their responses were only for the purposes of evaluation not for any other reasons. Permission to collect data was obtained from relevant regional and district authorities.

3.10 Dissemination Plan

The findings of the evaluation will be disseminated to all important stakeholders including the Regional and District authorities, health facilities who were involved in the study and last but not least with the Mzumbe University officials. The findings will also be disseminated to other relevant stakeholders that have contribution on pharmaceutical supply management in Mbeya City Council like MSD and implementing partners during meetings.

The evaluation findings address important elements of a programme's objectives, operations, and outcomes specifically on ILS activities implementation and medicine availability.

The dissemination started with the health facilities in which the study was conducted then the DMOs office together with the CHMT members followed by RHMTs and lastly the Mzumbe University officials.

CHAPTER FOUR

FINDINGS AND ANALYSIS

4.1 Introduction

This chapter presents the study findings and data analysis of the evaluation of the effect of integrated logistics system on essential medicine availability in health centres and dispensaries in Mbeya city Council. The main evaluation question for the study was: to what extent has the integrated logistics system improved the availability of essential medicine in health centres and dispensaries? The specific evaluation questions were: What is the stock status of essential medicine for the past 12 months and on the day of assessment?, To what extent are Integrated Logistics System activities i.e records keeping, store management, filling report and request forms implemented as designed?, What are the factors influencing implementation of Integrated Logistics System?, and lastly “To what extent does the Integrated Logistics System activities i.e records keeping, store management, filling report and request forms contribute to availability of medicines? Presentations of the study findings go alongside the objectives of the study.

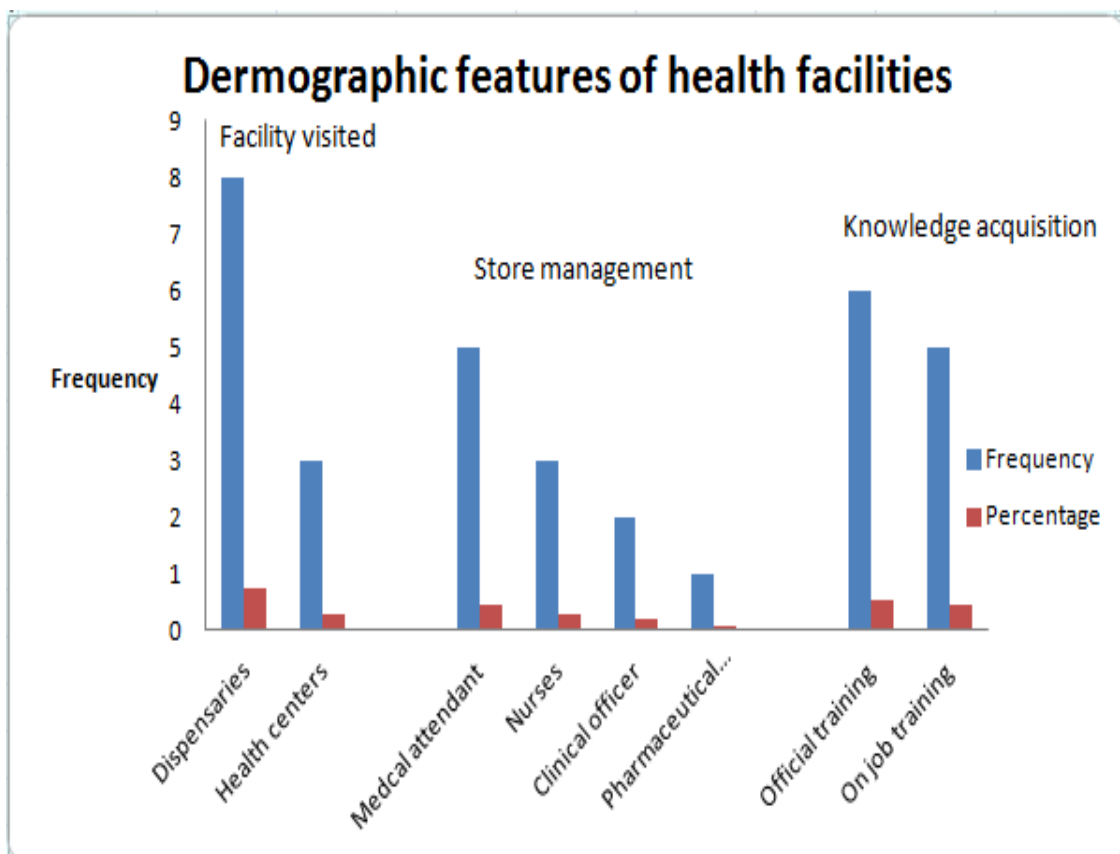
The chapter presents the results beginning with elaborating the demographic features of the respondents followed by the results on the assessments of each of the specific objective mentioned above.

4.2 Demographic Features of the Facilities Visited

This chapter demonstrates the demographic characteristics of the facilities visited. A total of 11 health facilities were involved in the study (3 Health centres and 8 Dispensaries. Health workers dealing with Integrated Logistics System activities were purposely included in the study to determine how ILS activities were conducted in their health facilities. Among all the health facilities visited, Forty six percent (46%) of the medicine stores were managed by medical attendants, Twenty seven percent (27%) by nurses, eighteen percent (18%) by clinical officers and only nine percent (9%) equivalent to one facility in the study were managed by pharmaceutical personnel.

Among all the staff dealing with ILS activities, only fifty five percent (55%) got the ILS knowledge through official training and forty five percent (45%) through on job training. All of the demographic features explained above are presented in figure 4.1 below:

Figure 4.1: Demographic Features of Facilities Visited



Source:Evaluation data (Francis,2017)

4.3 Descriptive analysis

4.3.1 Introduction

The findings were analysed to establish the linkages between independent variables (Record keeping, store management, report submission time and filling of R&R forms) and dependent variable essential medicine availability by identifying existing factors associated with essential medicine availability. The identification of the existing factors was done by using data collected from questionnaire, observational checklists and individual interview and analysed as per objectives of the study.

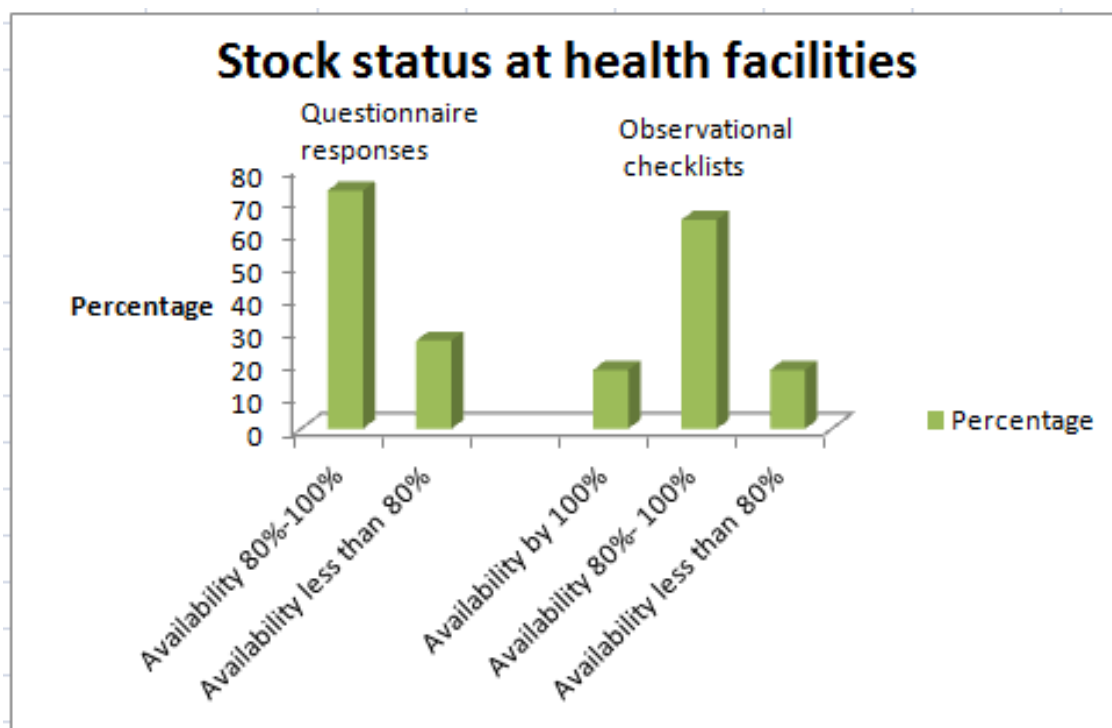
4.3.2 The Stock Status of Essential Medicine (tracer medicines) for the Past 12 Months and on the Day of Assessment

The variables were selected in the study to see the effect of ILS on essential medicines availability at health centres and dispensaries. The variables were captured both in questionnaire and observational checklists. The results for variable stock status for the past 12 months revealed that all health facilities involved in the study did not keep records about stock out days of the essential medicines. Although the facilities reported monthly the stock status of essential medicines to the council level, there were no records about what was sent. Therefore, the information about stock status for the past 12 months was not obtained from health facilities. According to the district report on tracer medicines (30 selected essential medicines) which were being sent to the regional level, the availability showed to be 92% for the period of July 2016 to March 2017, 78% for financial year 2015/2016 and 70% tracer availability according to HMIS data of 2014.

