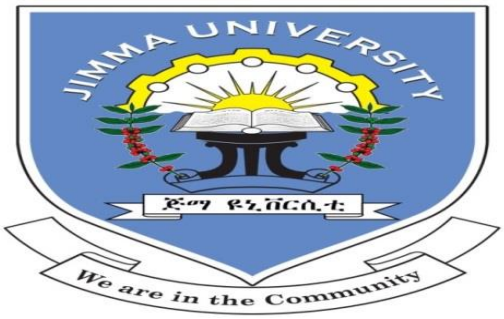

Jimma University

Institute Of Health

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Assessment of Maternal and Child Health Commodities Supply Chain Management in selected public Health Facilities under Jimma branch of Pharmaceutical Fund and Supply Agency, Ethiopia.

By

Addisalem Geremew (B.Pharm)

A Research thesis submitted to School of Pharmacy, Faculty of Health Science, Institute of Health, Jimma University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Pharmaceutical Supply Chain Management

October, 2017

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M/Advisor: Gizachew Tilahun (B.Pharm, MSc)

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Abstract

Background: Health logistics system is responsible to ensure, obtain and use quality health supplies. In Ethiopia, the government is the primary health care provider and supplier of pharmaceuticals for the public sector. Strengthening supply chain management to ensure access to quality pharmacy services that will lead to improved health outcomes. The UN Secretary-General's Global Strategy for Women's and Children's Health highlighted the suffering of women and children around the world caused by lack of access to Reproductive, Maternal, Newborn, and Child Health commodities.

Objective: To assess Maternal and Child Health Commodities supply chain management practice in selected public Health Facilities under Jimma Branch of Pharmaceutical Fund and Supply Agency, Ethiopia.

Method: A facility based descriptive cross-sectional study complemented by qualitative approach was conducted in Fifty two public health facilities (Ten hospitals and Forty two health centers) that provide Maternal and Child Health service in south west of Ethiopia. The sample of health facilities was calculated by using the Logistic Indicators Assessment Tool. The data was collected using semi-structured questionnaires and observation check lists from April 10 to May 10, 2017.

Result: Quantification of MCH products was conducted both at central and branch PFSA. The Overall, availability of MCH commodities were 72.45% (hospital 65.2% and HCs 74.19).On average 38.8% of hospital and 36.47% of HC had stock out MCH commodities in the past 6 months prior to data collection. This is an indicator of weak supply chain. There was inconsistency in the usage of the LMIS formats for products. The overall supply chain management of Maternal and child health commodities both at Public Health Facilities and PFSA have challenges summarized under supply, demand, internal and external factors.

Conclusion, Supply chain management of MCH Commodity in the study area was found to be weak.Interrupted supplies and stock outs are challenges in the SCM of MCH Commodities.In addition to this, Demand uncertainty and lack of data quality affect forecasting & planning activities of the product. Availability of MCH commodities at Health facility needs improvement. Because the supply chain of MCH product was interrupted due to Single sourcing strategy for majority of core products. Appropriate management of medicines at the different stages of supply chain is important because the ultimate goal of a supply chain system is to ensure product availability at all times and minimize wastage rate of the product.

Key word: ***MCH Commodities, SCM, PFSA, Availability, Bin Card, SO, Hospitals, HC***

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Abbreviation/Acronyms

DNS	Dextrose In Normal Saline
DRC	Democratic Republic the Congo
FEFO	First Expiry First Out
FMOH	Federal Ministry of Health's
FP	Family planning
GHI	Global Health Initiative
HC	Health Centre
HCMIS	Health Commodity Management Information System
HO	Health Officer
HW	Health workers
ICCM	Integrated Community Case Management
IFRR	Internal Facility Reporting and Requisition Form
IPLS	Integrated Pharmaceutical Logistic System
LMIS	Logistic management information system
LIAT	Logistics Indicators Assessment Tool
LSAT	Logistic System Assessment Tool
MCH	Maternal and child health
MDGs	Millennium Development Goals
MHS	Maternal health supplies
MMR	Maternal mortality ratio
MSHs	Management Sciences for Health
NLMS	National Level Medical Store
ORS	Oral Rehydration Salt
PFSA	Pharmaceutical fund and supply agency
PHU	Primary Health Care Unit
PPH	Post-partum hemorrhage
PE/E	Pre-eclampsia/eclampsia
PI	Principal investigator
RDF	Revolved Drug Fund
RRF	Report and Requisition Form
RMNCH	Reproductive, Maternal, Newborn, and Child Health

SCM	Supply Chain Management
SCMS	Supply Chain Management System
SDPs	Service delivery points
SOP	Standard Operating Procedure
SPSS	Statistical Package for Social Sciences
UN	United Nations
USG	United States Government
USAID	United States Agency for International Development
WHA	World Health Assembly
WHO	World Health Organization

Chapter One

1. Introduction

1.1. Background

Life-Saving MCH commodities are those medicines, medical devices, and health supplies that effectively address leading avoidable causes of death during pregnancy, childbirth and childhood and that, if more widely accessed and properly used, could significantly reduce preventable deaths among women and children(1).

In 2010, the UN Secretary-General's Global Strategy for Women's and Children's Health highlighted the suffering of women and children around the world caused by lack of access to life-saving commodities. Based on this, A UN Commission Report in 2012 identified and endorsed an initial list of 13 Life-Saving MCH commodities across the reproductive, maternal, newborn and child health (RMNCH) commodities these are:- Female Condom, Contraceptive Implants, Emergency Contraception, Oxytocin, Misoprostol, Magnesium Sulfate, Amoxicillin dispersible scored tablet, Oral Rehydration Salts, Zinc, Injectable Antibiotics, Antenatal Corticosteroids, Chlorhexidine and Resuscitation(2). The World Health Organization (WHO) defines access to medicine as a priority for citizens. It needs to be available at all times in adequate amounts, in appropriate dosage and quality and at an affordable price for individuals and communities(3).

The Global supply Chain Forum describes supply chain management as the integration of key processes and resources from end user through original suppliers that provide products, services and information that add value for customer and other stakeholders. It encompasses the planning and management of all activities involved in sourcing and procurement and all logistics management activities. In addition, supply chain management integrates supply and demand management with in and across companies. In other words, logistics activities could be considered as the operational component of supply chain management, including quantification, procurement, inventory management, transportation and fleet management and data collection

and reporting. Supply chain management includes the logistics activities plus the coordination and collaboration of staff, levels and functions. The main goal of having supply chain management is to offer good service to the final customer, while keeping costs and lead times low(4).

A major component of access is availability and to ensure availability, accurate estimates of supply requirements are needed. At the global level, this information can inform both donors' plans for procurement and manufacturers' plans for production. At the national level, this information is also essential for budgeting, resource mobilization, and planning for procurement and supply chain operations. The Commission's 2012 report also notes that improved quantification efforts are needed as part of supply chain improvement. This guide provides practical guidance on estimating the quantities of supplies needed by programs as part of a national quantification exercise. While this guidance was developed primarily for public sector and nongovernmental program (NGO) programs, the methodology presented could also be relevant for forecasting of commodity needs for the private sector(5).

Globally, the two leading causes of maternal mortality are post-partum hemorrhage (PPH) and pre-eclampsia/eclampsia (PE/E) – together comprising 40% of all maternal deaths.Fortunately, treatments exist for combating these conditions. Oxytocin and misoprostol are both used to prevent and treat PPH, while magnesium sulfate is the most effective agent for treating seizures associated with PE/E. Although all life-saving commodities are important, these three maternal health supplies (MHS) are often essential during fatal, emergency circumstances. As such, increasing the availability, affordability and quality of these MHS is critical to reduce pregnancy-related deaths(6).

In Ethiopia, the government is the primary health care provider and supplier of pharmaceuticals for the public sector through pharmaceutical fund and supply agency (PFSA). Health sector supply chain management play pivotal role to ensure accessibility of health care for all segments of the population. The Federal Ministry of Health (FMOH) of Ethiopia has been working to ensure an efficient and high performing health care supply chain that ensures an equitable access to affordable medicines for all Ethiopia(7).

This assessment assess the Maternal and Child Health Commodities supply chain management practice in selected public Health Facilities under Jimma branch of PFSA and to identify the possible gaps that exist in the supply chain of these commodities. This study also help decision makers and other stakeholders to have an insight about the supply chain of Maternal and Child Health commodities in public health facilities which may be found in a similar position to improve upon supply chain of the commodities.

1.2. Statement of the problem

Improving maternal and child health is a global priority. Persistent gaps in availability of and access to life saving MCH commodities were identified as major obstacles to achieving universal basic health care for pregnant women and children(8).In public health care service, supply chain of health commodities is the most costly activity requiring significant attention, effective strategy and management(9).

Globally, more than 8 million of the 136 million women giving birth each year suffer from excessive bleeding after childbirth. This PPH causes one out of every four maternal deaths that occur annually, Deaths due to PPH disproportionately affect women in low-resource countries(10).In 2012, an estimated 7.6 million children under the age of five die every year; most of them in developing countries die every day due to complications related to pregnancy or childbirth. Many of these deaths are due to conditions that could be prevented or treated with access to simple, affordable medicines (11). The life saving reproductive, maternal, newborn, and child health (RMNCH) commodities that, if more widely accessed and properly used, could save the lives of more than 6 million women and children per year(5).

Supply chain management bottlenecks exist in all areas of, procurement, distribution, storage, information systems and inventory management. Common challenges include (a) a lack of standard commodity specifications for procurement, leasing and donations; (b) a lack of predictable and sustained funding to procure commodities at critical times of the year; (c) poor commodity forecasting; (d) poor data for supply chain decision-making, including the

quantification of commodities; (e) poor distribution channels and storage, which expose drugs and commodities to conditions causing degradation; and (f) poor stock inventory management, leading to rationing of commodities and stock-outs. Without a predictable supply chain, increased supply through market shaping and improved quality for example, are pointless Improved demand and awareness is also detrimentally affected by poor supply chains(12).

Poor forecasting and quantification processes, leads poor procurement methods are among the common problems that affect availability and accessibility of essential medicines, in most of health facilities. Poor quantification and forecasting of medicines may lead to incorrect ordering, leading to under-stocking or overstocking of the medicines. Under stocking may also lead to increase in number of stock-out medicines(13).

In many low and middle income countries, the capacity of the pharmaceutical supply management (PSM) system has always been challenging. WeakDrug supply management and inventory control leads to stock out, loss due to unnecessary expiry, theft and the desired pharmaceutical products are un-available at all times in adequate quantity(14).

Ethiopia has a highly centralized health system, with national level forecasting and procurement mechanisms. A best practice when developing a country forecast for any health commodity is to use national-level morbidity and consumption data. Unfortunately, in many countries, such underlying data for maternal health is not currently being tracked. Indeed, stakeholders cited the lack of country-specific morbidity information as a key concernand it is reported that only half of all countries have data on causes of maternal death(15).

Maternal mortality in Ethiopia remains among the highest in the world. With a current estimate of 267 maternal deaths per 100,000 live births, The Government of Ethiopia has applied multi-pronged approaches to reducing maternal and newborn morbidity and mortality to improve maternal health. Thus, the priority activities that need to be accomplished are ensuring the availability of life-saving maternal/reproductive health medicines in health service delivery points(16).In 2013 in Ethiopia, The Availability of the two essential lifesaving maternal/reproductive health medicines dropped to 86.8% and 38.9% for Oxytocin and

Magnesium Sulphate respectively. On the other hand, the 2012 and 2013 survey findings on availability of the seven (including two essential) life-saving maternal/RH medicines had a decline from 54.6% to 38.3% respectively(17).

Given the evidence of the above, persistent poor supply chain management of MCH commodities in public health facilities, the study mainly focuses on health facilities and key informants who are involved in supply chain of pharmaceutical found in under PFSA Jimma Branch. It will identify the pharmaceutical supply chain problems at facility level and will propose solutions for the problems. The results of this study will reveal some of the problems exist and enable the policy makers to take the relevant corrective measures and will help to formulate strategic plans to ensure uninterrupted supply of MCH drugs in the public health facilities to avert the problems. The findings of study will also be useful in proposing areas of improvement in supply chain management of life saving MCH commodities.

1.3. Significance of the study

Supply chain is key strategic area requiring significant attention and effective management especially in the health system of any country. It is one of the most expensive activity and improving or optimizing the supply chain will have significant impact on performance in terms of improving access to essential medicines and improving health outcomes. Because, effective supply chain will help a lot in delivering the right product/service, in the right quantity, to the right place, at the right time, with the right quality and in the right cost. Therefore, the finding and recommendation from this study will be an interest for policy and decision makers in the health sector in general and public health supply chain in particular. Specifically, the finding will be significant in the following aspects:-

1. As far as the knowledge of the researcher is concerned, there is no empirical study conducted in the study area. So, this paper will provide baseline evidence based information on the supply chain management of MCH commodity under jimma branch

PFSA on the health supply chain practices and management of the catchment public health facilities.

2. It will help in identifying weak link in the public health supply chain to prioritize intervention accordingly and hence finally improve the health of the public.
3. It will help in diagnosing and evaluating customer focused output and internally focused (operation) performance attributes of the supply chain for further improvement.
4. It will also be used as an input by PFSA in general and jimma branch in particular to further improve and optimize supply chain strategy that will significantly improve the performance in terms of medicine access and health outcome.

Chapter Two

2. Literature Review

2.1. Theoretical Literature Review

2.1.1. Supply chain management

The supply chain management (SCM) literature offers many variations on the same theme when defining a supply chain. The most common definition is a system of suppliers, manufacturers, distributors, retailers, and customers where materials flow downstream from suppliers to customers, and information flows in both directions. There are now significant opportunities related to initiatives such as Every Woman, Every Child for stakeholders to engage in building demand, strengthening supply chains, and ensuring sustained availability to reproductive health and family planning commodities, information and services. Ensuring universal access to reproductive health and rights, including family planning is key to achieving global goals to improve women's and children's health. Without additional attention and resources, unmet need is projected to grow by 40% over the next 15 years(18).