With regard to the stock status on the day of assessment determined by observational checklists, the results revealed that only 18% (2 facilities) had 100% availability of essential medicine, 64% (7 facilities) had medicine availability above 80% and 18% of facilities had availability below 80%. On average, the availability of tracer medicines (30 selected essential medicines) for the district on the day of assessment was found to be 87%. On the other hand, from the questionnaire responses for the question “What is the average stock status of essential medicines at your facility everyday.?” the results explained that 73% of health facilities had essential medicines availability between 80% and 100% on average daily and 27% responded to have less than 80% as shown in figure 4.2.

According to HSSPIV, the target focus is to ensure 100% stock availability of essential medicines in all primary health facilities in the country. On this particular aspect, the results showed that only 18% of the facilities managed to reach the target and the majority did not reach the target as shown by the observational results.

Figure 4.2: Stock Status at Health Facility Results from Questionnaire and Observational checklists



Source: Evaluation data (Francis, 2017)

4.3.3 The implementation of Integrated Logistics System Activities (i.e record keeping, store management, report submission time, filling report and request forms)

4.3.3.1 Introduction

Accurate records, proper store management, correct filling of R&R forms together with timely submission of reports are the vital elements in the Integrated Logistics System. An accurate record helps the facility to know the actual quantities of medicines received, issued, consumed and available balance in stock which later are the data assisting in ordering of medicines.

Correct filling of R&R reports facilitates ordering, helps in reducing overstocking and shortage of medicines as the facilities will order quantities that are needed. Timeliness of

ordering helps the districts in entering data timely into the electronic logistics management system (elmis) and sending them to MSD that might do packaging and delivering of medicines timely to the health facilities due to the fact that report was submitted timely. According to Godliver & Kagashe, (2012) if medicines are managed well, it can reduce expiration, wastage and pilferages.

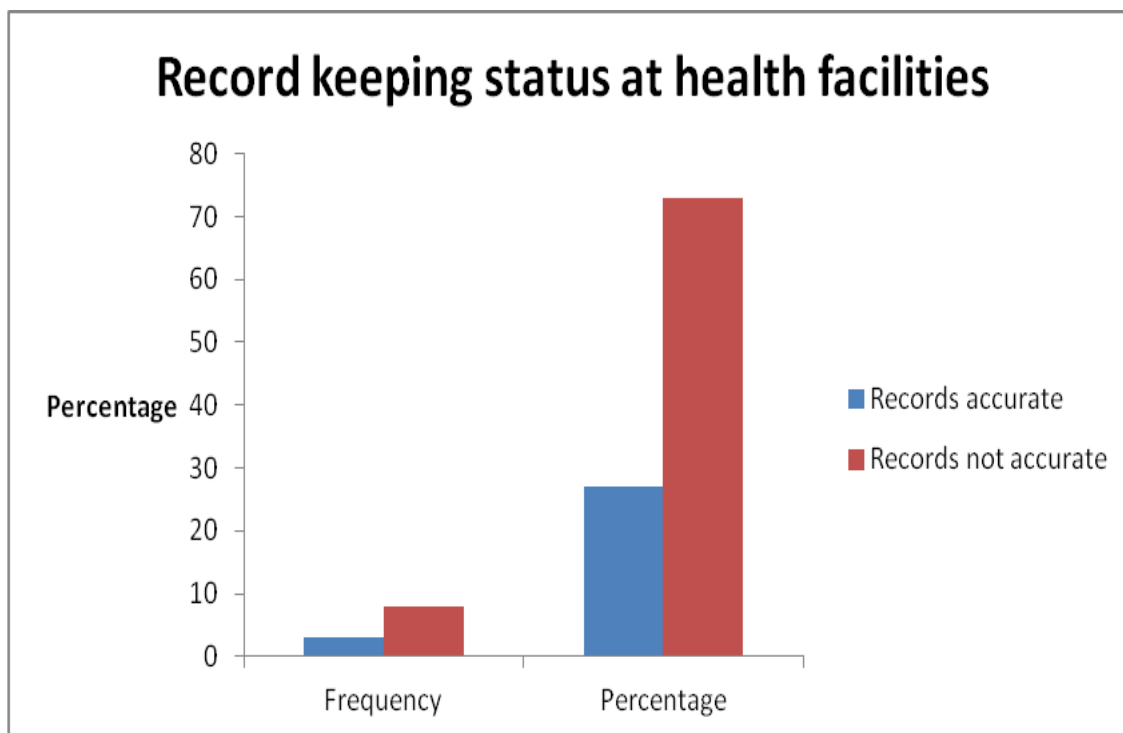
4.3.3.2 Record Keeping

All facilities were seen to keep records of essential medicines received and issued to other departments /other facilities. The ledger book was used to keep those records as it was responded by participants in the questionnaire and also observed. The ILS guideline recommends health facilities to keep records of medicines issued and received in the ledger book therefore in this case facilities were following the guidelines.

The accuracy of records was determined using the observational checklists and the results revealed that only 27% (3 facilities) of the facilities had accurate record of essential medicines in the ledger book that tallied with the physical count and 73% (8 facilities) had no accurate records as shown in figure 4.3 below. Furthermore, for the facilities with inaccurate records, 63% was found to have more medicines in ledger books than in storage room (missed in storage room and not accounted for) while 37% had more medicines in stock than in the ledger books (not entered into the ledger books after receiving). From these results of records keeping it implies that only 27% of health facilities keep records as designed by ILS were as 73% did not follow the guidelines.

The ILS guideline recommends that all records must be kept up to date by recording immediately without delay, every receipt or issue of medicines or other health commodities (MOHSW, 2013).

Figure 4.3: Record Keeping Status at Health Facilities



Source:Evaluation data (Francis,2017)

4.3.3.3 Store Management

Upon observation with the checklists as shown in Table 4.1, it was revealed that all of the facilities under study had store rooms which could be securely locked, 73% of the health facilities had enough space for storage of medicines received and only 27% of the health facilities had not enough store space, 73% of the store rooms were maintained in good condition (clean & all trashes removed) while 27% were not. These results implied that all facilities were following the guidelines which insisted the facilities to have the store rooms for storing medicines received but on the other side of storage space only 73% followed the ILS guideline and 27% did not. Furthermore the results implied that only 73% followed the ILS guidelines which recommend that the store room to be maintained in good conditions and 27% did not.

Maintaining the medicines in good condition helps ensure that supplies including essential medicines will not become damaged or otherwise will be wasted (MOHSW, 2008).

The majority of health facilities (91%) were found to have access to storage limited to authorized personnel only and 9% were not limited to authorized person. Furthermore, 73% of the health facilities were observed to have medicines which were within expiry date and 27% were found with expired medicines in shelves of stores not separated from those which were within the expiry date and 64% of the stores medicines were arranged in the manner of first expired first out while 36 were not as seen in table 4.1. These results implied that only 91% followed the ILS guidelines by limiting the store to the authorized personnel only and 9% did not also only 73% followed the guideline which recommends that medicines and other supplies to be kept in the storage room following the principle of First Expired First Out.

Table 4.1: Store Management Observation Results

SN	Description	Inadequate	Adequate
1.	Store room can be securely locked	0%	100%
2.	Enough space for storage	27%	73%
3.	Store room maintained in good condition	27%	73%
4.	Access to storage is limited to authorized personnel only	9%	91%
5.	Medicines are within expiry	27%	73%
6.	Medicines are arranged in the manner accessible for first expired first out	36%	64%

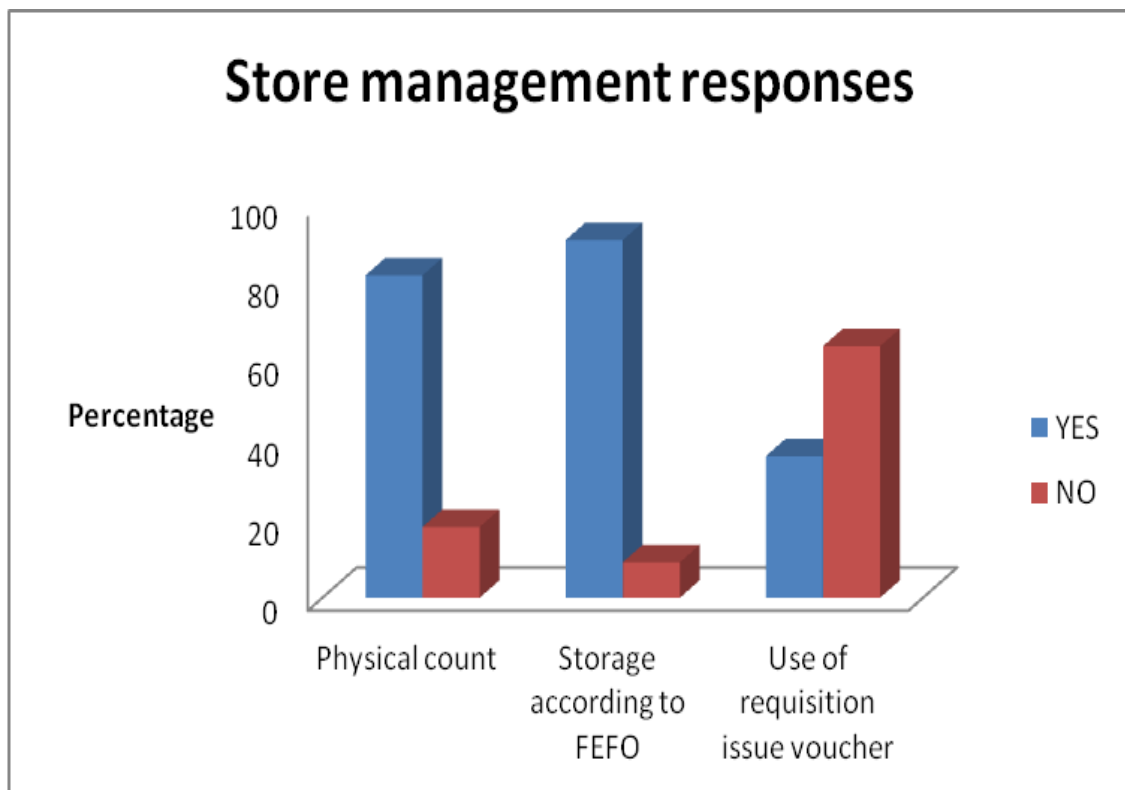
Source:Evaluation data (Francis,2017)

On the other hand, questionnaire responses in figure 4.4 revealed that 82% of the health facilities were conducting monthly physical count of essential medicines and only 18% these results did not differs from those obtained upon observation. Also, the responses showed that 91% (10 facilities) were storing the essential medicines following the

principle of first expired first out (FEFO) and only 9% (1 facility) did not know about the FEFO principle.

Furthermore, in case of issuing medicines to other departments, only 36% had approved requisition issue forms for supplying to other departments/facilities and 64% did not have the approved requisition issue forms which were also observed and the result were the same only 36% used approved requisition issue forms for issuing medicine to other departments. The ILS guidelines recommend issue voucher as a job aid for health facilities on issuing medicines and other supplies outside the storage room therefore according to the questionnaire responses only 36% followed the guidelines.

Figure 4.4: Store Management Practices upon Questionnaire Responses



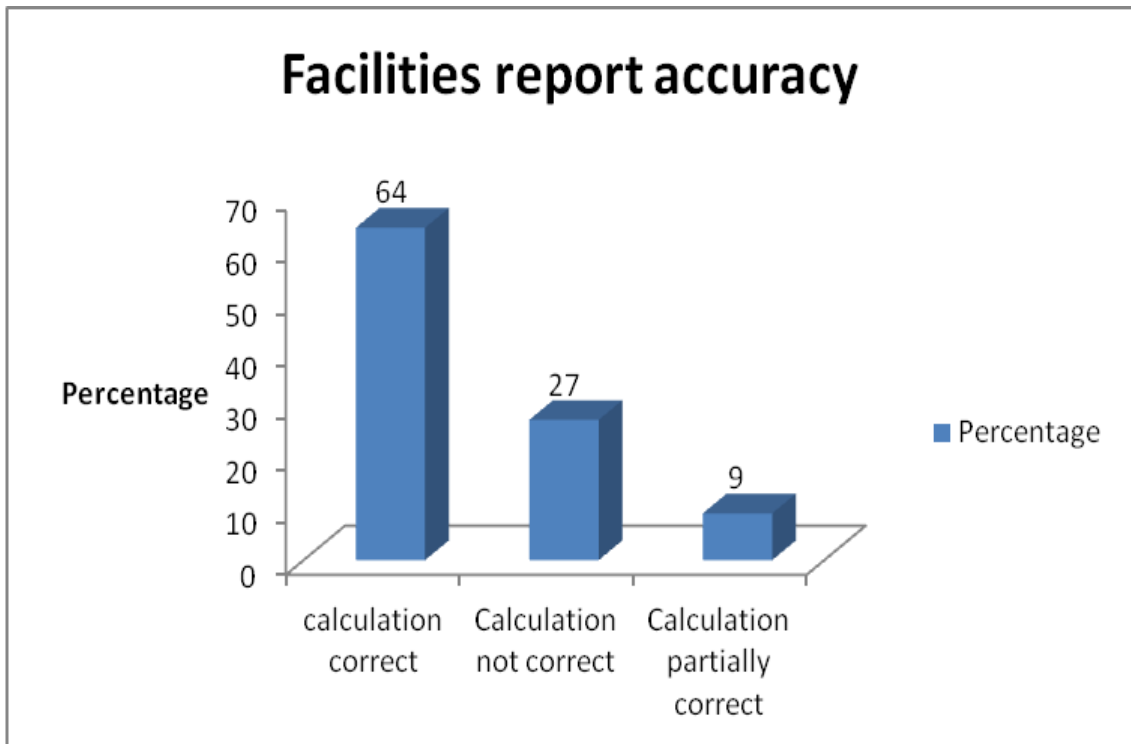
Source:Evaluation data (Francis,2017)

4.3.3.4 Filling of Report and Request Forms

The questionnaire result reveals that all facilities were reporting and requesting medicines quarterly as per ILS guidelines. It was revealed that facilities were using past consumption data to determine the quantities to order while ledger book and previous report and request forms were tools used when filling report and request forms. All facilities claimed to have been getting consumption data from ledger book.

Through observation, it was found that all facilities were sending the R&R forms timely to the DMOs office but there was doubt about using the data correctly from ledger books and other logistic tools used for ordering because the record keeping results revealed that only 27% (3 facilities) of the facilities had accurate record of essential medicines in the ledger book that tally with the physical count and 73% (8 facilities) had no accurate records as shown in Figure 4.3. However it was noted that only 64% of them did the calculation correctly while 27% did not do correctly and 9% did such a task partially as shown in figure 4.5. The ILS guidelines recommend the use formula for estimating the consumption data and when the records are accurate the data entered into the formula will be correct hence correct calculation. From these results on calculation it implied that only 27% followed the guideline and 73% did not.

Figure 4.5: Shows Facilities Report Accuracy

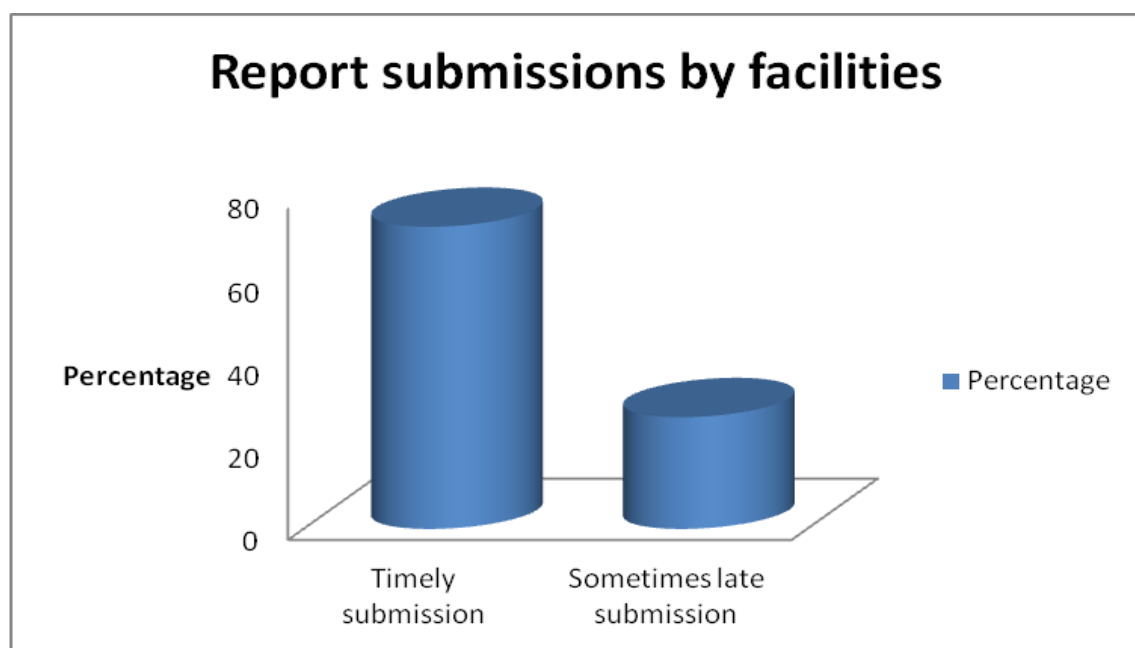


Source:Evaluation data (Francis,2017)

4.3.3.5 Report submission time

On this particular regard, the responses revealed that 73% of the facilities were timely sending the report and request forms to the district medical officer offices while 27% said that sometimes they reported and requested late. However through observation the result showed that all facilities were timely submitting the reports. The observation result on report submission time implied that the all facilities followed the ILS guideline which recommends that all facilities to submit report timely on the first week of reporting month.