A well designed medicines supply system ensures that procurement, warehousing and transportation are seamlessly linked to form a network that can deliver the requested medicines to health facilities in good time in the correct quantities and at lowest possible cost. Reproductive health supply chain Ensure RH Commodities Strongemphasis is to be given for capacity enhancement in areas including forecasting, procurement, logistics, LMIS, distribution, storage, transportation, etc. on national capacity enhancement and the development ofsustainable national systems, procedures and mechanisms. In order to guarantee that the quality of the pharmaceuticals distributed is preserved, the distribution system also has to ensure that good storage and distribution practices are maintained throughout the supply chain. Continuous access to quality pharmaceuticals is an important component of health care but in many African countries continues to be problematic. Commonly reported problems include inadequate storage facilities, poor forecasting, pilfering of stock, insufficient human resources and limited financing resulting in chronic stock outs(19).

Efficient public health supply chain is essential for assuring access to health supplies and positive health outcomes. Most countries in sub- Saharan Africa where large proportion of the population served by the public and mission health sectors. The public/mission health supply chain improving maternal health, reducing child mortality, and combating other diseases(20).

Countries face the challenge of meeting people's rising demand for contraceptives, including condoms and other essential reproductive health supplies. The goal of RHCS and its translation into operational terms focuses on supplies and is informed by decades of experience in supply chain management. From long-term perspective help a broad range of stakeholders on product availability and role in ensuring it. It approaches reproductive health commodity security as a goal to strive for, requiring ongoing commitment and continuous progress(21). Logistics activities as the operational component of supply chain management, including quantification, procurement, inventory management, transportation and fleet management, and data collection and reporting. Supply chain management includes the logistics activities plus the coordination and collaboration of staff, levels, and related functions(22).

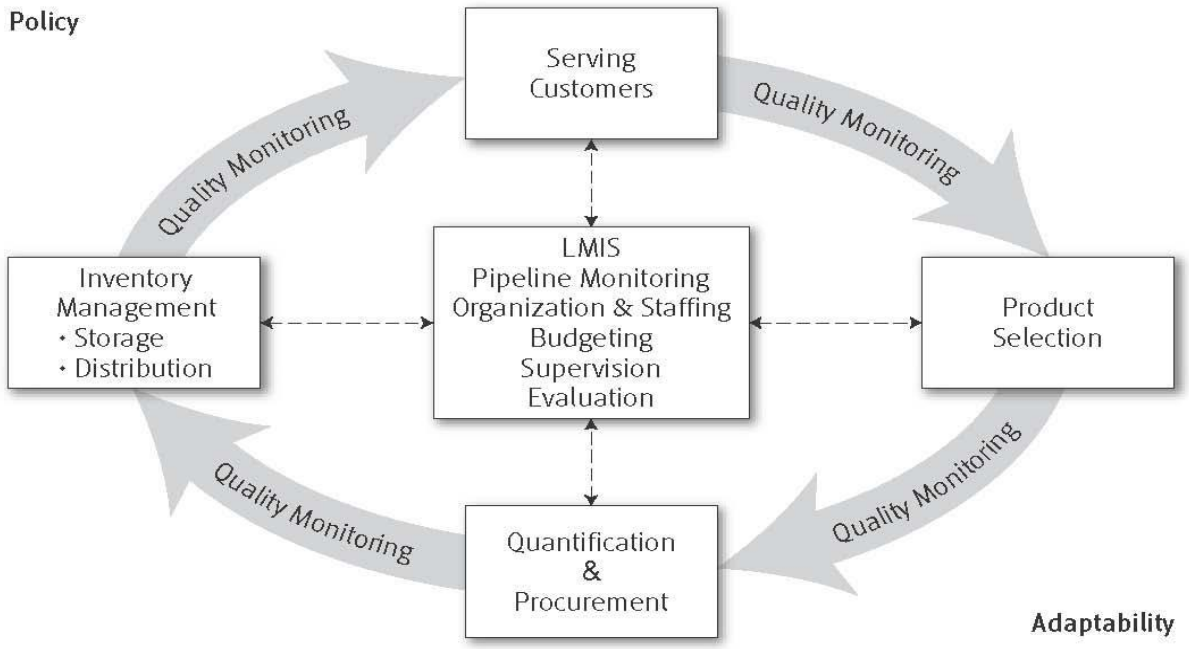

Figure 1: Pharmaceutical supply management framework (John Snow, Inc. and DELIVER, 2004)

2.1.2. Selection and Quantification

Selection in the drug and health commodity management cycle is the first step and involves: reviewing prevalent health problems and priorities; identifying interventions and treatments of choice; selecting needed drugs and dosages; selecting required health commodities, including laboratory tests and procedures; and making decisions about which drugs and health commodities will be available at what service levels. Program managers and drug and therapeutic committee will have to prioritize choices during the selection process, particularly if resources are limited(23).

Accurate forecasting of maternal and child health commodities provides a means to ensure that enough supplies will be available to meet client demand, without having too many. It is the aim of an effective procurement and forecasting unit to calculate how many maternal and child health commodities should be ordered, of what type, and when they should be shipped in order to ensure that the program receives a continuous supply. Forecasting the number of each type of maternal and child health commodities that clients are likely to use is the only way to ensure that programs order the right amount of each. Having too few commodities may result in stock-outs and dissatisfied clients, while too many wastes resources and overburdens the supply system. However, factors other than inaccurate forecasts including budget constraints, fluctuations in product availability from manufacturers, introduction of new products, special promotional events, and complications in donor coordination can cause supply disruptions(24).

The ability of countries to predict, forecast, and manage the life saving essential commodities along their supply chains is critical to the success of saving the lives of the millions of women and children. Currently, accurate estimates of need are unavailable for many of the life saving commodities at either the global or national levels. Additionally, market sizing of quantification exercises optimizing in-country supply chains to reduce losses related to overstocking, waste expiration dates, damaged commodities, and inefficiencies can protect program investments and strengthen health systems to better deliver health services to the women and children who need them the most(25).

The Federal Ministry of Health of Ethiopia undertook quantification exercises to estimate the need for essential commodities as part of accelerating reduction of maternal and newborn and child mortality and morbidity in the period 2012-2015 and the implementation plans for iCCM and the community based newborn care that was started in March 2013(9).

Forecasting is used to estimate the quantities of each product that a program will dispense to users for a specified period of time. It is the only way to ensure that programs order the right amount of each type of contraceptive that clients are likely to use. Forecasting is done at central level where procurement usually takes place and it is often done by logistic and program managers. Having a reliable supply of contraceptives and essential RH commodities available requires accurate forecasting. To ensure regular and reliable forecasts for all essential drugs and contraceptives, PFSA is taking concrete actions to build its internal capacity for forecasting. Forecasting should always be done using as many data sources as possible. The Contraceptive and essential RH commodities Forecasting methods used are:-Consumption Method (Logistics Forecasting), Demographic Method (Population-Based forecasting) and Service Statistics Method (Service Data Forecasting)(26).

2.1.3. Inventory Management

One of the major reasons that medicines are wasted is that they may have expired without anyone noticing that the shelf life date was approaching. Failure to notice approaching expiry does might lead to the loss of a significant amount of resources, especially in resources limited countries. This type of loss is not acceptable to pharmaceuticals. Expiry dates can be monitored by using different technique so that appropriate action can be taken on short dated product before they become unusable(27).

A combination of inventory control systems (push and pull) is in place for reproductive health commodities at the central and regional levels, with a set maximum and minimum inventory control system. Established guidelines for maximum and minimum stock levels are available at all levels for family planning. Contraceptives should be full supply i.e. there should be enough stock at the various levels of the logistics pipeline, and when people order they can expect to get

what they order every time or at least almost every time. Inventory control is used to show how much stock one has at any one time, and how to keep track of it. Efficient stock control allows one to have the right amount of stock in the right place at the right time. It ensures that capital is not tied up unnecessarily and protects production if problems arise within the supply chain(26).

A well designed distribution system should maintain a constant supply of drugs; keeps drugs in good condition throughout the distribution process; minimize drug losses due to spoilage and expiry; maintain accurate inventory records; rationalize drug storage points; reduce theft and fraud; and provide information for forecasting drug needs. The distribution cycle includes the following steps: receipt and inspection; storage; inventory control; requisition of supplies; delivery; dispensing to patients, and reporting consumption(28).

Ensuring availability of modern contraceptives and essential life-saving maternal/RH medicines is a major challenge in Ethiopia, where unmet need is very high and funding for supplies is almost completely donor dependent. The Ethiopian pharmaceuticals supply chain has several problems including non-availability, un-affordability, poor storage, lack of stock management and irrational use. In addition to these the right products, right quantity, and right quality are not available at the right time, right place, for the right cost due to poor distribution system. To solve these problems in public health facilities the Government of Ethiopia established Pharmaceutical Fund and Supply Agency in 2007 G.C which has a mandate to avail affordable and quality pharmaceuticals sustainably to all public health facilities and ensure their rational use(29).

2.1.4. Logistic Management Information system (LMIS)

Logistics Management Information System (LMIS) is a system that generates information, which is needed to make logistics decisions. The logistics decisions include selection, forecasting, procurement, training, re-supply disposal, supervision, monitoring, and management. The LMIS can be manual (paper-based), or partly or wholly computerized. For any supply chain system, the three essential LMIS data items are quantity of stock on hand, quantity of stock consumed and losses and adjustments. But all the United States Government (USG) partners like DELIVER,

SCMS and MSH agree that 70% of the data collection should be done paper based even at location that had been using computerized sometime(22).

A well designed LMIS involves collecting, organizing, and reporting relevant and quality logistics data on timely basis and to the right recipient. The timeliness and quality of logistics data depends on the arrangement of the sources of data according to a certain procedure (system). Possible sources of a logistics data include stock movement cards, transaction vouchers, purchase/procurement vouchers, returning records, etc(24).

In Ethiopia, LMIS was designed in 2007, and according to this system, the PFSA is expected to deliver health commodities directly to health facilities and collect LMIS reports from the health facilities. This LMIS is designed in such a way that logistics information is collected and reported for decision making on resupply planning(9).

The logistics pipeline is designed in such a way that logistics information is collected and reported monthly by Health Posts and every other month by Health Centres and Hospitals using LMIS forms to the next higher level. Each month, Health Centres should issue enough stock to bring the Health Posts stock level up to its Maximum of 2 months of the commodities. The overall information system also includes a mechanism for higher levels to provide "feedback" to the respective lower levels. In the feedback reports, facilities will be able to see how they are performing compared to other facilities in their geographical area. The current pipeline has 5 levels and products flow from the central PFSA down to regions; and from regions to Zones, where they exist, and then to Woredas and finally to SDPs. Information flow follows the same line, but down up. The facilities send monthly LMIS reports to the woredas. At the woreda level, these reports are compiled and sent to the zones (regions); from the regions, the reports go to the central-level quarterly(26).

2.1.5. Supply chain management in Ethiopia

Medical supplies and logistics are managed by the Pharmaceutical Fund and Supply Agency (PFSA) in Ethiopia. PFSA has been founded in 2007 to handle forecasting, procurement, storage,

distribution and rational use of drugs in all public health facilities. It has about 17 branch warehouses which are distributed throughout the country in such a manner that they can distribute all health commodities directly to health facilities. The agency is responsible to build the capacity of health facilities in all aspects of supply chain management(9).

A coordinated plan for supply chain strengthening can improve efficiency. This plan aims to coordinate actors, levels, and functions of the supply chain to facilitate a reliable and sufficient stream of medicines and supplies at the lowest cost for public sector health facilities. In addition, the FMOH has implemented the Business Process Review, which restructures regulatory and procurement agencies for medicines into a single national commodity supply chain. Procurements and donations are coordinated through a central warehouse and then transferred to regional hubs or warehouses. The hubs manage distribution to hospitals and health centers, which then distribute commodities to health posts(30).

In Ethiopia, centralized forecasting of MH medicines is challenging due to limited availability of consumption data. This results in commodity estimates based on demographic and morbidity data, which may not represent the actual need. Effectively linking with and obtaining information on consumption at health posts (the lowest level of the chain where community health workers [CHWs] are based) are thought to be the most significant challenge since no consistent method for obtaining those data exists, making it difficult to forecast accurately(30).

2.2. Empirical Literature Review

Access to essential medicines for children is globally accepted as an important contributing factor for good childhood health outcome. However few surveys in developing world on availability of key essential medicines for children have exposed the severe lack of medicines at both public and private level. A snapshot national survey carried out in India in the year 2010 reported that limited and poor availability of five key pediatric essential medicines in Jammu and Kashmir State as compared to other states of the country, thus making it the only availability specific study carried out in this state till date. An important and vital step towards improving

medicines access for children is to measure the availability of essential medicines and to identify the key barriers in its access(31).

A study by Robertson and colleagues showed poor availability and accessibility of children's medicines and in order to achieve substantial progress towards Millennium Development Goals (MDGs), a major effort to improve access to medicines for children will be required. In order to achieve the desired therapeutic outcomes for children, access to age appropriate and well tolerated drug formulations is essential. Hence the need for countries to have essential medicines list for children, however, access to appropriate medicines for children is a major challenge. In 2007, the World Health Assembly (WHA) resolution 60.20 urged countries to promote access to medicines for children. In the same year, the World Health Organization (WHO) and partners launched the Make Medicines Child Size Campaign to increase children's access to appropriate dosage formulations. The need to access appropriate medicines for children is recognized as an essential step in achieving the Millennium Development Goals 4 and 6(32).

A study done in Lesotho reveal that there were challenges in the drug supply system, which were mainly due to the lack of supervisory site visits, led to facilities over-stocking or under-stocking on certain items. Moreover, essential medicines were expired on the shelves in some facilities where inventory was poorly managed(33).

The storage condition observed in district and PHUs of Sierra Leone was not generally in a good condition. The stock keeping practice in selected Sierra Leones' health facility was reported as not good. The Expired drugs and kits were stored together with the usable commodities which bring a shortage of space in the health facilities. While they used to meet the storage need by storing and issuing of RH drugs integrated within existing hospital pharmacy stores or laboratory store, No stock cards were available for the commodities at any of the PHUs visited(34).