Figure 4.6 Report submissions by Facilities



Source:Evaluation data (Francis,2017)

Figure 4.6 above shows report and request forms submissions time by health facilities according to the questionnaire responses and as observed 73% of health facilities responded to submit the reports timely.

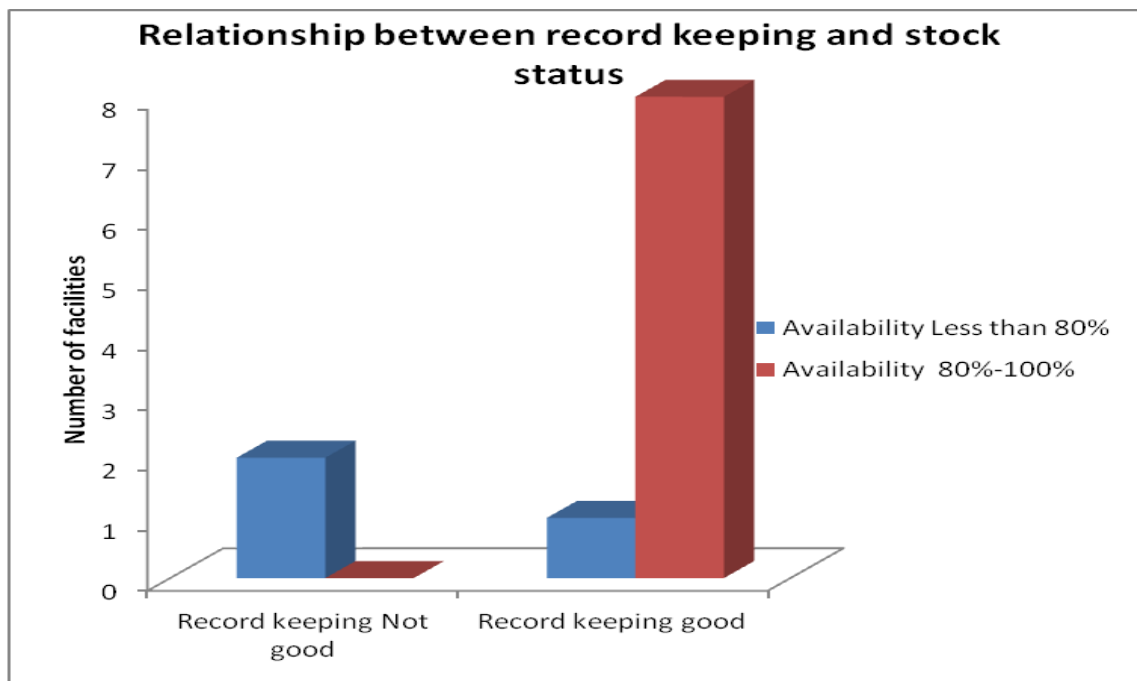
4.3.4 The contribution of Integrated Logistics System Activities i.e record keeping, report submission time, filling report and request forms to the availability of essential medicines?

4.3.4.1 Record Keeping Contribution on essential medicines availability

On this particular regard, the facilities were asked the following question: “Does your facility accurately keep essential medicines records like physical count and stores ledger?” and another question was: what is the everyday average stock status of essential medicines at your facility? The results from such questionnaire responses reveal that 73% of facilities with good record keeping responses also responded to have availability of medicines between 80%-100% and those responded not to keep the records

accurately 27% reported to have availability of between 80%-100% no facility responded to have essential medicines availability of less than 80% on average daily . These responses suggest that there were contribution of good record keeping and essential medicines availability as shown by the majority of responses with good record keeping also had high medicines availability. These responses are presented in figure 4.7 below:

Figure 4.7: The Contribution of Record Keeping to Essential Medicine Availability



Source: Evaluation data (Francis,2017)

Figure 4.7 above shows the contribution of record keeping to essential medicines availability upon questionnaire reponses.

On the other hand, through observation as shown in Table 4.2, the results revealed that that only 27% of the facilities were keeping records accurately in the sense that the quantities found in stock tallied with those in the ledger book while 73% of the facilities did not. However, 82% of the facilities were observed to have medicine availability between 80%-100% and only 18% were observed to have medicine availability less than 80% thus suggesting that accuracy records alone can not

influence medicine availability though it has contribution to the essential medicines availability.

Table 4.2: Observation Findings for Essential Medicines Availability and Record Keeping

Description	Percentage
Availability 80%-100%	82%
Availability less than 80%	18%
Accurate records	27%
Records not accurate	73%

Source:Evaluation data (Francis,2017)

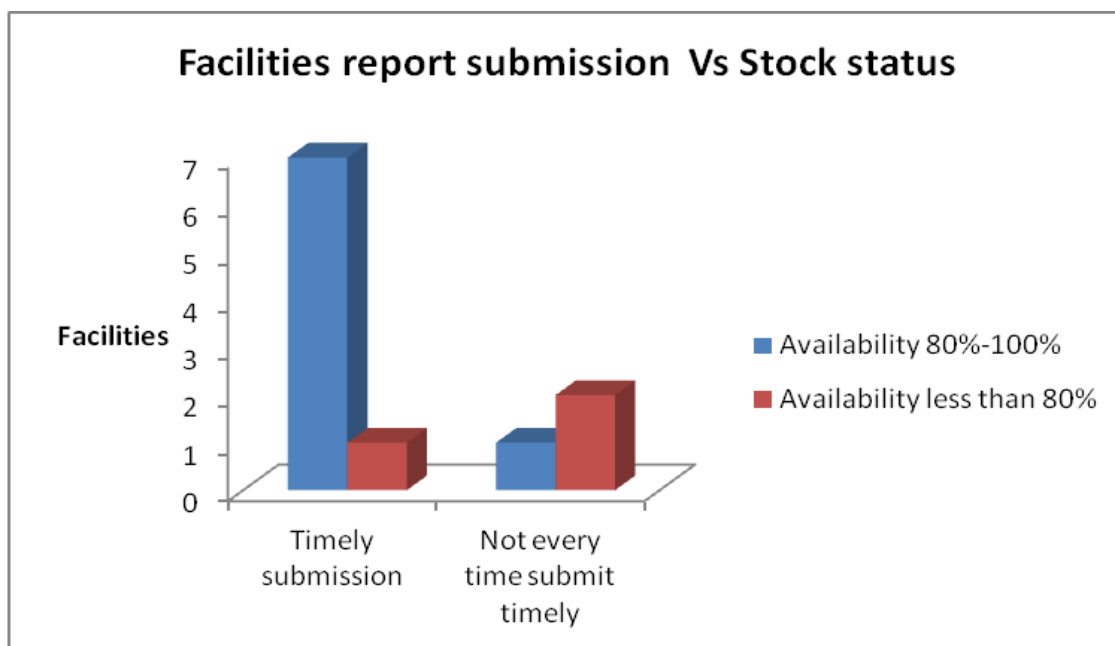
4.3.4.2 Report Submission Time contribution on essential medicines availability

On this particular regard, the responses revealed that 73% of the facilities were timely sending the report and request forms to the district medical officer offices while 27% said that sometimes they reported and requested late, on examining the responses of essential medicine availability and submission time the results revealed that 64% facilities which responded to submit report timely the essential medicines availability responses were between 80%-100% and only 9% had essential medicines availability less than 80%.On the other hand the facilities responded sometimes submitted the reports late only 9% had the availability between 80%-100%. These results suggest that timely report submission had contribution on essential medicines availability.

Through observation the result showed that all facilities were timely submitting the reports. For the case of essential medicines availability, through observation, it was revealed that 82% of the health facilities had availability between 80%-100% while the remaining 18% had less than 80% availability. The results further showed that some facilities reported timely but the availability was less than 80% suggesting there are also

other factors which can contribute to the essential medicines availability though the majority of those timely had high medicine availability (between 80%-100%).

Figure 4.8 Facilities Report Submission against Stock Status of Essential Medicines from Questionnaire Responses



Source: Evaluation data (Francis,2017)

Figure 4.8 above explains the report submission time for the health facilities against essential medicines availability for the questionnaire responses. As it was observed, most of the facilities were responding timely therefore the availability was high compared to those which were not timely submitting their reports.

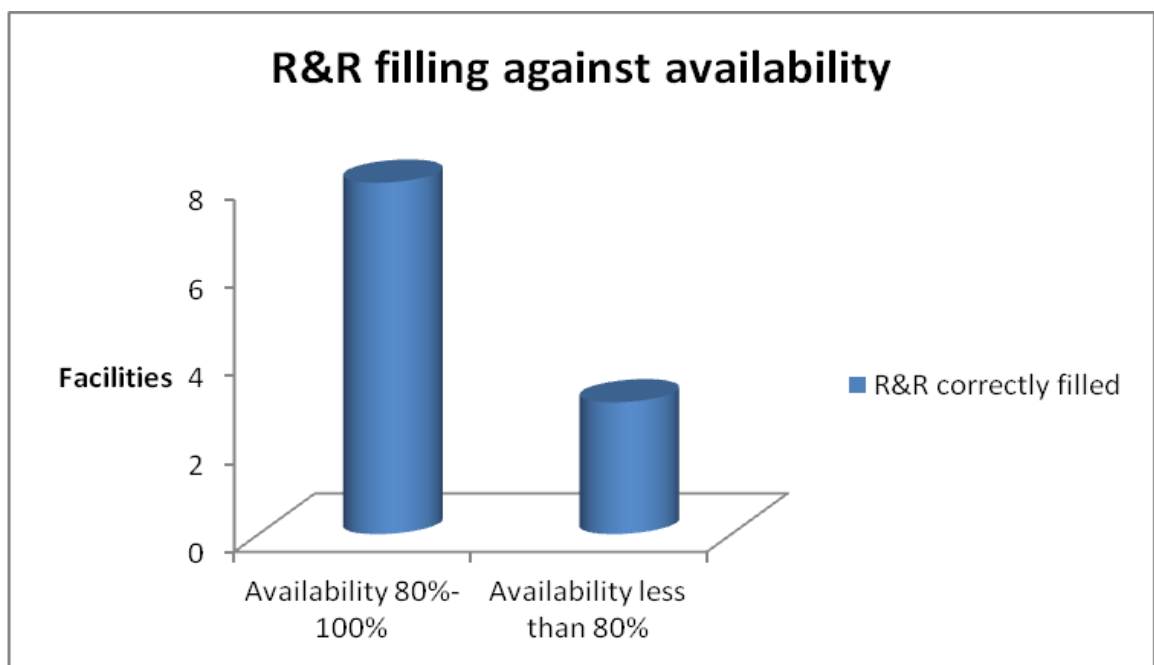
4.3.4.3 Filling Report and Request Forms contribution on essential medicines availability

Responses from the questionnaires revealed that all facilities were filling the reports accurately and the availability of essential medicines was shown to be 73% (between 80%-100%) and 27% (less than 80%) as shown in figure 4.8 below. These results suggested that filling report and request timely had contribution to essential medicine

availability due to the fact that the majority showed to have high essential medicines availability.

On the other hand through observation, the results revealed that not all facilities were accurately filling the R&R reports as it was discovered that only 64% were correctly doing the calculations whereas 27% did not do such calculations correctly and 9% were doing them partially as shown in figure 4.9. The availability on observation was 82% between 80%-100% while 18% had less than 80% availability. According to these results there was suggestion that filling the report and request timely may contribute to the essential medicines availability though there might be other factors that can contribute to essential medicines availability because some of those who did not correctly filled the forms had high medicines availability.

Figure 4.9: Availability of Filled Report and Request Forms on Essential Medicines



Source:Evaluation data (Francis,2017)

4.5. Health Care Workers Perspective on Integrated Logistics System

This section presents the findings for the evaluation question: “what are the factors influencing implementation of Integrated Logistics System?” The respondents were asked about what they knew about ILS, factors that could facilitate ILS implementation and provided suggestions for the improvement of the system. Eight facilities in charge were interviewed and the following were the findings presented as per objective.

4.5.1 Health Care Workers’ Understanding of the Integrated Logistics System and Its Value

Majority of the respondents admitted to know the meaning of ILS and how it was working. The respondents acknowledged that it was a good system because it had a specific schedule for ordering the medicines as printed in the R&R forms and other forms which had the blank spaces where by the facilities could write the medicines not in the printed forms.

“ILS is the system for ordering medicines, in this system you are suppose to order quarterly, we use R&R forms on ordering and the forms have list of medicines you fill what you need” (Respondent number one)

One respondent suggested that in order to have better implementation and for simplification of ordering, the system should work electronically even for the lower facilities. He further recommended that the number of medicines printed in the forms should fit the level of health facility as it is observed in the quotation below.

“ILS is a good system for sure, but for me I think it could be better even for us lower facilities to do the ordering electronically. I know that the forms have some medicines which most of us are not using. Therefore, if it is possible, the higher levels should reduce the number of such medicines to fit the need of the lower facilities. The electronic system is easy, so you can order easily. I think even the calculation will be automatic, you know, for most of us, calculating is a problem.” (Respondent number three)

4.5.2 Integrated Logistics System and Essential Medicines Availability

For the issue of ILS and medicines availability, majority of the respondents said that ILS was helping the facilities to have essential medicines because they were ordering what they needed and when commodities were missing from MSD, they ordered them from private pharmacies by using other sources of funds although they said the system had some challenges which needed to be addressed:.

“The system helps on the availability of medicines due to the fact that we order medicines which are needed by the facilities in case they are missed at MSD we order from private pharmacies after conducting meeting with health facility governing committee and we send our requests to district pharmacist”

(Respondent number six)

Majority of the respondents blamed the MSD for not supplying the same amount of medicines as ordered. One respondent wanted the Government to go back to the essential drug kit because sometimes the facility did not receive what they had ordered:

“When you order medicines you don’t receive them in quantity you ordered. I think the Government should go back to the essential drug kit there is no need of ordering something you don’t receive as in the case now”

(Respondent number five)

4.5.3 Integrated Logistics System Implementation Factors and Recommendations

When interviewed about what perception they had on the implementation factors responsible for the performance of ILS, majority of the respondents said training was among those factors. On this aspect, they claimed to have shortage of refresher training as some of them did not get such training when they were employed for the first time rather they got the knowledge on how to do their duties from their co workers.

“For example I myself have been transferred to this facility and I’m supposed to supervise the ILS activities but I have not received any training and the one I supervise is the one helping me”.

(Respondent number eight)

“I’m new to this position since I came here I have not ordered medicines using the R&R forms because I don’t know how to fill the forms”.

(Respondent number seven)

It was revealed that majority of the respondents blamed the MSD for not delivering the same quantities ordered and sometimes the facilities received medicines which were not ordered. However, majority of the respondents suggested the MSD to have all the essential medicines in stock as it is observed in the quotation:

“MSD should make sure they have all the essential medicines because sometimes, you don’t receive what you ordered (she provided the MSD statement for 13/01/2017 with balance of 12,410,000) look at this balance, but in the last quarter, I did not receive all the medicines I ordered although the facility had money as you can see by yourself.”

(Respondent number three)

One of the respondents commented on the communication issues and insisted MSD to have good communication with the facilities in case it has shortage of some medicines. Furthermore, the respondent suggested that the MSD provide the medicines which the facilities had requested by they were missing. They should do so once they got them. Also MSD should provide information to the facilities when they are about to deliver to them the medicines they had ordered:

“For me I think for the ILS to perform well MSD should have a good communication with the facilities they work with, in case the medicines are missing, they should inform the facilities and say for how long the facility should wait for them so that if the facility has fund, it can purchase the same kind of medicines from private pharmacies. MSD should give us information before the delivering the commodities so that we can inform the committee to be available on delivery. However, as it is

now, they do not inform us that they are coming, rather they ambush us”
(Respondent number three)

It seems that availability of report and request forms from MSD is a challenge which makes the ordering process difficult. This was explained by one respondent:

“Nowadays, printed books are a problem. For example, it is now almost the third quarter since we ordered the printed R&R forms but we have not received such printed books from MSD. The district pharmacist provided us with the photocopy of the forms” **Respondent number five**

Some of the respondents talked on the issue of supervision from the higher level and said that most of the supervision conducted to the health facilities was not specific for the ILS activities something which made supervisors not do the supervision effectively. Also other respondents commented on the issue of shortage of staff and funds despite the fact that they were required to prepare many reports regard less of the shortage of staff.

“I suggest that supervision be conducted specifically for ILS activities focusing for example on how we fill the forms and things like that. As you know, we are few in the facility; when every department comes at once in the facility it is a problem”
(Respondent number one)

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter discusses the findings of the study by summarising responses for each evaluation questions. The discussion is based on the evaluation results provided in chapter four. The main discussion of the findings covers the assessment of the stock status of essential medicines, implementation of ILS activities, factors influencing ILS implementation and contribution of ILS activities implementation to essential medicines availability at health centres and dispensaries in Mbeya City Council.

5.2 Responses to Evaluation Questions

The author raised four evaluation questions which were in line with the identified evaluation objectives to evaluate the effect of integrated logistics system on Essential Medicine Availability at Health Centres and Dispensaries in Tanzania: A Case of Mbeya City Council. This section discusses the responses to evaluation questions. The responses to the evaluation questions were obtained using structured questionnaires, observation checklists and in depth individual interview.

5.2.1 Evaluation Question 1.

The first evaluation question focused on the stock status of essential medicines in health centres and dispensaries. The evaluation question was: “What is the stock status of essential medicine for the past 12 months and on the day of assessment?”

As shown in figure 4.2, the stock status on the day of assessment observed was that, only 18% (2 facilities) had 100% of all the essential medicine available at facilities, 64% (7 facilities) had medicine availability above 80% but not 100% and 18% of facilities had availability below 80%. On the other hand, from the questionnaire, responses for the question “What is the average stock status of essential medicines at your facility every day?” revealed that 73% of the health facilities had essential

medicines availability between 80% and 100% on daily average and 27% said to have less than 80% on the same basis

According to HSSPIV, the target focus is to ensure 100% stock availability of essential medicines in all primary health facilities in the country. On this particular aspect, the results showed that only 18% of the facilities managed to reach the target and the majority did not reach the target indicating that the quality of services provided by the majority of health facilities did not meet the standard.