A study done by Anna Schopperle on Analysis of challenges of medical supply chains in sub-Saharan Africa regarding inventory management and transport and distribution, appropriate inventory management at the various levels of the supply chain is crucial for effective distribution from the various warehouses. Often there are several tiers between NLMS and HCs,

which all hold inventory and handle orders from lower levels. This results in high stock levels, involves significant labor to process orders and leads to high inventory costs and numerous logistics tasks for health workers (HW). In Nigeria poor planning and forecasting, insufficient information about consumption and current stock levels, funding and capacity constraints and a poor infrastructure are reasons for inappropriate stock levels(3).

The shortage of drugs and medical supplies for maternal health is a challenge facing many health systems in low and middle income countries. This contributes to the provision of poor quality maternal health services and consequently to maternal deaths. It is estimated that almost 99% of all maternal deaths occur in developing countries and these are mostly in women living in rural areas(35).

A study done by USAID | DELIVER PROJECT and The ACQUIRE Project in Tanzania on Contraceptive Security Assessment, Countries in the sub-Saharan Africa region are faced with the challenge of meeting increasing demand for contraceptives and reproductive health supplies. Having an adequate range of family planning methods is important in sustaining and building upon the strides already made in the region. Countries are also coping with changes in the funding environment as development partners and new mechanisms are introduced coupled with fluctuations in available resources. Other factors such as low human resource capacity, access, logistics, have lead many countries to take various approaches in addressing contraceptive and reproductive health security. Tanzania is actively working to ensure there is contraceptive and reproductive health security through the creation of a Contraceptive Security Committee and increases in funding by the Government of Tanzania to cover the contraceptive needs of the population(36).

The Commission acknowledges the broader health systems challenges countries face when accelerating access to and use of life-saving commodities. Nevertheless, the production, distribution, availability and demand generation for medicines and commodities is a persistent weakness that requires specific attention and interventions. The Commission underscores the need for synergies and linkages between commodities-focused actions and broader systems interventions and efforts(37).

2.2.1. Availability of Life- Saving MCH drugs

UNFPA tracks the provision of five life-saving maternal and reproductive health medicines. Among Global Programme countries in 2009, the availability of five life-saving maternal medicines is available in 90 percent of facilities in Mongolia and 80 percent in Madagascar. In Sierra Leone, where deaths due to pregnancy and childbirth are down dramatically from estimated 2,000 to 857 per 100,000 live births as of 2008. UNFPA is contributing to this trend by procuring life-saving maternal health drugs and contraceptives. Report shows that, "women's lives are being saved every day with the availability of these drugs"(38).

Study conducted in Kenya on stock status and logistics system assessment in 2009; the survey collected data on both stock on hand, stock outs on the day of visit, stock outs during the previous six months prior to the survey, and the frequency and duration of stock outs during the same 6 month period. The finding showed that the performance of the logistics systems at district stores was better than at the health facilities. More than 70 percent of district/health center stores use stock cards to manage health commodities. This contrasts with the availability and use of stock cards at the facilities level; Data collectors also observed the accuracy of the balance on stock cards at those facilities that both managed the product and had stock cards available and also for a stock card to be considered accurate, no discrepancies could be found between the stock card and the physical count. The study examined the level of compliance with 14 guidelines for proper storage, assessing through direct observation and interview questions asked of facility staff(39).

A study done on Health Facility Assessment on Availability of the 13 Reproductive, Maternal, Newborn, and Child Health Commodities Prioritized by the UN Commission on Life-Saving Commodities for Women and Children in all regions of Ethiopia,The current status of priority RMNCH medicines, the availability of Three priority life-saving RMNCH medicines, female condoms, amoxicillin dispersible tablets, and chlorhexidine 7.1% gel, were not available at all hospitals. Two priority life-saving medicines, contraceptive implants, and benzyl-penicillin or gentamicin injections were available in all hospitals. Overall, nine priority life-saving RMNCH medicines and commodities were available in more than 80% of SDPs at the time of survey. Oxytocin, ORS, and a resuscitation device (Ambu bag) were each found in (96.9%) of hospitals.

Emergency contraceptives, magnesium sulfate 500 mg/ml injection, and either beta-methasone injection 6 mg/ml or dexamethasone injection 4 mg, or both, were available in 93.9%, 90.9%, and 84.9%, respectively, of the surveyed hospitals. Zinc 20 mg scored dispersible tablets, however, were available only in one-third (33.3%) of hospitals. The study recommended that, there is a need to strengthen provision of regular supportive supervision of staff training and encouraging staff to improve their performance to provide high-quality health services, implementing good inventory control system, training on drug supply management, and continuous supervision of the public health facilities(17).

A survey done on Facility Assessment for Reproductive Health Commodities and Services in Ethiopia in 2013, The Availability of the two essential lifesaving maternal/reproductive health medicines, (Oxytocin and Magnesium Sulphate) was observed over the years 2010 to 2012 Oxytocin was availed in 75.7% of the surveyed SDPs in 2010 increased to 84.7% and 94.1% in 2011 and 2012 respectively. Similarly, Magnesium Sulphate that was available in 14.1% of the SDPs in 2010 increased to 26.7% and 55.6% in the same period. But In 2013, the availability of both medicines dropped to 86.8% and 38.9% for Oxytocin and Magnesium Sulphate respectively. On the other hand, the 2012 and 2013 survey findings on availability of the seven (including two essential) life-saving maternal/RH medicines had shown a decline from 54.6% to 38.3% respectively(40).

Stock-out times varied widely among RMNCH medicines and commodities, with average stock-out times between 7 days in the last three months for implants in one hospital and 90 days for female condoms, amoxicillin dispersible tablets, and chlorhexidine gel in all hospitals. Zinc 20 mg scored dispersible tablets were the most frequently unavailable product, on average 58 days before the day of visit, in approximately 57.6% of hospitals. The three medicines misoprostol, oxytocin, and magnesium sulfate that prevent and treat excessive bleeding after childbirth and high blood pressure during pregnancy were also out of stock during the three months before the day of the visit. Misoprostol 200 mcg tablets were out of stock for more than two months in 27.3% of hospitals. Magnesium sulfate 500 mg/ml injection was not in stock for more than a month in 24.2% of hospitals. Oxytocin was unavailable in 15.2% of hospitals, which experienced 25 stock-out days on average preceding the day of visit(40).

Assessments made to explore the reasons for not offering certain maternal/RH medicines revealed, response delays by the main source, delay by the SDP to request, non-availability of the medicines in the market, low or no demand, no trained staff to provide the service, not in the drug list and unavailability of cold chain were frequently mentioned. To this effect, delay on the part of main source was the most commonly cited cause of non-availability of lifesaving maternal/reproductive health medicines. As for the two essential lifesaving medicines (Magnesium Sulphate and Oxytocin), delays in the part of the main source (34.6% for Magnesium Sulphate and 50.0% for Oxytocin), delay by the SDP to request (38.5% for Magnesium Sulphate and 20.0% for Oxytocin)were marked. Also, the reason presented as “no cold chain” was attributed to Oxytocin in nearly one-third (30.0%) of SDPs. Facility’s physical distance from the warehouse is also important factor that affects facility’s stock status. Facilities that are closer to the source of supply are less likely to encounter “stock out” compared to facilities that are far away(29).

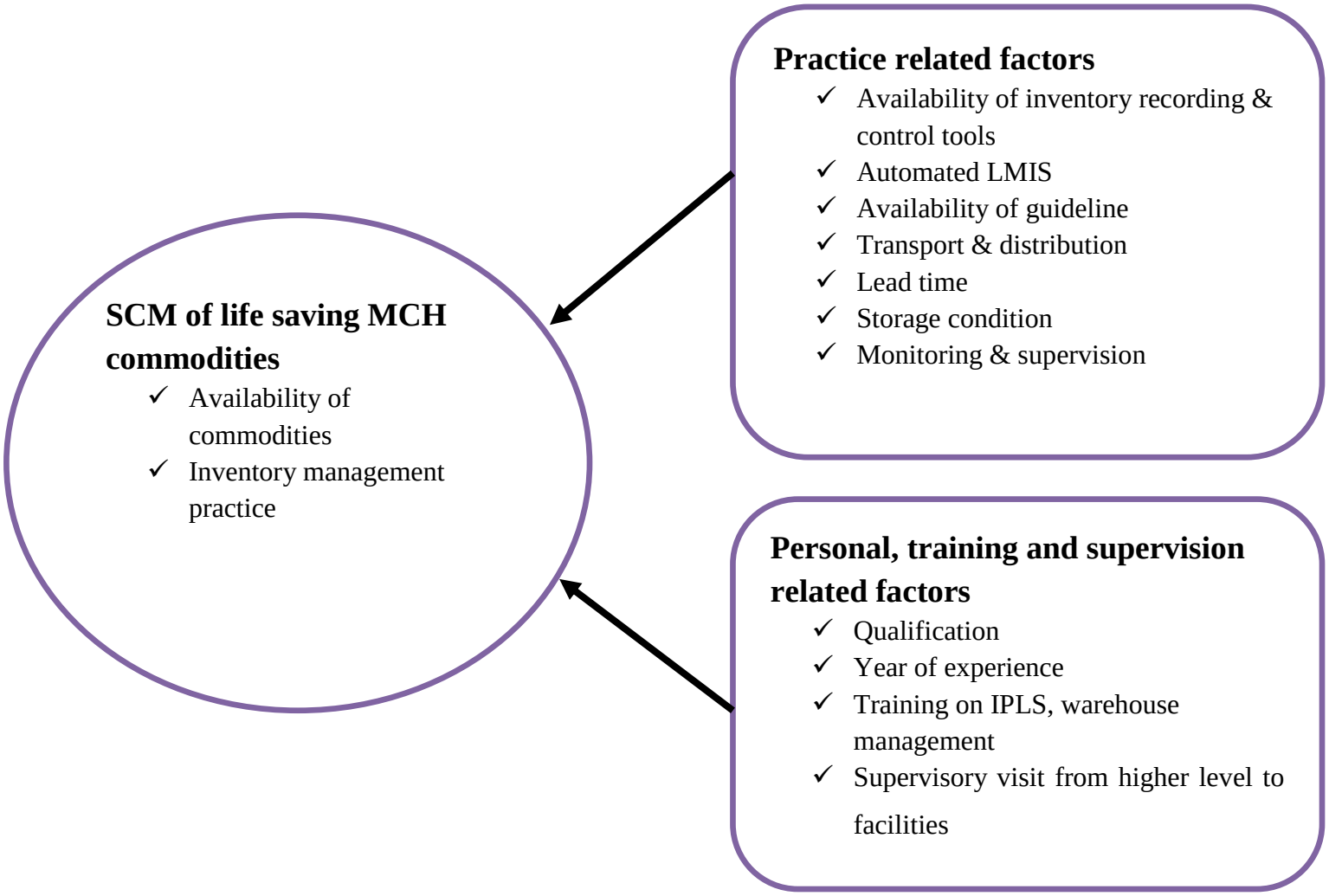

Figure 2: Conceptual framework on assessment of SCM of MCH commodities,

South west Ethiopia, May 2017

Chapter Three

3. Objective

3.1. General objective

- To assess Maternal and Child Health Commodities supply chain management practice in selected public Health Facilities under Jimma Branch of Pharmaceutical Fund and Supply Agency, Ethiopia.

3.2. Specific objectives

- To assess quantification and distribution practice of pharmaceutical requirements at Jimma branch of Pharmaceutical Fund and Supply Agency
- To assess the availability of Maternal and Child Health Commodities in selected public health facilities.
- To assess inventory management practices of Maternal and Child Health Commodities at selected public health facilities.
- To identify challenges in SCM of Maternal and Child Health Commodities.

Chapter Four

4. Methods and Materials

4.1. Study setting

The study was conducted in the selected public health facilities under Jimma branch of Pharmaceutical Fund and Supply Agency (PFSA), located at Southwest of Ethiopia. Jimma is found 346 km to the south west of the national capital city, Addis Ababa. According to the projections of the 2007 E.C population and housing census, the total population under the Southwest region served by PFSA Jimma hub for the year 2016 is estimated to be 7,967,511 (30). A total of 313 government health facilities (i.e. 292 health centre and 21 hospitals) with a total of 7913 health professionals working at public health facility are found under Jimma branch of PFSA as of Study period (the list of health facilities are obtained from Jimma branch of PFSA).

4.2. Study Period

The study was conducted from April 10 to May 10, 2017 GC.

4.3. Study design

The study was utilized facility based descriptive cross-sectional study design using both quantitative and qualitative data collection techniques to gather the required information.

4.4. Population

4.4.1 Source population and type of data

- **Source population**

The sources of population for the study are all public health facilities providing MCH under Jimma branch of PFSA are the source facilities. All health care professionals who manage the

supply chain of MCH drugs under Jimma branch also sources of information. Additionally, all professionals who are involved in supply chain management of pharmaceuticals at Jimma branch of PFSA also source of population.

- **Type of data**

The sources of data for the study are all documents found in all public health facilities used to manage the supply chain of MCH drugs under Jimma branch of PFSA are sources of data. The primary data was collected by observation and structured interview guide with selected health facility relevant staffs and key informant interview at Jimma branch of PFSA. Health facilities records, guidelines and standard operating procedures used as secondary data sources.

4.4.2 Study population

The study populations was selected public health facilities being served by Jimma branch Pharmaceutical Fund and Supply Agency (PFSA), selected health care providers working at public health facilities and selected key informants who are involved in supply chain of pharmaceuticals at Jimma branch of PFSA and Document found in selected public health facilities, Bin cards, receiving and Issuing Vouchers, SOP, Requisition and Reporting Forms of selected public health facilities, and guidelines were the major documents checked and reviewed and observing the warehouse condition of selected public health facilities.

4.4.3 Inclusion and exclusion criteria

Inclusion criteria

- ✓ Public health facilities under Jimma Branch of PFSA
- ✓ A public health facility that has been in service at least for one year.

Exclusion criteria

- ✓ Public health facilities that do not give MCH service
- ✓ Health facilities found in Gambela region supplied by Jimma Branch of PFSA

4.5. Sample Size and Sampling Procedure

4.5.1. Sample Size Determination

Jimma Branch PFSA was selected purposefully due to the fact that it serves health facilities under this branch. The sample of health facilities are calculated by using the Logistic Indicators Assessment Tool. This document suggested that it would be enough to take 15% of the targeted health facilities as sample for the study(41). Therefore, 313 public health facilities which are served by Jimma branch of PFSA have an equal and independent chance of being included in the sample that was selected. By using 15% of the targeted public health facilities and by adding 10% non-response rate fifty two public health facilities were selected.

4.5.2. Sampling Technique

A total of 313 public health facilities are found under Jimma branch of PFSA. Stratified random sampling method was used since there were heterogeneous group of different zones in the catchment area. Therefore, the study has used stratified sampling method to choose the respective number of health facilities from the total found in each zone or strata. Proportional allocations to each stratum were used. For each stratum the study units selected using simple random sampling method. Therefore, those 313 public health facilities have an equal and independent chance of being included in the selected sample.

Table 1: Proportional sample size of Health facilities included in the study, South west Ethiopia, May, 2017

S.N	Zone	No of health facilities	Proportional sample size of health facilities
1	Jimma Town	7	1
2	Jimma	126	21
3	I/Ababor	42	7
4	Buno Bedele	27	4
5	Kaffa	47	8
6	Bench Maji	40	7

7	Sheka	14	2
8	Konta	4	1
9	Yem	6	1
	Total	313	52

4.6. Study variables

4.6.1. Dependent variables

- SCM of life saving MCH commodities
  - ✓ Availability of commodities
  - ✓ Inventory management practice

4.6.2. Independent variables

- ❖ Practice related factors
  - ✓ Availability of inventory recording & control tools
  - ✓ Automated LMIS
  - ✓ Usage of format
  - ✓ Availability of guideline
  - ✓ Transport & distribution
  - ✓ Lead time
  - ✓ Storage condition
  - ✓ Monitoring & supervision
- ❖ Personal, training and supervision related factors
  - ✓ Qualification
  - ✓ Year of experience
  - ✓ Training on IPLS, warehouse management
  - ✓ Supervisory visit from higher level to facilities

4.7. Data Collection Procedures

4.7.1. Data collection instrument

The Logistic Indicator Assessment Tool (LIAT) was adopted to develop quantitative structured questionnaires and The Logistic System Assessment Tool (LSAT) was adopted to develop standard qualitative open ended questionnaires for key informant interview.

- The structured interview guides was used to conduct key informant interview with Jimma PFSA officials and staffs to describe the supply chain management practices including quantification, forecasting and distribution system of the commodities and supply chain management challenges. Key informant interview methods was used to obtain information from primary data sources on the SCM practices using standard open ended questionnaires for relevant staffs in the system. Key informants from Jimma branch PFSA officials and staffs which include; Branch manager, forecasting and capacity building coordinator and officers, stock and distribution coordinator and officer. The interviewer records verbal answers to various questions which were transcribed latter.

- Semi-structured questionnaire and observation check list was used at selected public health facilities to collect data on the supply chain management of the commodities including acceptable storage condition, inventory control procedures, product availability and data quality of Life-Saving MCH commodities from the different respondents including the head of the pharmacy, drug dispenser and Store manager. A six month data (October 2016 to March, 2017) was used from bin card and daily register to see the pattern of stock status in selected public health facilities.

4.7.2. Data collectors

Data was collected using the tools that are mentioned above from all study units by trained data collectors and principal investigator. The data collectors was pharmacy professionals; prior to data collection, the data collectors have received one day training on how to complete the tools

that included practical data collection before being involved in the data collection. The in-depth interview with key informants was conducted by principal investigator and the principal investigator Coordinated and supervised overall data collection process. Advisor has supervised the overall process of the study. The data was collected on April 10 to May 10, 2017 G.C.

4.8. Data processing and analysis

The collected data was manually checked for completeness and consistencies before being entered into the computer. The quantitative data was entered and analyzed by using MS Excel 2007 and Statistical Package for Social Sciences (SPSS) software version 20. The quantitative data is analyzed through descriptive statistics, which include percentage and frequency and result was presented in tables and figures and to explore the relation between the dependent and independent variables Chi-square test was done. The qualitative data was analyzed thematically. Qualitative data was transcribed, summarized in to key thematic area and presented by narrating the findings.

4.9. Ethical considerations

Ethical approval of the research was obtained from the ethics review committee of Jimma University, Institute of Health. In addition, permission to conduct the research was obtained from the administrative office of the all selected public health facilities and PFSA. Data collectors clarify about the objectives, benefits, and risk of the study to the participants orally and they convinced and agreed to respond for the interview. The confidentiality was assured by excluding their names and the right not to participate in the study was respected.

4.10. Data quality assurance

The data collection tool was pre-tested prior to the actual data collection. The pre - test was madeon 5% of similar facilities (which are not included in the study facilities) to evaluate the data collection tool for its validity, reliability and consistency. After pre - test was done some

question was modified.The PI discus with the research assistant on regular basis and reviewed the collected data for completeness. The collected qualitative data was summarized on the same day of the data collection.The quality of the data was confirmed by using different types of documents containing the same information. Data was checked by the principal investigator for the consistency, reliability and completeness. Data cleaning and editing were taken regularly.

4.11. Operational definition

MCH Commodities: For this study MCH Commodities are those medicines a prioritized by UN Commission and other MCH commodities across the reproductive, maternal, newborn and child health (RMNCH) commodities these are:- Female Condom, Contraceptive Implants, Emergency Contraception, Oxytocin, Misoprostol, Magnesium Sulfate, Amoxicillin dispersible scored tablet, Oral Rehydration Salts, Zinc, Injectable Antibiotics, Antenatal Corticosteroids, Chlorhexidine, Resuscitations**,** Ampicillin sodium 500mg injection, Calcium gluconate 10% Injection, Dextrose 40% , Dextrose in Normal Saline (5% + 0.9%), Tetracycline 1% eye ointment, Ferrous Sulphate + Folic Acid 200mg+0.4mg Tablet, Hydralzine 20mg/ml Injection, Ceftriaxone 1gm injection , Vitamin K 10mg/ml Injection, Methylergometrine Maleate 0.2mg/ml Injection, Diazepam 5mg/ml injection and Metronidazole Hydrochloride 5 mg/ml intravenous injection.

Supply chain management of MCH Commodities: Management of pharmaceuticals and information flow in a supply chain to provide the highest degree of customer satisfaction at the lowest possible cost, for this study supply chain management is measured by availability of MCH commodities and inventory management practice of MCH commodities at the public health facility level.

Availability of MCH Commodities: Commodities said to be available itshould be available at dispensary unit or store more than average daily consumption of products in particular health facility on the day of visit.

Definition of terms

Essential pharmaceuticals: are those that satisfy the priority health care needs of the population.

Stock out: a commodity was considered as a stock out when the product was stocked out from the dispensary and store on the day of visit and when the balance was zero on bin card.

Inventory control system: is to inform personnel when and how much of a pharmaceuticals to order and to maintain an appropriate stock level to meet the needs of patients. A well designed and well operated inventory control system helps to prevents shortages, oversupply, and expiry of pharmaceuticals.

Logistics Management Information System (LMIS): is a system that generates basic logistics information, which is needed to make logistics decisions.

Supply Chain Management Practices: are set of activities undertaken in an organization to promote effective management of its supply chain.

Supply Chain Performance: is the performance of the supply chain system in terms of reliability and responsiveness.

Reliability: Customer (health facility) focused attribute describing systems ability to deliver the right quantity and quality on the right time.

Responsiveness: Customer (health facility) focused attribute describing the speed at which tasks are performed and mostly expressed by cycle-time metrics.

Order Fill Rate: is the percentage of difference between amounts ordered in the last ordered period (defined period of time) and the amount received for that period.

Delivery Lead Time: is the time interval between when new stock is ordered and when it is received and available for use.

4.12. Dissemination of the finding

As this work is part of MSc thesis it will publicly defended. In addition the findings of this study will be shared in print copy to all concerned bodies that can make use of the study findings including Jimma University, institute of health science, Central PFSA, Jimma Branch PFSA, FMOH, selected public health facilities found under Jimma Branch of PFSA, Jimma zonal health department, different organizations working in the areas of SCM, and will also be sent for publication to peer reviewed scientific journals

Chapter Five

5. Result

A total of 52 health facilities were visited during the assessment; of which 10 were hospitals and 42 were HCs located in south west region of Ethiopia. Thirty three health facilities were in Oromia region and the rest 19 were found in South Nation, Nationality & People Region (SNNPR). All selected facilities were providing MCH services.

5.1. The socio-demography of the study health facilities

The number of professionals working at pharmacy department were found to be 213 at the time of assessment, of which 112(52.6%) were pharmacist, 69(32.4%) were druggist, 31(14.5%) were clinical nurses and the remaining 1(0.5%) was HO. Regarding work experience of store managers, 30(57.7 %) had experience greater than3 year and the remaining 22(42.3%) has less than 3 years of experience. Thirty two (61.5%) of store managers received formal IPLS Training.

Among selected public health facilities HCMIS were available in 21(40.4%); of which only 9(42.9%) facilities had functional HCMIS (Table2)

Table 2: Socio-demography characteristics of selected public Health facilities, South west Ethiopia, May, 2017 (**N=52HFs)**

S.N		Variables	Frequency	%
1	Professionals under pharmacy unit	Pharmacist	112	52.6
		Druggist	69	32.3
		Nurse	31	14.5
		HO	1	0.5
		Total	213	100
2	Principal person managing MCH drugs	Pharmacist	15	28.8
		Druggist	22	42.4
		Nurse	14	26.9
		HO	1	1.9
		Total	52	100

3.	Experience	<1year	5	9.6
		1year -3year	17	32.7
		> 3year	30	57.7
		Total	52	100
4	Completing Format	Formal IPLS Training	32	61.5
		On-the-job training	14	26.9
		Learn from Colleagues	6	11.5
		Total	52	100
5	Presence of HCMIS	Present	21	40.4
		Not present	31	59.6
		Functional	9	42.9
6	SOP of IPLS	Present	52	100

5.2. Stock status of MCH Commodities

5.2.1. Availability of MCH Commodities

At the time of data collection the overall availability of MCH commodities were 72.45% (hospital 65.2% and HCs 74.19%). Availability of MCH commodities in Oromia region were 73.08% (hospital 68.66% and HCs 74.08%) and availability of MCH commodities in SNNPR region were 71.8% (hospital 60% and HCs 70.4%).The availability of the essential MCH commodities, oxytocin was availed in 80% and 97.6% of hospitals and health centers respectively; magnesium Sulphate was availed in 70% and 83.3% of hospitals and health centers respectively and misoprostol was availed in 70% and 81% of hospitals and health centers respectively. (Table 3)

Table 3: Percentage of availability of MCH Commodities on the day of visit by region, facility type and drug type for selected public Health facilities, South west Ethiopia, May,2017 (**N=52HFs)**

Product Description	Region								
	OROMIA (N=33)			SNNPR (N=19)			TOTAL (N=52)		
	Hospital(N=6)	HCs(N=27)	Total	Hospital(N=4)	HCs(N=15)	Total	Hospital	HCs	Total
Female condoms	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Implants	6(100%)	27(100%)	33(100%)	4(100%)	15(100%)	19(100%)	10(100%)	42(100%)	52(100%)
Emergency contraception	4(66.7%)	19(70.4%)	23(69.7%	2(50%)	10(66.7%)	12(63.2%)	6(60%)	29(69%)	35(67.3%)
Amoxicillin250mgdispersibletab	4(66.7%)	21(77.8%)	25(75.8%	3(75%)	13(86.7%)	16(84.2%)	7(70%)	34(81%)	41(78.8%)
Oxytocine 10 IU injection	5(83.3%)	27(100%)	32(96.9%	3(75%)	14(93.3%)	17(89.5%)	8(80%)	41(97.6%)	49(94.2%)
Gentamicin 80mg/2ml inject	6(100%)	25(92.6%)	31(93.9%	3(75%)	15(100%)	18(94.7%)	9(90%)	40(95.2%)	49(94.2%)
Dexamethasone 4 mg injection	4(66.7%)	17(62.9%)	21(63.6%	2(50%)	9(60%)	11(57.9%)	6(60%)	26(61.9%)	32(61.5%)
Magnesium sulfate 500 g/ml inj.	5(83.3%)	24(88.9%)	29(87.9%	2(50%)	11(73.3%)	13(68.4%)	7(70%)	35(83.3%)	42(80.8%)
Misoprostol 200 mcg tablet	5(83.3%)	23(85.2%)	28(84.8%	2(50%)	11(73.3%)	13(68.4%)	7(70%)	34(81%)	41(78.8%)
ORS	5(83.3%)	21(77.8%)	26(78.8%	4(100%)	12(80%)	16(84.2%)	9(90%)	33(78.6%)	42(80.8%)
Zinc 20 mg dispersible tabs	5(83.3%)	25(92.6%)	30(90.9%	3(75%)	13(86.7%)	18(94.7%)	8(80%)	38(90.5%)	46(88.5%)
Chlorhexidine 7.1% gel 25gm	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Resuscitation device (Ambu bag)	6(100%)	27(100%)	33(100%)	4(100%)	15(100%)	19(100%)	10(100%)	42(100%)	52(100%)
Ampicillin sodium 500mg inj.	2(33.3%)	21(77.8%)	23(69.7%	0(0%)	9(60%)	9(47.4%)	2(20%)	30(71.4%)	32(61.5%)
Calcium gluconate 10% injection	5(83.3%)	20(74.1%)	25(75.8%	4(100%)	12(80%)	16(84.2%)	9(90%)	32(76.19%)	41(78.8%)
Dextrose 40% Injection	6(100%)	25(92.6%)	31(93.9%	3(75%)	15(100%)	18(94.7%)	9(90%)	40(95.2%)	49(94.2%)
DNS (5% + 0.9%)	5(83.3%)	27(100%)	32(96.9%	2(50%)	15(100%)	17(89.5%)	7(70%)	42(100%)	49(94.2%)
Tetracycline 1% eye ointment	5(83.3%)	21(77.8%)	26(78.8%	4(100%)	13(86.7%)	17(89.5%)	9(90%)	34(81%)	43(82.7%)
FerrousSulphate FolicAcidTab	3(50%)	12(44.4%)	15(45.5%	3(75%)	7(46.7%)	10(52.6%)	6(60%)	19(45.23%)	25(48.1%)
Hydralzine 20mg/ml injection	4(66.7%)	20(74.1%)	24(72.7%	3(75%)	12(80%)	15(78.9%)	7(70%)	32(76.19%)	39(75%)
Ceftriaxone 1gm injection	1(16.7%)	21(77.8%)	22(66.7%	0(0%)	15(100%)	15(78.9%)	1(10%)	36(85.7%)	37(71.2%)
VitaminK 10mg/ml Injection	4(66.7%)	21(77.8%)	25(75.8%	2(50%)	11(73.3%)	13(68.4%)	6(60%)	32(76.19%)	38(73.1%)
Methylergometrine 0.2mg/ml Inj	5(83.3%)	19(70.4%)	24(72.7%	2(50%)	10(66.7%)	12(63.2%)	7(70%)	29(69%)	36(69.2%)
Diazepam 5mg/ml injection	5(83.3%)	23(85.2%)	28(84.8%	2(50%)	15(100%)	17(89.5%)	7(70%)	38(90.5%)	45(86.5%)
Metronidazole Hcl 5 mg/ml inj.	3(50%)	14(51.8%)	17(51.5%	3(75%)	7(46.7%)	10(52.6%)	6(60%)	21(50%)	27(51.9%)
Average	**68.66**	**74.08**	**73.08**	**60**	**70.4**	**71.8**	**65.2**	**74.19**	**72.45**