Despite the fact that the facilities had shortage of essential medicines the results discovered improvement on availability of essential medicines. The results showed that 82% of health facilities had medicines availability above 80% and only 18% had below 80%. On average, the availability essential medicines on the day of assessment in Mbeya City was found to be 87% and according to the district HMIS data provided by the Council to the Regional level, the average availability for the period 2015/2016 was 78% and for July 2016 to March 2017 was 92% something which shows improvement on the availability compared to 2014 HMIS data which was 70% tracer medicines availability.

5.2.2 Evaluation Question 2

The second evaluation question focused on the implementation of ILS activities whose evaluation question was: “To what extent are Integrated Logistics System activities i.e records keeping, store management, report submission time, filling report and request forms implemented as designed?”

As the data from chapter four revealed in figure 4.3, the record keeping results were found to be 100% accurate to only 27% (3 facilities) in which the essential medicines records in the ledger book were found to tally with those of physical count in store room. The remaining 73% (8 facilities) had no accurate records. Furthermore, for the facilities with inaccurate records 63% was found to have more medicines in ledger book than in storage room (missed in storage room and not accounted for) while 37% had more medicines in stock than in books (not entered after being received). From these results of records keeping it implies that only 27% of health facilities keep records as

designed by ILS were as 73% did not follow the guidelines. This result also indicates that most of the health facilities did not keep essential medicines records accurately as the ILS guideline illustrates thus suggesting the risks of pilferage of essential medicines to unauthorized areas which may lead to shortage. Furthermore inaccurate records can lead to exaggeration of consumption data hence overstocking of health commodities and use of unnecessary fund which could be used by other activities at health facilities.

Through observation as shown in Table 4.1, all facilities under study were found to have store rooms which could be securely locked thus reducing the risks of loss of medicines unknowingly. 73% of the health facilities had enough space for storage of medicines received while 27% had no enough store thus indicating that 27% of the health facilities medicines were not stored under good conditions thus increasing the risks of expiration because of piling up of medicines not arranged in a proper way due to space shortage. The results also discovered that 73% of the store rooms were maintained in good condition (clean with all trashes removed) while 27% were not. These results implied that all facilities were following the guidelines on the issue of having store room for storing medicines received but on the other side of storage space only 73% followed the ILS guideline and 27% did not. Furthermore the results implied that only 73% followed the ILS guidelines which recommend that the store room to be maintained in good conditions and 27% did not.

The majority of facilities (91%) found to have access to storage limited to authorised personnel only and 9% was not limited to authorise person hence making easy management of medicines reducing the risks of loss of medicines unsuspectingly and increasing accountability. Furthermore, 73% of facilities observed to have medicines which were within expiry date and 27% found with expired medicines in shelves of stores not separated from those which were within the expiry date indicating that some clients might be issued with expired medicines. Having expired medicines in shelves of stores suggests that monthly physical stock was not done according to the ILS guidelines. ILS guidelines clearly stipulated how to do physical count and insisted that on doing physical stock activity the responsible person should check expire date of the

commodity and separate from usable stock if found expired. On the issue of implementation of ILS activities as designed these results implied that only 91% followed the ILS guidelines by limiting the store to the authorized personnel only and 9% did not also only 73% followed the guideline which recommends that medicines and other supplies to be kept in the storage room following the principle of First Expired First Out.

The result further revealed that only 64% of the stores medicines were arranged in the manner first expired first out while 36 did not, the storage of medicines not following FEFO principle can lead to expiration of medicines without been noticed hence wastage and shortage. The ILS guidelines stipulates clearly that medicines should be stored following FEFO principle, the guidelines is in line with WHO which recommends that the warehouse should always be kept clean and dry. Health commodities should be stored according to the principles of “first expired, first out.” There should be regular inspection of medicines so that damaged or expired stock is disposed of safely. (<http://apps.who.int/medicinedocs/documents>).

In case of issuing medicines to other departments, only 36% had approved requisition issue forms for supplying to other departments/facilities and 64% did not have the approved requisition issue forms which were also observed and the result were the same only 36% used approved requisition issue forms for issuing medicine to other departments. The facilities without requisition issue voucher were only recording the issue data on the ledger book this increases the risk of pilferage because some health worker are not faithfully might just write commodities in the ledger book which were not issued but also there were no evidence if the medicines had really issued to the stated department. The ILS guidelines recommend issue voucher as a job aid for health facilities on issuing medicines and other supplies outside the storage room therefore according to the questionnaire responses only 36% followed the guidelines.

The questionnaire results reveal that all the facilities were reporting and requesting medicines quarterly as per guidelines. The observation result on report submission time implied that the all facilities followed the ILS guideline which recommends that all facilities to submit report and request forms timely on the first week of reporting month. It was also revealed that all the facilities were using past consumption data to determine the quantities to order while ledger book and previous report and request forms were tools used when filling report and request forms. All of the facilities claimed to have been obtaining consumption data from ledger book.

Through observation, it was found that all facilities were sending the R&R forms timely to the DMOs office and ordered quarterly as per ILS guidelines but there was doubt about usage of data correctly from ledger books and other logistic tools used for ordering because the record keeping results revealed that only 27% (3 facilities) of the facilities had accurate record of essential medicines in the ledger book that tally with the physical count and 73% (8 facilities) had no accurate records as shown in Figure 4.3. However it was noted that only 64% of them did the calculation correctly while 27% did not do correctly and 9% did such a task partially as shown in figure 4.5. Doing the calculation incorrectly can lead to either receiving more or few medicines than needed which can result to either overstocking or shortage of medicines at health facilities. The ILS guidelines recommend the use formula for estimating the consumption data and when the records are accurate the data entered into the formula will be correct hence correct calculation. From these results on calculation it implied that only 27% followed the guideline and 73% did not. The DMOs office with the support of district pharmacist should do regular mentoring and coaching to health care workers responsible for reporting and requesting medicines and review the R&R forms critically before entering the data into the elmis.

5.2.3 Evaluation Question 3

The third evaluation question focused on exploring factors that can influence the implementation of ILS in health facilities. The question was: “What are the factors influencing implementation of Integrated Logistics System?” The results for this

evaluation question were obtained qualitatively using in depth individual interview and the following was revealed by the respondents.

Majority of the respondents admitted to know the meaning of ILS and how it was working. The respondents acknowledged that it was a good system because it had a specific schedule for ordering. Also the medicines had already been printed on the R&R forms and these forms had blank spaces where by the facilities could write the medicines not in the printed forms in case these were necessary for the facility. By admitting that the ILS is a good system, it implies that the health care workers had accepted the system and were ready to perform the ILS activities.

For the issue of ILS and medicines availability, majority of the respondents said ILS was helping the facilities in having essential medicines because they were ordering what they needed and when the items were not available in MSD, they ordered them from private pharmacies by using other sources of funds. However, they said that the system had some challenges which needed to be addressed. Since the responses revealed the challenges hindering the performance of the ILS system, the government should work on them to improve the system.

When interviewed about the implementation factors responsible for the performance of ILS majority of the respondents said that shortage of refresher training for some of them who were new and affected them since they only got the knowledge on how to discharge their duties from their co workers which in fact was not enough. Majority of them blamed MSD for not delivering the same quantities ordered and sometimes the facilities received medicines which they had not ordered. For this case MSD should make sure that the delivered commodities are only those ordered medicines by the facilities and should communicate with them in case of delivering medicines not ordered to know if those facilities need them.

One of the respondents suggested that MSD should have good communication with the facilities in case it had shortage of some medicines. Furthermore, the respondents suggested that the MSD should provide the missing medicines once they got them. Also

information should be provided beforehand to the facilities with regard to delivering of medicines they had ordered instead of simply ambushing them as it was known to be the case. Prior information upon delivering of medicines might facilitate good deliverance of commodities involving all stockholders responsible of receiving commodities at facility level because there would be enough time to inform them.

Majority of the respondents also suggested that MSD should have all the essential medicines in stock this might increase medicines availability at health facilities. Some of the respondents talked on the issue of supervision from higher level and said that such supervision was not specifically for the ILS issues. If the supervision done were specifically for ILS activities the supervisors might have enough time to identify gaps and rectify them immediately. Also other respondents commented on the issue of shortage of staff and funds also for having to produce lot of reports despite the staff shortage. For the issue of shortage of staffs Government should employ more staffs specifically pharmaceutical carder who is the custodian of the medicines issues. One respondent suggested that the system should work electronically even for the lower facilities this is good but important infrastructure should be provided and trainings to health workers before the start.

5.2.4 Evaluation Question 4

The fourth evaluation question was: “To what extent does the Integrated Logistics System activities i.e records keeping, store management, report submission time, filling report and request forms contribute to availability of essential medicines (tracer items)?” Results from questionnaire revealed that facilities with good record keeping for the question asking: “Does your facility accurately keep essential medicines records like physical count and stores ledger?” and another question was: what is the everyday average stock status of essential medicines at your facility?

The results from questionnaire responses above reveal that 73% of facilities with good record keeping responses also responded to have availability of medicines between 80%-100% and those responded not to keep the records accurately 27% reported to have availability of between 80%-100% no facility responded to have essential medicines

availability of less than 80% on average daily . These responses suggest that there were contribution of good record keeping and essential medicines availability as shown by the majority of responses with good record keeping also had high medicines availability. These responses are presented in figure 4.7

On the other hand, through observation as shown in Table 4.2, the results reveals that that only 27% of the facilities were keeping their records accurately in the sense that the quantities found in stock tallied with those in the ledger book whereas 73% of the facilities did not. However, 82% of the facilities were observed to have medicine availability between 80%-100% and only 18% were observed to have medicine availability less than 80% hence suggesting that accuracy records alone can not influence medicine availability but the facilities should make sure that they have accurate records to facilitate medicine availability.

The questionnaire responses revealed that 73% of the facilities were timely sending the report and request forms to the district medical officer offices while 27% said that sometimes they reported and requested late as shown in figure 4.6, on examining the responses of essential medicine availability and submission time the results revealed that 64% facilities which responded to submit report timely the essential medicines availability responses were between 80%-100% and only 9% had essential medicines availability less than 80%. On the other hand the facilities responded sometimes submitted the reports late only 9% had the availability between 80%-100%. These results suggest that timely report submission had contribution on essential medicines availability therefore the facilities should make sure that report are submitted timely every quarter.

Through observation the result showed that all facilities were timely submitting the reports. For the case of essential medicines availability, through observation, it was revealed that 82% of the health facilities had availability between 80%-100% while the remaining 18% had less than 80% availability. The results further showed that some facilities reported timely but the availability was less than 80% suggesting there are also

other factors which can contribute to the essential medicines availability though the majority of those timely had high medicine availability (between 80%-100%) which suggests its contribution to availability.

In case of report and request forms filling through observation, it was revealed that not all facilities were filling R&R report accurately since it was learnt that only 64% had correct calculations whereas 27% did not calculate correctly and 9% did partial correct calculations as shown in figure 4.9 hence suggesting the need to have on job training and mentoring and coaching for the health care workers dealing with report and requesting activities. The availability on observation was 82% between 80%-100% while 18% had less than 80% availability. From these findings, it can be argued that when calculation results and availability are compared, the results suggest some relationship although some of the facilities who did not do the calculation correctly were observed to have medicines availability something which implies that correct calculation alone cannot contribute to medicine availability.

Generally, the results implied that the ILS has an effect on essential medicines availability, its activities implementation depends on each other and if all activities were implemented as designed, it could contribute to the availability of essential medicines although other factors like availability of fund and medicines at MSD need to be checked which did not included in this evaluation study.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter summarises the problem statement, evaluation objectives, followed by the study findings, policy implications, limitations and conclusion and lastly evaluation recommendations.

6.2 Summary on Problem Statement and Evaluation Objectives

6.2.1 Problem Statement

Availability of essential medicines in health facilities depends upon well functioning supply chain management without a well functioning supply chain management medicines can be wasted due overstocking, pilferage and expiry. The wastage reduces the quantity of medicines available to patients hence the quality of services provided by health facilities (Godeliver & Kagashe, 2012). In response to the problem of shortage and wastage of essential medicines Tanzania introduced the supply chain system for reporting and requesting medicines and other medical supplies to the respective Government owned health facilities.

The data have shown that despite the introduction of ILS, essential medicines availability is still low something which makes health facilities have limited ability to provide adequate health care services to the community. ILS has activities implemented for its performance, the effects of implementing its activities record keeping, store management, report submission time and filling of report and request forms need to be further investigated. Therefore, because of the fact that record keeping, report submission time, store management and filling of report and request forms (ordering) have not been examined; the question comes: “what is the effect of ILS activities implementation on essential medicines availability?” It is in the context of this that this evaluation study intended to examine the effect of integrated logistics system on essential medicines availability so as to see the implementation of ILS activities in the

selected health centres and dispensaries and its influence on essential medicine availability.

6.2.2 Evaluation Objectives

1. To determine the stock status of essential medicine for the past 12 months and on the day of assessment.
2. To examine the extent to which integrated logistics system activities i.e records keeping, store management, filling report and request forms are implemented as designed.
3. To explore factors influencing the implementation of integrated logistics system.
4. To examine the contribution of integrated logistics system activities i.e records keeping, store management, filling report and request forms on essential medicine availability.

6.3 Study Findings

The evaluation of the effect of integrated logistics system on essential medicines availability at Health Centres and Dispensaries in Mbeya City Council revealed that although the facilities had shortage of essential medicines, on average, the availability of essential medicines on the day of assessment in Mbeya City was found to be 87% and according to the district HMIS, data provided by the Council to the Regional level, the average availability for the period 2015/2016 was 78% and for July 2016 to March 2017 was 92% which show improvement on availability compared to 2014 HMIS data which was 70% availability.

The results of this study suggested ILS implementation had an effect on essential medicines availability to health facilities. However the results discovered that majority of ILS activities were not implemented as designed in Mbeya City Council health centres and dispensaries as observed in chapter 4. Also, it was revealed that ILS activities implementation depended on each other and if they were all implemented as designed, it could contribute to the availability of essential medicines because the

activities implementation results suggests to have contribution on medicines availability although other factors like availability of fund and medicines at MSD would need to be checked although which did not included in this evaluation study.

Through individual interview, the results revealed that the implementation of ILS had some factors that hindered its performance. The most cited factors that were hindering the performance were shortage of integrated logistics system training to the newly employed staff hence shortage of skilled staff, unfulfilled orders by MSD, poor communication between MSD and health facilities, shortage of funds and lack of supervision specifically for the integrated logistics system activities.

6.4 Policy Implications

The evaluation results of this study and its recommendations will be used for planning, decision making, resources allocation at all levels and re-orientation of the integrated logistics system activities at health facilities. Furthermore, this study has a great implication to the healthcare workers by increasing the general knowledge on integrated logistics system and its influence on essential medicine availability. It will help health facilities on the best way to improve performance on supply chain management of essential medicines.

6.5 Limitations of the Study

The study was conducted only in Mbeya City Council health facilities due to time and budget constraints. Many facilities in Tanzania could have been involved in the study to achieve large scale information. There were problem of data management in some of the health facilities where by documents were difficult to be found. Also it was found that most of the store keepers were having other activities which made data collection consume a lot of time.

6.6 Conclusion

The results of this study suggested ILS implementation had an effect on essential medicines availability to health facilities. ILS activities implementation depend on each other and if they all implemented as designed can contribute to the availability of essential medicines though other though other factors like availability of fund and medicines at MSD need to be checked which did not included in this evaluation study.

Furthermore the results discovered that ILS activities were not implemented as designed by the majority of health facilities, no facility had found to conduct the activities perfectly as designed.

The results also revealed that the implementation of ILS faces some challenges that hindered its performance and these need to be rectified by the responsible authorities which includes Ministry of health, social welfare, gender and elderly, medical stores department, Regional and District levels without forgetting the health workers at facilities.

6.6 Recommendations

The findings of the study revealed that ILS implementation has an effect on medicines availability. In the context of this, the author recommends the following:

- I. Training and mentoring should be conducted to the newly employed staff on the ILS activities also refresher and on job training as reminder to the existing health workers.
- II. Communication strategy to be developed by MSD for the improvement of delivering of commodities to the health facilities such as prior information before delivering health commodities and when the facilities might receive the missed items.
- III. Timely entries and recording issues on logistics tools like ledger books will contribute to the perfect match of physical stock and that on the ledger books thus reducing the risks of wastage and pilferages and increases accountability.

- IV. Regular supervision specifically for the ILS activities should be conducted by the Health Management Council team to the health facilities to know the status of ILS activities implementation.
- V. Monthly physical count should be conducted as per guidelines to minimise the risks of having expired medicine in stock as the facilities will be able to recognise short expired medicines before expiration date and do redistribution to the other facilities
- VI. Health facilities should keep records of the monthly stock status of tracer medicines sent to the district level so as to have the stock status report for each month at facility level.
- VII. MSD should provide logistics tools timely to the health facilities to facilitate effective ordering instead of the facilities using the photocopy of R&R forms which were the old version
- VIII. The government should employ the pharmaceutical personnel to the lower level health facilities (Health centres and dispensaries) to facilitate effective ILS activities implementation

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APPENDICES

APPENDIX I: QUESTIONNAIRE QUESTIONNAIRE FOR STORE KEEPER /FACILITY IN CHARGE AT HEALTH FACILITY

INTRODUCTION

Dear sir/Madam,

My name is Lucia Francis a Master of Science student in Health Monitoring and evaluation at Mzumbe University Morogoro. I am conducting an evaluation research on the effect of ILS on essential medicines availability in health centres and dispensaries implementing integrated logistics system in Mbeya City Council.

You have been identified as someone who can assist by responding to the questionnaire intended for the evaluation research. Your information will be treated in utmost confidentiality and also that your responses are only for the purposes of this research not for any other reasons. Therefore, be free to answer the questions.

Thank you.