5.2.2. Stock-Outs of MCH Commodities

On average 38.8% of hospitals and 36.47% of HC had experienced stock out of MCH commodities within the past 6 months prior to data collection. The most frequently stocked out product at health facilities were female condom, Chlorhexidine 7.1% gel, Ferrous Sulphate + Folic acid tablet, Vitamin K injection, Methylergometrine Maleate injection, Metronidazole HCl 5 mg/ml intravenous injection (Table4)

Table 4: Stock out of MCH Commodities by facility type, South west Ethiopia, May, 2017 (**N=52HFs)**

S.N	Product Description	On the day of visit		Past 6 month	
		Hospital	HCs	Hospital	HCs
1	Female condom	10(100%)	42(100%)	10(100%)	42(100%)
2	Implants	0(0%)	0(0%)	0(0%)	9(21.4%)
3	Emergency contraception	4(40%)	13(30.95%)	5(50%)	13(30.95%)
4	Amoxicillin 250mg dispersible scored tablet	3(30%)	8(19.05%)	4(40%)	14(33.3%)
5	Oxytocine 10 IU injection	2(20%)	1(2.38%)	2(20%)	6(14.28%)
6	Gentamicin 80mg/2ml in 2ml inject	1(10%)	2(4.76%)	2(20%)	8(19.05%)
7	Dexamethasone 4 mg injection	4(40%)	16(38.1%)	5(50%)	22(52.38%)
8	Magnesium sulfate 500 g/ml injection	3(30%)	7(16.66%)	5(50%)	14(33.3%)
9	Misoprostol 200 mcg tablet	3(30%)	8(19.05%)	3(30%)	14(33.3%)
10	ORS	1(10%)	9(21.4%)	2(20%)	21(50%)
11	Zinc 20 mg scored dispersible tabs	2(20%)	4(9.5%)	5(50%)	11(26.2%)
12	Chlorhexidine 7.1% gel 25gm	10(100%)	42(100%)	10(100%)	42(100%)
13	Resuscitation device (Ambu bag)	0(0%)	0(0%)	0(0%)	0(0%)
14	Ampicillin sodium 500mg injection	8(80%)	12(28.57%)	3(30%)	17(40.47%)
15	Calcium gluconate 10% Injection	1(10%)	10(23.81%)	2(20%)	13(30.95%)
16	Dextrose 40% Injection	1(10%)	2(4.76%)	1(10%)	3(7.14%)
17	DNS (5% + 0.9%)	3(30%)	0(0%)	4(40%)	1(2.38%)
18	Tetracycline 1% eye ointment	1(10%)	8(19.05%)	1(10%)	15(35.71%)
19	Ferrous Sulphate + Folic Acid Tablet	4(40%)	23(54.76%)	8(80%)	25(59.52%)
20	Hydralzine 20mg/ml injection	3(30%)	10(23.81%)	4(40%)	14(33.3%)
21	Ceftriaxone 1gm injection	9(90%)	6(14.28%)	2(20%)	12(28.57%)
22	VitaminK 10mg/ml Injection	4(40%)	10(23.81%)	6(60%)	15(35.71%)
23	Methylergometrine Maleate 0.2mg/ml Inj.	3(30%)	13(30.95%)	5(50%)	21(50%)
24	Diazepam 5mg/ml injection	3(30%)	4(9.5%)	4(40%)	7(16.66%)
25	Metronidazole Hcl 5 mg/ml inj.	4(40%)	21(50%)	4(40%)	24(57.14%)

5.2.3. Reasons for Stock-Outs of MCH Commodities

Unavailability of the medicines from PFSA was mentioned as the main reason for stock-outs which account 37.95%. In addition, delay in delivering medicines from PFSA 15.99%, delay by the hospitals to request resupply on time 2.2%, lack of information on availability at the supplier 0.24%, and short expiry date 17.7% were mentioned as the reasons for stock outs of MCH medicines at the time of data collection.

5.3. Inventory management practice of MCH commodities

5.3.1. Availability of LMIS formats and Usage

Availability of receiving and issuing models, RRF and IFRR in hospitals were 100%. In health center receiving and issuing models and RRF were available 100%, whereas IFRR were available in 39(92.8%). (Table 5)

Table 5: Summary of LMIS format availability and usage, south west Ethiopia, May, 2017

LMIS formats	HOSPITAL		HEALTH CENTER	
	Available (%)	Usage (%)	Available (%)	Usage (%)
% Bin card Availabilityfor MCH Product	86.5		69.8	
% Bin card updated	63.6		58.9	
Receiving & issuing forms /models	100	100	100	100
RRF	100	100	100	100
IFRR	100	100	92.8	100

The study showed that, 86.5% of hospitals and 69.8% of health centers have bin card of which 63.58% of hospitals and 58.9% of health centers had updated bin cards. Percentage of bin card updated varies from facility to facility with a range of 37.5% - 85.7% in hospitals and 46.7% - 74.7% in HCs.

The main reason given for not updating the LMIS forms was workload because of most of the time they assigned to do dispensing activities due to shortage of pharmacy professionals.

Table 6: Health facilities bin card availability and updating practice, south west Ethiopia, May, 2017

S.N	Product Description	Hospital(N-10)		HC(N-42)	
		Bin card available	Bin card Updated	Bin card available	Bin card Updated
1	Female condoms	0		0	
2	Implants	9(90%)	6(66.7%)	30(71.4%)	20(66.7%)
3	Emergency contraception	9(90%)	7(77.8%)	26(61.9%)	18(69.23%)
4	Amoxicillin dispersible scored tablet	7(70%)	3(42.9%)	25(59.5%)	16(64%)
5	Oxytocine 10 IU injection	7(70%)	5(71.4%)	20(47.6%)	13(65%)
6	Gentamicin 80mg/2ml in 2ml inject	9(90%)	5(55.6%)	37(88.1%)	25(67.56%)
7	Dexamethasone 4 mg inject	8(80%)	5(62.5%)	30(71.4%)	18(60%)
8	Magnesium sulphate 500 mg/ml inject	8(80%)	6(75%)	25(65.8%)	14(56%)
9	Misoprostol 200 mcg tablet	8(80%)	6(75%)	21(50%)	12(57.4%)
10	ORS	9(90%)	5(55.6%)	34(80.9%)	18(52.9%)
11	Zinc 20 mg scored dispersible tabs	8(80%)	6(75%)	31(73.8%)	17(54.8%)
12	Chlorhexidine 7.1% gel 25gm	0		0	
13	Resuscitation device (Ambu bag)	0		0	
14	Ampicillin sodium 500mg inject	9(90%)	6(66.7%)	29(69.1%)	17(58.6%)
15	Calcium gluconate 10% Injection	7(70%)	3(42.9%)	8(50%)	5(62.5%)
16	Dextrose 40% Injection	10(100%)	7(70%)	37(88.1%)	22(59.4%)
17	DNS (5% + 0.9%)	7(70%)	3(42.9%)	31(79.5%)	16(51.6%)
18	Tetracycline 1% eye ointment	10(100%)	7(70%)	34(81%)	18(52.9%)
19	Ferrous Sulphate + Folic Acid Tablet	7(70%)	6(85.7%)	25(60.9%)	15(60%)
20	Hydralzine 20mg/ml injection	9(90%)	5(55.5%)	33(82.5%)	18(54.5%)
21	Ceftriaxone 1gm injection	10(100%)	7(70%)	36(85.7%)	23(63.8%)
22	VitaminK 10mg/ml Injection	8(80%)	3(37.5%)	28(68.3%)	16(57.1%)
23	Methylergometrine Maleate Injection	5(50%)	3(60%)	21(52.5%)	10(47.6%)
24	Diazepam 5mg/ml injection	10(100%)	7(70%)	30(71.4%)	14(46.6%)
25	Metronidazole Hcl intravenous inject	10(100%)	7(70%)	20(52.6%)	10(50%)

5.3.2. Reporting and ordering MCH drugs

All health facilities used RRF to report and request MCH Commodities from PFSA every two months. However, the review of the last RRF sent during data collection revealed that only 92.3% of the reports are completed for all products. Sixty nine point two percent of health facilities used facility personnel and vehicle to submit their report and the rest 30.8% respondents mentioned that reports were picked by higher level. Regarding factors affecting the quantity of drugs to order, number of patients was the main factor affecting the quantity of drugs that the health facilities order. In addition, this study showed that store size was also another factor that affects the quantity of drug being ordered.

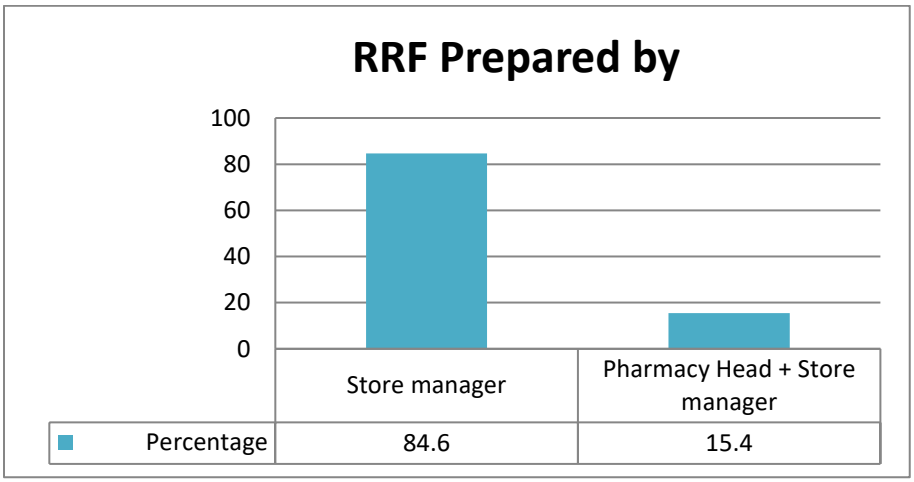

Figure 3: Professionals prepared Report and Requisition Form in selected public health Facilities, South west Ethiopia, May, 2017

Despite the fact that they were supposed to submit the report every two months; between the 1st and the 10th day of the reporting month, only 55.8% of health facilities was able to submit their reports according to the schedule. They had mentioned Work load as a main reason for not being able to submit their RRF on time.

Regarding emergency order 26.92% of them faced at least two twice in past 6 months prior to data collection. Generally 80% of Hospitals and 23(38.1%) of HCs had emergency orders of Life- Saving MCH drugs in the past 6 months.

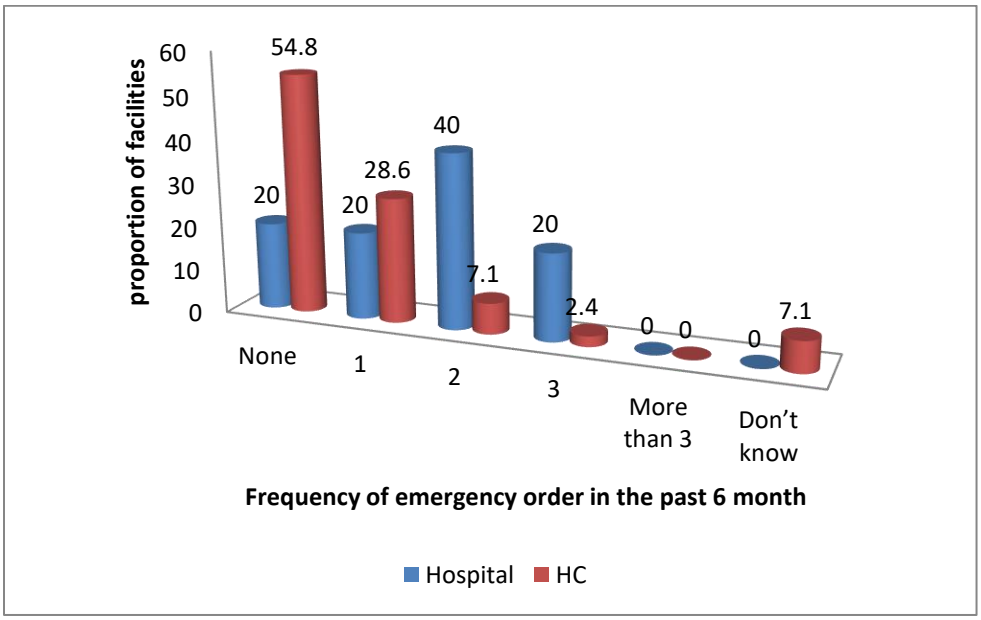

Figure 4: Percentage of emergency order for MCH commodities, south west Ethiopia, May, 2017

5.3.3. Receiving/ distribution and transportation of MCH Commodities

Results showed that 84% of the facilities reported that they were the ones who make the decision on the quantity to be refilled and the remaining 16% said that decisions were made at higher level. This might be because the facilities were not refilled for some products according to the quantity they requested. Concerning direct source of product and mode of distribution, results were consistent with that of the desired system by IPLS. They reported that PFSA is the direct source of products and mode of distribution is delivery by PFSA for program drugs and facilities collect for emergency order.

All health facilities had been expecting PFSA to bring the ordered MCH Commodities within 30 days of the reporting. All the store managers had kept the invoice as a proof of delivery. The

store managers of health facilities, 39(75%) said that they received the quantity of drug they ordered sometimes, while 6(11.5%) of health facilities said that they always received the quantity of the drug they ordered.

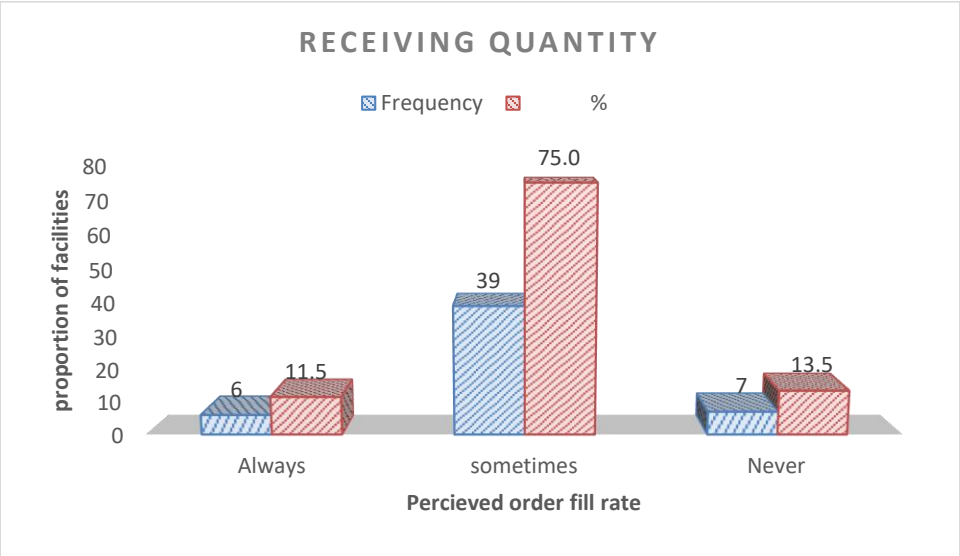

Figure 5: Health Facilities receiving quantity of MCH commodities they ordered, South west Ethiopia, May, 2017

The store keeper of the Health Facilities said that PFSA sometimes send excess MCH drugs and sometimes decreased the ordered MCH drugs. Additional some products are delivered to the health facilities by break down without the need of the facility.

5.3.4. Delivery Lead Time of MCH Commodities

As can be seen in figure below 23(45%) of the health facilities delivery lead time were less than 2weeks and between2weeks to 1 months each of which account for 8% and 37 % respectively. 9(17%) of the Health Facilities received their order quantity more than 2 months.(Figure 6)

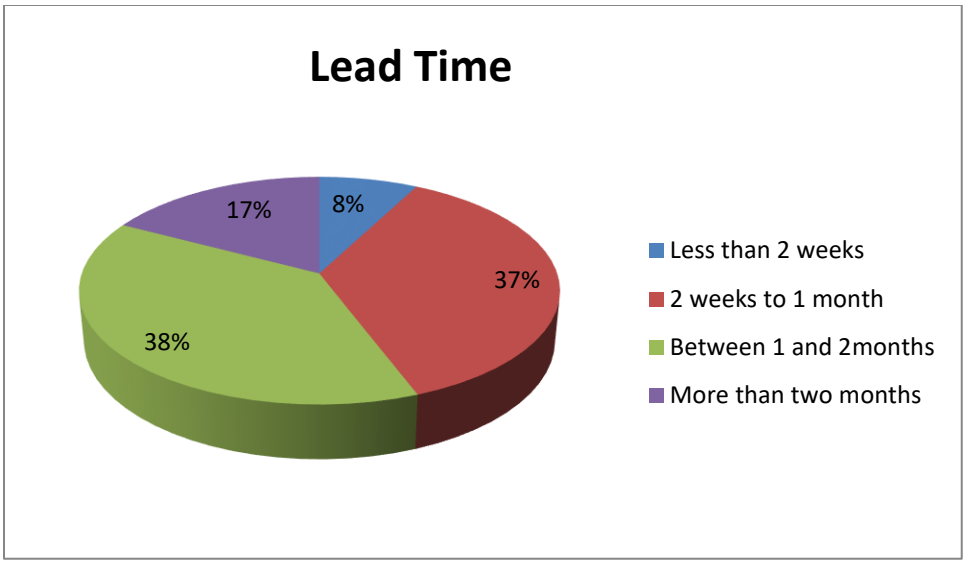

Figure 6: Perceived Average Lead time of MCH commodities, south west Ethiopia, May,2017

PFSA was responsible for transporting MCH Commodities to the facilities at regular order. However, during emergency order, the facilities itself took the responsibility for transporting MCH Commodities by using their own vehicle.

5.4. Storage condition

Twenty five (48.1%) of the assessed health facilities has fulfilled the minimum acceptable storage condition (>80%) according to IPLS SOP and the remaining 27(51.9%) has not fulfilled the minimum acceptable storage condition. The five conditions met most often by all types of facilities were Products protected from direct sunlight, products are protected from water and humidity, Pharmaceutical arranged well ready for distribution, FEFO and storage area is secured with a lock and key. The least fulfilled criteria were availability of fire safety equipment, placing products 30cm away from walls, and sufficient storage space and organization. (Table 7)

Table7: Summary of storage condition of products at the selected public Health Facilities, South west Ethiopia, May, 2017

No	Criteria for maintaining storage condition and stock management for pharmaceuticals	% responses of HFs	
		Yes	No
1	Products that are ready for distribution are arranged so that identification labels and expiry dates and/or manufacturing dates are visible.	47(90.4%)	5(9.6%)
2	Products are stored and organized in a manner accessible for first-to-expire, first-out (FEFO) counting and general management.	47(90.4%)	5(9.6%)
3	Cartons and products are in good condition, not crushed due to mishandling. If cartons are open, determine if products are wet or cracked due to heat/radiation (fluorescent lights in the case of condoms, cartons right-side up for Depo-Provera®).	37(71.2%)	15(28.8%)
4	The facility makes it a practice to separate damaged and/or expired products from usable products and removes them from inventory.	40(76.9%)	12(23.1%)
5	Products are protected from direct sunlight.	49(94.2%)	3(5.8%)
6	Cartons and products are protected from water and humidity.	48(92.3%)	4(7.7%)
7	Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of bats and/or rodents [droppings or insects].)	45(86.5%)	7(13.5%)
8	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.	52(100%	0(0%)
9	Products are stored at the appropriate temperature according to product temperature specifications.	34(65.4%)	18(34.6%)
10	Roof is maintained in good condition to avoid sunlight and water penetration.	46(88.5%)	6(11.5%)
11	Storeroom is maintained in good condition (clean, all trash removed, sturdy shelves, organized boxes).	38(73.1%)	14(26.9%)
12	The current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).	25(48.1%)	27(51.9%)
13	Fire safety equipment is available and accessible (any item identified as being used to promote fire safety should be considered).	6(11.5%)	46(88.5%)
14	Products are stored separately from insecticides and chemicals.	39(75%)	13(25%)

15	Products are stacked at least 10 cm off the floor.	40(76.9%)	12(23.1%)
16	Products are stacked at least 30 cm away from the walls and other stacks.	8(15.4%)	44(84.6%)
17	Products are stacked no more than 2.5 meters high.	45(86.5%)	7(13.5%)

5.5. Supportive Supervision

21(40.4 %) of the facilities reported that they received supportive supervision within the last month and another 17(32.7%) reported that they received it within the last 1-3 month. 7(13.5%) reported that they didn't receive supportive supervision. All the respondents said that their last supervision include review of stock cards and bin cards, different reports, physical stock count, storage condition and review of HCMIS. They also discussed and facilitate removal of expired products from the store. Table below shows the summary of last supportive supervision as reported by the facilities.

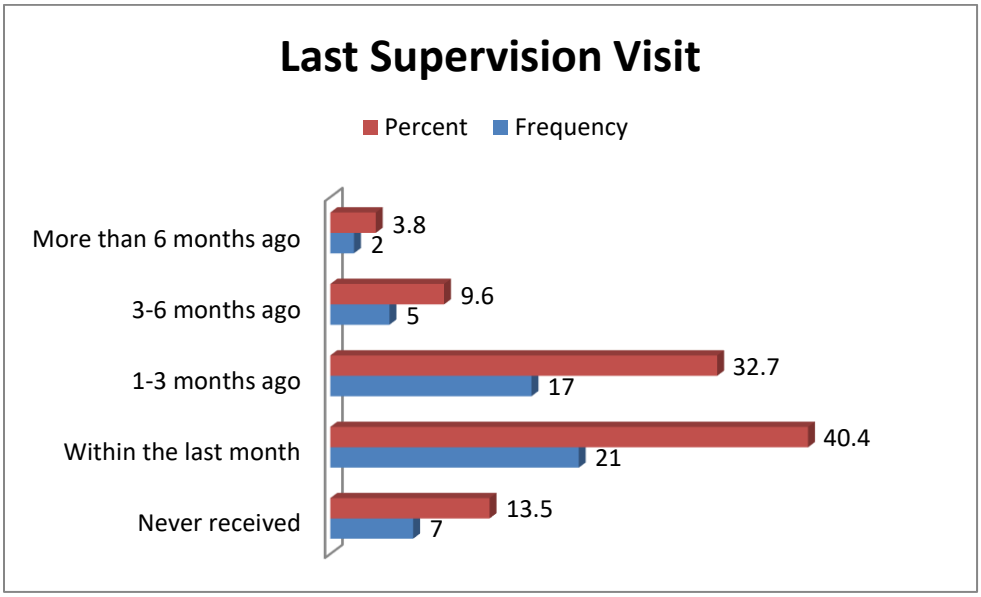

Figure 7: Health facilities have their last supervisory visit in selected public Health facilities, South west Ethiopia, May, 2017

Table8: Summary of organization who conducted supportive supervision at selected HFs, South west Ethiopia, May, 2017

	Frequency	Percent
PFSA	16	29.2
Woreda Health Office	2	4.2
RHB+ Woreda Health Office	2	4.2
Non-Governmental Organization	2	4.2
PFSA+ZHD	5	8.3
ZHD+ Woreda Health Office	2	4.2
PFSA+RHB+ZHD	5	8.3
PFSA+ NGO	7	12.5
PFSA+RHB	2	4.2
PFSA+ZHD+NGO	11	20.8
Total	52	100.0

As can be seen from the table, PFSA was involved in 83.3%of the cases in conducting the last supportive supervision visit to the facilities under the study and secondly NGO's were involved in 37.5% of last supportive supervision visit to the facilities under the study.

Associated factors of MCH supply chain Management practice

Table 9:-Chi-square test result for Availability of product and Qualification of the Professionals, South West Ethiopia, May, 2017

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.666	3	0.043
Likelihood Ratio	10.226	3	0.011
Linear-by-Linear Association	8.211	1	0.014
N of Valid Cases	52		

As can be seen from the above table, Chi-Square test showed that there was a significant association between Availability of product and Qualification of the professionals (p-value = 0.043).

The association of dependent and independent variable were performed using correlations coefficient, therefore Availability of product had no associations with Year of experience of professionals (p-value=0.49), Automated LMIS format (HCMIS) (p-value=0.36) and Availability of guideline in health facility (p-value=0.21).

The stock out of medicines had significant association with non-availability of the medicines from the supplier (p-value=0.012), delivering short expiry date medicines (p-value=0.008), delay in delivering medicines from the supplier (p-value =0.001),

Table 10:- Chi-square test result for Storage Condition and Formal IPLS Training, South west Ethiopia, May, 2017

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.191	1	.007		
Continuity Correction	5.426	1	.020		
Likelihood Ratio	8.144	1	.004		
Fisher's Exact Test				.012	.008
Linear-by-Linear Association	7.053	1	.008		
N of Valid Cases	52				

Chi-square test showed that there was significant association between Formal IPLS Training and Storage Condition of the products in the health facility (P-value=0.007).

The spearman correlation was used to identify the association between dependent variables and independent variables. Table 11 showed that spearman correlation test. Accordingly there was also a moderate correlation between the availability of MCH and the availability of bin cards for MCH with r= 0.44 and P value of 0.00. Similarly, the storage condition of health facilities warehouse, there was a moderate correlation with the type of the facility with r=0.22 and P=0.02 which was statistically significant at P=0.05. On the other hand, time of recent supervision and availability of updated bin cards has also a moderate correlation with storage condition with r= -0.45 and P= 0.01 respectively.