1. DEMOGRAPHIC INFORMATION

SN	Questions	Answers/Code
1.	Sex	Male..... 1 Female.....2
2.	Age	
3.	What is your role in medicine management?	Store keeper.....1 Facility in charge.....2 Both store keeper and facility in charge.....3
4.	What is your profession?	Medical attendant.....1 Nurse.....2 Clinical Officer.....3 Assistant Clinical officer.....4 Assistant Medical officer.....5 Pharmacist Assistant6 Pharmaceutical technician.....7 Pharmacist.....8
5.	How many years have you been working in this capacity?	
6.	Does your facility implement ILS?	YES.....1 NO.....0
7.	Do you have any knowledge on ILS?	YES.....1 NO.....0
8.	If YES, in question in 7 where did you get the knowledge on ILS?	Seminar.....1 On job training.....2 During supervision.....3
9.	What is the ordering group of your facility?	A1 B2 C3

2. INTEGRATED LOGISTICS ACTIVITIES AND MEDICINE MANAGEMENT

10.	Does the facility keep records for all health commodities received by health facility?	YES.....1 NO.....0
11.	If YES, in question 17 which ILS management tool are used to record medicine received in your health facility?	Ledger book.....1 Counter book2 Any book.....3
12.	Does the facility conduct physical Count?	YES.....1 NO.....2
13.	If YES, in questions 10 how often does it conduct?	End of each month.....1 Once every six month.....2 Once a year.....3 When necessary.....4
14.	Does the facility use and fill out the following logistics tools to manage medicine?	Bin cards YES1 NO.....0 Daily register YES.....1 NO.....0 Ledger book YES.....1 NO.....0 Report and request forms YES.....1 NO.....2
15.	When do the facility normally report and request medicine in ILS?	Monthly.....1 Quarterly.....2 Biannual.....3 When need arise.....4
16.	What date does the facility submit report to DMOs office?	Before 10 TH day of reporting month....1 After 10 TH day of reporting month.....2
17.	Which logistic tools the facility should have when ordering medicine?	Daily dispensing register.....1 Ledger book2 Previous Report and Request form....3
18.	How do you determine the quantity of health commodities needed?	Past Consumption data.....1 Availability of Funds2 Morbidity data.....3

19.	By which method medicines are stored and issued in your facility?	First In, First Out (FIFO).....1 Last In, First Out (LIFO).....2 First Expiry, First Out (FEFO).....3
20.	How are medicines issued out of the store room?	Approved Requisition/issue forms.....1 Any book/piece of paper from department2 Verbally by Higher Authority.....3

3. ASSESSING AVAILABILITY OF ESSENTIAL MEDICINES AND ILS ACTIVITIES

21.	What is the everyday average stock status of essential medicines at your facility?	1.....80%-100% 2....Less than 80%
22.	Does your facility receive the same quantities of medicines from MSD as ordered?	1.....YES 0.....NO
23.	Do you correctly fill the R&R reports?	1.....YES 0.....NO
24.	Do you timely submit reports to the council?	1.....YES 2.....Not all the time
25.	Does your facility accurately keep essential medicines records like physical count and stores ledger?	1.....YES 0.....NO
26.	Does the facility records stock out days of the missed essential medicines in the ledger book/Bin cards?	YES.....1 NO.....0

APPENDIX II: OBSERVATION CHECKLIST

DATE.....

NAME OF FACILITY

1. Availability of medicines

Which of the following medicines are available today?

SN	NAME	Do health service provide this service YES=1 NO = 0	AVAILABLE YES=1 NO=0	Stock status for the past 12 months 1:Less than 1 month 2:1-3 Months 3:More than a 3 months
1	DPT +HepB/HiB vaccine for immunization			
2	ALU tablets			
3	Amoxicillin 250mg caps or Cotrimoxazole tabs			
4	Amoxicillin syrup or Cotrimoxazole suspension			
5	Benzyl Penicillin 5MU inj			
6	Mebendazole or Albendazole tabs			
7	Medroxyprogesterone acetate (depo) inj			
8	Ergometrine or oxytocin injection			
9	Dextrose 5% or sodium chloride + dextrose			
10	MRDT test kit or microscope			
11	Magnesium sulphate injection			
12	Zinc sullphate tablets			
13	Paracetamol tablets			
14	Ferrous + Folic acid tablet			
14	Metronidazole tablets			
16	Combined oral contraceptives			
17	Cutgut sutures			
18	Nevirapine oral solution			
19	Tenofovir 300mg + Lamivudine 30mg +			
20	Tenofovir 300mg + Lamivudine 30mg + Efavirenz 600mg tablets			

21	Efavirenz 600mg tablets			
22	Unigold HIV 1/2			
23	Determine HIV 1&2			
24	FACS count reagent			
25	DBS			
26	RHZE Rifampicin150mg/Isoniazide75mg/ Prazinamide /Ethambutol tablets			
27	RH Rifampicin150mg/ Isoniazide 75mg tablets			
28	Sulphadoxine + pyrimethamine tablets			
29	Syringes			
30	Oral rehydration salt (ORS)			

Source: HMIS data collecting tool (Tracer medicine form)

Result:

Availability in % = Total number of yes answers divided by 30 x100

Availability in % = _____

1. Timeliness of ordering

Please document whether the last order (R&R form) was filled on time based on ILS cycle (Group A, B or C) and whether it was received by the DMO's office on time.

	YES =1	NO=0
Last R&R form filled on time		
R&R form received in DMO office on time		

3. Record Keeping

Please indicate the number of each medicine in the ledger book and the physical inventory

	NAME	Number in ledger book	Number by physical inventory
1	DPT +HepB/HiB vaccine for immunization		
2	ALU tablets		
3	Amoxicillin 250mg caps or Cotrimoxazole tabs		
4	Amoxicillin syrup or Cotrimoxazole suspension		
5	Benzyl Penicillin 5MU inj		
6	Mebendazole or Albendazole tabs		
7	Medroxyprogesterone acetate (depo) inj		
8	Ergometrine or oxytocin injection		
9	Dextrose 5% or sodium chloride + dextrose		
10	MRDT test kit or microscope		
11	Magnesium sulphate injection		
12	Zinc sulphate tablets		
13	Paracetamol tablets		
14	Ferrous + Folic acid tablet		
14	Metronidazole tablets		
15	Combined oral contraceptives		

Record keeping in % = Total number # in ledger book divided by total number in physical inventory # x 100

Record keeping in % = _____

Interpretation:

- 1) % > 100 ☐ more medicines in books than in stock ☐ missing in storage room and not accounted for
- 2) % < 100 ☐ more medicines in stock than in books ☐ not entered in ledger book after receiving

Adopted from HPSS health facility indicators of medicine by ILS

2. Correct filling of R&R form (accuracy of reports)

Please fill in the following data and compare previous R&R form with the following R&R form:

	Beginning Balance +	+ Received this Period	+/- Lost/ Adjusted	+ Ending Balance	= Estimated Consumption
Amoxicillin caps 250mg					
Paracetamol tabs 500mg					

Source: HPSS health facility indicators of medicine by ILS

	YES=1	NO=0	Partially=2
Is calculation correct for medicines?			
Does ending balance equal beginning balance of the following report?			

Store management

0 =no, 1 = inadequate, 2 = adequate

No		0	1	2	Comments
1.	Storage room can be securely locked.				
2.	Access to storage and pharmacy is limited to authorized personnel only				
3.	Space for storage				
4.	Storeroom is maintained in good condition (<i>clean, all trash removed, shelves, organized boxes.</i>)				
5.	Storage site is visibly free of dirt and pests				
0 =no, 1 = partially, 2 = fully					
6.	Medicines are appropriately labelled. (<i>Check if medicines are labelled by generic name, are stored under correct label station.</i>)				
7.	Medicines are within expiry date. (<i>Check all packs under each label</i>)				
8.	Medicines are arranged in manner accessible for first-to expire, first out (FEFO). (<i>Check if medicines are arranged such that those with the shortest expiry dates are at the outermost and first to be dispensed</i>)				

(Adopted from Mahoro, 2013)

APPENDIX III: INTERVIEW GUIDE

INTRODUCTION

I would like to thank you for giving me your time. My name is LUCIA FRANCIS MKUMBO, a Master of Health Monitoring and evaluation student from Mzumbe University. I would like to talk to you about your experience on integrated logistics system and medicine availability specifically on implementation factors/issues.

The interview will take less than one hour. I will be recording the interview because I don't want to miss any information, although I will be taking some notes during the session, possibly I will not write fast enough to catch up all of your responses. Please I beg you to speak up so that I will not miss any of your responses.

The interview is for learning purpose, please be free to answer my questions. Your response will be kept confidential and will only be shared with research team members. We will ensure that our report does not identify you as the respondent.

Remember, you don't have to talk about anything you don't feel like to and you may end the interview at any time. Do you have any question about what I have just explained? Are you willing to participate in this interview?

1. What are the factors influencing implementation of Integrated Logistics System?

PROBES

- Please tell me what you know about ILS?
- What are your views about ILS and medicine availability in health facility?
- From your experience, what implementation factors do facilitate the performance of ILS?
- Could you tell me more about those factors/issues you know?
- What are your suggestions for the management concerning the system?

Wrap up Questions

1. Do you have anything to add?
2. Is there anything I should have asked?
3. How was the interview?

Thank you