Table 11: Correlation between dependent and independent variables, SWE, May 2017

Variable	Availability of MCH	Storage condition
Facility type		r=0.22 p=0.02
Time of recent supervision		r=(-0.45) p=0.01
Bin card Available	r=0.44 p=.00	
Bin card updated		r=0.39 p=0.03

5.6. Key informant interview findings

5.6.1. Quantification and Distribution

The interview result with the Forecasting and Capacity Building Coordinator described the Quantification and forecasting of the health commodities at Jimma PFSA are as follows:-

The key informants said

"The branch has two groups of pharmaceutical products: RDF products and program products. Quantification of program products is done at central level and quantification of RDF products done at branch level by collecting all health facilities annual quantification data. The branch PFSA cross check quantification data collected from facilities Vs data distributed to health facilities then corrective action will be made. The facilities used both consumption and service expansion plan data for quantification of health commodities. The six and three month's consumption data are used for hospitals and health centers respectively. Some of MCH products are classified under program products while majority of MCH products are classified under RDF products. Therefore, their quantifications and resupply system done accordingly. Quantification takes into account the expected demand for commodities, unit costs, existing

stocks, stock already on order, expiries, lead time and minimum and maximum stock levels. Using this information, the total commodity requirements and costs for the program are calculated and compared with the available financial resources to determine the final quantities to procure. Finally, branch PFSA made 10% contingency on aggregated quantified data and sent to central PFSA.

The interview result with the stock and distribution coordinator and the warehouse managers was used to describe the logistics and distribution system of Jimma PFSA as follows:-
The key informants said
"The branch has two group of warehouses intended for storing RDF products and program products. Hundreds of different products are stored in these warehouses; ranging from medicines, laboratory diagnostic reagents and equipment, medical supplies, medical equipment, etc. It also has a cold room within one of the warehouses which is meant to store products that need to be refrigerated".

They also said
"Standard warehousing and inventory management practices like labeling, racking, categorization and record keeping are well implemented in both warehouses. FEFO – First Expiry First Out, a policy that enforces issue by expiry is well practiced and product arrangement in the warehouse facilitates the implementation of the policy except when the warehouse is overfilled and aisles are blocked as a result which mostly happens in the RDF warehouse".

While visit to the warehouse, it was observed that stock keeping and transaction records like bin card, stock issue voucher and good receiving note are used to track, monitor and document movement and storage of products in and out of the warehouses. In addition, reporting formats like store requisition forms and product return note are used to transfer essential data needed for decision from one level to another. The branch has a computerized software system that carries out the above mentioned record and they also keep manual records.

5.6.2. Supply chain challenges

The result of in-depth interview was identified in to key thematic areas and based on thematic content analysis following major challenges found by this research and summarized under supply, demand, internal and external factors.

❖ Supply related factors

Key informants were asked about supply chain challenge and according to the interview made, key informants said, "……*Insufficient availability of products in the local market to provide majority of important products needed in the country. PFSA is currently importing 80% of the products it is distributing in the country. Though the branch office is not involved in procurement, the challenge in this regard being faced by the head office is affecting Jimma PFSA. Even the available ones lack the required technical and financial capacity to deliver the right quantity of supplies in the right time".*

❖ Demand related factors

Key informants were asked about supply chain challenge and according to the interview made, key informants said, *"……..Demand uncertainty and lack of data quality along with imperfect market structure did affect PFSAs long term forecasting and planning activities. This in turn affects the optimization effort to allocate organizational resources efficiently. Reliability and responsiveness of health facilities demand report at all level for supply chain management is also under question mark because it has not reached that level of maturity".*

❖ Internal Operation related factors

Key informants were asked about supply chain challenge and according to the interview made, key informants said, "……*Majority of problems in relation to Jimma branch PFSAs internal operation revolves around financial, technical, managerial and infrastructure. Demand and supply uncertainty by itself affected organizational operation. Insufficient storage space to handle the volume of products needed to fulfill health facilities demand especially for RDF products is also another problem".*

❖ External Environment related factors

Key informants were asked about supply chain challenge and according to the interview made, key informants said, *"……..System inefficiency in warehousing, transportation and other logistics related services, the mandate to enforce the system in order to get a reliable, complete and timely data and reports for better decision making is limited because PFSA is not the owner of the health facilities (Regional health bureaus are the owners)".*

Chapter Six

6. Discussion

Supply chain management of MCH commodity is strategic area requiring significant attention and effective management in the health system of the country. Therefore, this paper has attempts to provide evidence based information on the supply chain management of MCH commodity under jimma branch of PFSA and identifies weak link in the public health supply chain of the commodities. Strengthening Supply Chain Management of pharmaceuticals was expected to improve stock status information including stock availability, stock out duration and storage condition at both Health facilities and PFSA level. Improving access to essential medicines is important to improve health outcomes.

This study showed that,The Overall, availability of MCH commodities were 72.45% (hospital 65.2% and HCs 74.19%). It was expected to be 100%. But the finding figure was lower than what is expected. The Availability of the essential MCH commodities, Oxytocin was availed in 80% and 97.6% of Hospitals and Health centers respectively; Magnesium Sulphate was availed in 70% and 83.3% of Hospitals and Health centers respectively and Misoprostol was availed in 70% and 81% of Hospitals and Health centers respectively These findings was comparable with study done by Getahun, W. *et al,* in 2015showed that Overall,Availability priority RMNCH medicines and commodities were available in less than 80% at the time of survey(17).Similarly study done in Ethiopia, on National Health Facility Assessment on Reproductive Health Commodities and Services showed that, improved availability of the two essential maternal/reproductive health medicines, (Oxytocin and Magnesium Sulphate) was observed over the years (2010-2012). Hence, Oxytocin that was availed in 75.7% of the surveyed SDPs in 2010 increased to 84.7% and 94.1% in 2011 and 2012 respectively. Likewise, Magnesium Sulphate that was available in 14.1% of the SDPs in 2010 increased to 26.7% and 55.6% in the same period. In 2013, the availability of both medicines dropped to 86.8% and 38.9% for Oxytocin and Magnesium Sulphate respectively(29).This indicates that figure of finding on Availability of MCH commodities at selected public Health facility was better compared to the above literature. The possible reasons for this may be the initiatives set by government to reduce maternal and

newborn morbidity and mortality to improve maternal health. But compared to standard and expected availability which is 100% commodity security it is lower than what is been expected. This finding was also enforced by the key informant interview said that" Insufficient availability of products in the local market to provide majority of important products needed in the country were a major challenge. Additionally lack of data quality along with imperfect market structure did affect PFSAs long term forecasting and planning activities. Even the available ones lack the required technical and financial capacity to deliver the right quantity of supplies in the right time".

Availability of product had association with Qualification of the professionals (p-value = 0.043), Availability of product is better for those public health facilities whose store head was pharmacy professional than that of other professional in the health facilities. This finding was also supported by the key informant interview replying that, "In most of health facility, store head was nurse to manage the product which is not right position, and also they have more than one tasks if there is shortage of human resource".

Pharmaceutical supply to public health facilities is being managed by the Pharmaceuticals Fund and Supply Agency (PFSA) in Ethiopia. Accordingly, hospitals and health centers are expected to get their medicines from PFSA. However, non-availability of the medicines from PFSA was the major reasons for stock-outs which account 37.95%. In addition, delay in delivering medicines from PFSA 15.99%, delay by the hospitals to request resupply on time 2.2%, lack of information on availability at the supplier 0.24%, and short expiry date 17.7% were the main reasons mentioned for the non-availability of maternal and reproductive health medicines at the time of data collection. So the finding showed that there was a serious interruption of MCH commodities in supply chain and was an indicative of the current supply chain was not strong enough to fill the gaps. Similarly, a study done by Sara E Casey*et al* showed that interrupted supplies and stock outs are the major challenges in the supply chain of reproductive, maternal, newborn and child health (RMNCH) Commodities in Democratic Republic of the Congo(42). Shortage of MCH commodities might be associated with the reporting system of health facilities which seriously affect forecasting at national level. So to prevent this kind of interruption, there has to be efficient supply chain. Effective drug supply management and inventory control avoid

stock out, loss due to unnecessary expiry, theft and ensure that the desired pharmaceutical products are available at all times in adequate quantity

The finding of the study was also supported by the key informant interview said that" Insufficient storage space to handle the volume of products needed to fulfill health facilities demand especially for RDF products is a major problem. But for most of the program products, it holds maximum stock that it enables it to serve the facilities under it for four months and minimum stock that would enable it to serve those facilities for two months which can be considered as a safety stock or buffer stock meant to help it cope with uncertainties".

As can be seen from the result, 23(45%) of the health facilities delivery lead time were less than 2weeks and between2weeks to 1 months each of which account for 8% and 37 % respectively. 9(17%) of the Health Facilities received their order quantity more than 2 months. This indicates that only 45% of the Health facilities received their order as per the proposed schedule set by the PFSA. So this is also an indicative for the interruption of the supply from the central level. IPLS guideline says delivery lead time would be between2weeks to 1month. Similarly IPLS Survey report show that regardless of the type of product more than 80 percent of both hospitals and health centers usually receives products requested within one month or less(43).

The study result on assessment of availability of LMIS formats showed that all LMIS formats for recording and reporting health logistics data are available at required level (100%) during study period at the health facilities except for IFRR which is 92.3% available (less than the desired 100%). Though it should be improved, this 92.3% availability for IFRR should not be considered as poor because is limited to very few products as compared to the others. These findings are comparable with national IPLS survey in 2015, in which availability of LMIS format were above 90%. (43) Similarly these finding was in line with a study conducted by Gurmu TG, Ibrahim AJ. On Inventory management performance of key essential medicines in health facilities of East Shewa Zone, where bin-cards, report and requisition forms and internal facility report and requisition forms were 100% available. (44) This indicates that health facilities were high in availability of LMIS format, because all these documents are very critical for the proper management of inventory, to track and control pharmaceutical transaction in the Health Facility.

As seen in the result, all health facilities reported that they use both RRF and IFRR forms to report consumption and order MCH Commodities. RRF reports to Jimma PFSA bimonthly which are all in line with the desired level but, 29(55.8%) of health facilities were able to submit their report according to the schedule. But, there was inconsistency among facilities in sending reports to higher level other than PFSA. Some send to woreda health offices while others send to both woreda and PFSA. All heath facilities estimated their drug requirement using a standard formula in standard reporting and requisition form. These were in line with the standard operating procedure reference manual. The standard operating procedure manual for pharmaceutical logistics recommends health facilities to use standard formula to calculate their reorder quantity which includes beginning balance in store, quantity received, loss/adjustment and ending balance. (45)

Concerning Bin card updating practice, only 63.6% of hospitals and 58.9% of HC observed that they update bin card for product management. These findings are different with national IPLS survey in 2015, in which the average usage of bin cards in hospitals was 73% and 64 % in health centers. Overall, in the 30 days preceding the survey, about 60 percent of the facilities had updated bin cards for pharmaceuticals.(43)The IPLS guideline requires that bin cards are updated regularly and bimonthly reports are prepared based on the data on the bin card. (45) This finding is far below the desired level of usage of bin card which is 100%. This could be because the health care providers are not willing to use the format. So this lack of adequate and accurate data; might affect the decision on supply chain of MCH drugs.

Even though both HCs and Hospitals control their stock there were frequent emergency orders of MCH Commodities in the six months period prior to the study. 80% of hospitals had emergence order of MCH Commodities more than two times while HCs 19(45.2%) had one or more emergency order in the past six months. The emergency order might be associated with inadequate quantification and supply from central level. Literature said that an accurate quantification is essential for all health commodities. (16)

Jimma branch PFSA re-supplies its Health facilities based on the standard IPLS guideline Therefore, facilities are expected to send their report and request every two months and PFSA

hence refill them every two months based on their request. So, refill performance as described by percentage refilled against requested could be taken as indicator for order fill rate. Order refill rate (The percentage difference between quantity ordered and received) of Jimma branch PFSA was zero. Similarly, IPLS Survey report show that the perceived order fill rate, the percentage of items that are filled, based on the ordered quantities with the correct products, for both program and revolving drug fund (RDF) products was low. (43)As per IPLS guideline, facilities are said to be reached emergency order point when they are left stock on hand (SOH) that serves only for two weeks and hence are supposed to place emergency order. (45) The higher the number of emergency orders, the higher the problem of the supply chain system. Number of emergency orders placed could be considered as indirect indicator of order fill rate.

The stores of all health facilities were assessed based on good pharmacy practice standards for medicines storage condition.This assessment revealed that the storage condition of both hospitals and HCs were not adequate so it leads to inefficient handling and use of drugs. About 49(94.2%) of the facilities stored Products protected from direct sunlight, 48(92.3%) of the facilities stored Cartons and products are protected from water and humidity, 47(90.4%) of the facilities fulfilled both Pharmaceutical arranged well ready for distribution and organized in manner which facilitates use of first to expire, first out (FEFO), 52(100%) of facilities were fulfilled storage area is secured with a lock and key. But only 6(11.5%) of facilities had Fire safety equipment is available and accessible. When we conclude the overall storage condition in terms of health facilities achieve storage condition >80% were only 25(48.1%) health facility had fulfilled the criteria of good pharmacy storage practice. The finding is different with national survey result 80% of heath facilities meets the storage criteria and also this result is in not line with the standard operating procedure manual(43,45).This finding is better than study conducted by Gurmu TG, Ibrahim AJ. On Inventory management performance of key essential medicines in health facilities of East Shewa ZoneWhere only 25% of the facilities had fulfilled the criteria of good pharmacy practice standards for the storage of medicines(44).The finding is below the standard though this problem can be directly attributed to Supply chain management of Life-Saving MCH Commodities, availability of store rooms that fulfil the required standards is very important for the expected success and impact of Supply chain management.To provide clients

with high quality products, each facility must have safe, protected and organized storage areas to ensure efficient handling and use of products.

The assessment result on knowledge sources to complete LMIS formats showed that formal IPLS training and On-the-job training accounts 32(61.5%) and 14(26.9%)respectively. Additionally, 40.4% of the facilities reported that they received supportive supervision within the last month and another 32.7% reported that they received it within the last 1to 3 months and all of them reported that the supervision included drug (product) management and logistic. Frequent supervision is good practice since it can prevent interruption of supplies, overstocking and under stocking of products in order to get the expected fruits of the system. These findings are better than national IPLS survey in 2015, which taken IPLS training with the average of 46 percent.(43) This was not in line with the guideline as it recommends. Health facilities staff who are involved on pharmaceutical supply chain recommended to be trained on IPLS either by formal or on job training to implement national IPLS guideline properly.(45) This unavailability of trained health care providers affects the utilization of SOP forms as also supported by expert's interview.

A study done in Lesotho similarly reveal that there were challenges in the drug supply system, which were mainly due to the lack of supervisory site visits, led to facilities over-stocking or under-stocking on certain items. One of the major reasons for wastage of medicines is that they may have expired without anyone noticing that the shelf life date was approaching. Failure to notice approaching expiry date might lead to the loss of a significant amount of resources.Moreover, essential medicines were expired on the shelves in some facilities where inventory was poorly managed. (33)

Chapter seven

7. Conclusion and Recommendation

7.1. Conclusion

Appropriate management of medicines at the different stages of supply chain system is imperative. Because Failure to do this will result in Interrupted supplies, stock outs and wastage of medicines which in turn affects the overall health care service in the facility. Quantification of program products is done at central level while quantification of RDF products done at branch level by collecting all health facilities annual quantification data. While quantification of MCH products are conducted at central level for those products only supplied by program, where as the rest products supplied by RDF done at branch level. Because, Some of MCH products are classified under program products while majority of MCH products are classified under RDF products. This study found 72.45% of availability of products for selected MCH commodities by the time of visit. While this figure is better as compared to other studies, butit was expected to be 100%. Therefore, there is a need for improvement as one cannot afford stock out of these drugs considering the potential serious health impact of treatment interruption both to the individual patient and the public at large.

The supply chain of MCH drugs was interrupted and there were frequent stock outs of MCH drugs which are an indicator of weak supply chain. Distribution of pharmaceuticals includes storage, inventory management, distributing, and re-ordering. These functions are important in getting the health commodities down to the service delivery points (SDPs) and ultimately to the consumers. Availing required resources and compliance to guidelines and SOP forms is important to maintain uninterrupted supply chain. Availability of LMIS formats is very good. However, there was inconsistency in the usage rate of the formats for some products. Except for storage condition, the others can be easily obtained from Logistic management information system. Generally the Storage condition of stores of the assessed facilities did not fulfills majority of the standard parameters used for this study. The main challenge reported by PFSA, is the quality of data from the Health facilities. PFSA is providing training and technical support to

the expected level and distribution and transportation practice was also in line with IPLS implementation guideline.

The ultimate goal of a supply chain system is to ensure product availability at all times and minimize wastage rate of the product. The supply chain is characterized by narrow and long network structure on the supplier side combined with short and wide structure on the health facility side. Therefore, Single sourcing strategy for majority of core products along with support's length relationship management puts jimma PFSAs supply chain performance and reliability at risk This is because, the ability to deliver right products, in the right quantity and the right time depends highly on a single supplier (central PFSA).

7.2. Recommendation

Based on the findings of this assessment the following recommendation can be forwarded for professionals, facilities and other concerned bodies

Health care providers of health facilities

- Frequently utilize and update bin cards at health facility store and at all dispensing units.
- Follow the standards storage criteria and frequent follow up in stock management and inventory control to avoid expiry of pharmaceuticals and to distribute pharmaceuticals before they expiry.
- Health care providers and store manager better adhering to the schedule of reporting and requesting pharmaceuticals to health facility store manager and PFSA respectively according to national guideline for pharmaceutical supply chain management.
- All facilities should prepare and send reports regularly, since it is the main factor that affects the quantification of MCH drugs at national level.
- Storage condition of all the facilities should be improved so that safety and efficacy of drugs can be maintained while damage and expiry of products can be minimized.

Pharmaceuticals Fund and Supply Agency (PFSA)

- The need to make available and prevent stock-outs of maternal medicines (oxytocin, misoprostol, and magnesium sulfate) essential for maternal health should be emphasized because pre-eclampsia/eclampsiaand post-partum hemorrhage are known common causes of maternal deaths.
- The importance of data in supply chain decision should also be promoted in parallel. Maintaining logistic records and compiling and sending quality logistic reports from the Facility side should be associated with some kind of accountability
- Better, if improved on time re-supply of pharmaceuticals to health facilities according to the schedule of IPLS.

Concerned Stakeholders (MOH)

- Assess the possibility of linking the LMIS with HMIS and other data collection systems that exist currently to improve data quality.
- Roll out the electronic LMIS (HCMIS) in to more health facilities to reduce work burden and improve data quality.

7.3. Limitation of the study

- ✓ Out of 313 health facilities being served by jimma branch of PFSA, this study was conducted on 52 of them located in all 9 zones.
- ✓ The study did not include local and international suppliers at the upper tier of the SC and health posts down the tier.
- ✓ The study didn't include all the components of Pharmaceutical supply management framework mainly selection and Procurement.
- ✓ Limited studies have been conducted regarding supply chain management of MCH commodity that create difficulty to compare the result with different studies.

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Annex I: Data Collection Tool

Jimma University

Institute Of Health Sciences

School of pharmacy

Informed consent form

Dear respondent, My Name is Addisalem Geremew. My colleague is _____.

I am a postgraduate student in PSCM at Jimma University and I am conducting a research study on Assessment of Maternal and Child Health Commodities supply chain management in selected public Health Facilities under Jimma branch of PFSA and I would like to ask you a few questions about Maternal and Child Health Commodities supply chain management. So this type of research can be used to assess the current supply chain and it will provide an input for future improvement.

The purpose of the visit today is to assess the availability of MCH commodities at this facility, and to collect information on the supply chain management of these commodities in order to better understand how the logistics system for managing MCH commodities is functioning. This assessment may be conducted again in the future to measure changes in the logistics system over time.

After I get your permission my colleague and I will collect the data confidentially. In addition, I would like to visit the storage areas to actually count the products you have in stock today and observe the general storage conditions.

Since you are involving in this study I may take 30 – 60 minutes of your time. But this study doesn't have any additional discomfort.

By participating in this study you may not get any compensation or benefit right now. But the results of the assessment will provide information for developing recommendations and planning improvements in the logistics system for these products.

This is not a supervisory visit and the performance of individual staff members is not being evaluated. We are not going to take any personal identifiers. The collected data will be analyzed in aggregate without making any personal manipulation.

If you feel any discomfort or harm, you can withdraw from the study at any time. In addition to this, you are not obliged to answer every question. You have the right not to answer those questions that you do not want to answer.

Please indicate below if you are willing to participate in the study

I agree to participate ☐

I do not agree to participate ☐

If you are volunteer to participate please answer the following questions.

MCH Drugs Questionnaire and Observation Check List

GENERAL INFORMATION

Date _____ Time of data collection_____

Interviewee's title _____Qualification_____

Name of facility _____

Address: Region _____ Zone _____ woreda _____Town _____Tel._____

First ask to speak to Head of the pharmacy. After explaining your purpose asks the following questions, then visit the warehouse, storeroom, or other storage area. If you are referred to another staff member keep telling the purpose of the visit before data collection.

I. Availability and or implementation of guidelines , manuals and SOPs

1. Are the following guidelines and standards available and implement at pharmacy store for the intended purposes.

S.N	SOPs and formats	Available		Implemented		Remark
		Yes	No	Yes	No	
I	Standard operating procedures for IPLS (Pharmaceuticals Logistics System) in Health Facilities					
II	Receiving and issuing forms /models					
III	Reporting and requisition from					
IV	Internal facility reporting and requisition from					
V	Bin cards/ Stock record cards					

Interviewers please verify the availability and implementation or utilization of key SOPs by visiting appropriate units, reviewing document and checking use of such formats for the last 6 months.

S.N	Questions	Code classification	Comments
1.	Number of professionals worked at pharmacy dept		
2.	Qualification	Pharmacist……..…..……A Druggist……..……..……B Other……..……..…C	
3.	Number of years and months you have worked at this facility	Years: _____ Months: _____	

4.	Who is the principal person responsible for managing MCH drugs at this facility	Pharmacist……..…..……A Druggist……..…….……B Other……..……..….C	
5.	Months of stock for MCH drugs	Maximum_____ Minimum_____	
Inventory Management			
6.	Do you use the following stock keeping logistic forms to manage health commodity in this health facility?		
	Bin cards /stock cards	Yes…….……A No……..…..……..B	
	Other (specify)	Yes…….……A No……..…..…….B	
7.	What LMIS forms do you use for reporting/ordering? Multiple responses are possible. Must be verified		
	Reporting and requisition from (RRF)	Yes……..……A No……..……..…….B	
	Internal facility reporting and requisition from (IFRR)	Yes……..……A No……..……..…….B	
	Other (specify)	Yes……..……A No…….……..…….B	
8.	Does a completed LMIS Report include the following? **must be verified with completed report)**		
	A. stock on hand	Yes…….……A No……..……B	
	B. Quantities used	Yes…….……A No……..……B	
	C. Losses and adjustment	Yes…….……A No…….…..…B	
9.	The health facility compiles and sends RRF reports to higher level?	Yes…….……A No……..…..…B	
10.	If yes to whom? Multiple responses are possible	PFSA…….. ……..….A RHB…… ……..B Zonal Health Office……...C Woreda Health Office ……..D Don't know……E Other (specify)..…….....……F	
11.	In what time interval you submit reports to the higher level? *(Circle all that apply.)*	Monthly…….…..A Bi-monthly…….……..B Quarterly……...…..C Other (specify).…….....…….D	
12.	When was the last time you submitted the report of MCH drugs at this facility?(see & take copy)	Never……..…..A Within the last month..……...B 2 months ago……...…C More than 2 months ago……..…D	
13.	Are you able to submit your reports on time?	Always…….……..….A Most of the time……..…B Sometimes……...…….....C Never……..…..D	
14.	How do you transmit your report/order tothe higher level?	Send by facility Vehicle.....…….A Picked up by higher level...…….B	

		Email/postal……C Other (specify)……D	
15.	How did you learn to complete the forms/records used at this facility? *(Multiple responses are possible Circle all that applies.)*	Formal IPLS Training ……A On-the-job training ……B Never been trained ……..…C Other (specify)……E	
16.	Do you receive drugs using receiving voucher (model 19)?	Yes……..…….A No……..…….…….B	
17.	Do you have a guideline for dispensing MCH drugs (yes if see, No if not seen)	Yes…….…….A No…….……...B	
18.	Who prepares the orders/reports for MCH drugs for this facility?	Head of the pharmacy…….……A Store manager…….……B Other (specify)…….……C	
19.	What factors influence not being able to submit your report on time?	Takes too long……..…….....A Not enough time b/n reports….. B Don't have the form……C Approval process is too long…...D Difficulties in transmitting reports (mail, email, telephone, collection)……..…..……D Other(specify)……...……..E	
20.	Who determines the quantities of MCH drugs to re-supply? (Circle all that apply.)	The facilities itself…….…….A PFSA…….……..B Other (specify)…….……C	
21.	How are the order resupply quantities determined? (ask interviewee to explain the formula used to arrive at the order quantity and note here)	Formula…….…..….A Don't know…….B Other(specify)…….C	
22.	What factors affect the quantities you order?	No of pat's ……..……A Size of the store…….…..B Other……...C	
23.	How many emergency orders for MCH drugs were placed in the past 6 months?	None....…….…….……A 1……...B 2……..C 3……..D More than 3…….……B Don't know…….C	
24.	Product Delivery modality from PFSA	Direct……..A Indirect ……..B	
25.	Do you keep a copy of your proof of delivery? (take copy of Delivery)	Yes…….A No……..B Other (specify)……C	
Receiving/ Distribution/ Transportation			
26.	Do you receive the quantities of MCH drugs that you order?	Always……..……..…A Sometimes……...B Never……...C	
27.	Who is responsible for transporting products to	PFSA ……..A	

	your facility? **(multiple responses are possible)**	RHB ……..……...B ZHD…….C Woreda .. ……D The facility itself ……..……..E Other (specify)……F	
28.	What type of transportation is most often used?	Facility vehicle ……..….A Private vehicle ……. ……..B PFSA vehicle ……...C Motorcycle……..D Bicycle……E On foot……F Other (specify)……G	
29.	On average, approximately how long does it take from the time the facility places an order until the pharmaceuticals are received?	Less than 2 weeks……...A 2 weeks to 1 month…….B Between 1 and 2months……..C More than two months……D	
30.	What factors affects receiving your order less than two weeks?	_____	
Supervision			
31.	When did you receive your most recent supervision visit from your direct supervisor?**(Check visitors book, if necessary.)**	Never received……A Within the last month……..B 1 - 3 months ago……..…C 3 - 6 months ago ……..…D More than 6 months ago……..…E Other (specify)……..…F	
32.	Did your last supervision visit include management of the MCH drugs supply at this facility (e.g. review of stock cards, reports, physical stock count, removal/disposal of expired stock, storage condition)?	Yes…….A No……..B Other (specify)……C	
33.	The last supervision visit that included drug management was by:- **Multiple responses are possible.**	PFSA ……..A RHB ……..……...B ZHD…….C Woreda... ……D The facility DTC committee ……..E Partner (specify) ……..F Other (specify)……G	
Storage condition, stock keeping practice, physical inventory			
34.	Do you use HCMIS in your store?	Yes……..A No……..……...B	
35.	Is the HCMIS in your store functional	Yes……..A No……..……...B	
36.	Do you have Storage guideline in your store? (See the document), Yes if see it, otherwise No	Yes……..A No……...B	

Storage condition of pharmaceuticals at the store

Ask for permission to visit the storage area. Assess storage conditions of main storage area only. Place a check (tick) mark in the appropriate column based on visual inspection of the storage area; note any relevant observations in the comments column**.** To qualify for a Yes response, all products must meet the criteria for each item.

No	Description	Yes	No	Comments
1	Products that are ready for distribution are arranged so that identification labels and expiry dates and/or manufacturing dates are visible.			
2	Products are stored and organized in a manner accessible for first-to-expire, first-out (FEFO) counting and general management.			
3	Cartons and products are in good condition, not crushed due to mishandling. If cartons are open, determine if products are wet or cracked due to heat/radiation (fluorescent lights in the case of condoms, cartons right-side up for Depo-Provera®).			
4	The facility makes it a practice to separate damaged and/or expired products from usable products and removes them from inventory.			
5	Products are protected from direct sunlight.			
6	Cartons and products are protected from water and humidity.			
7	Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of bats and/or rodents [droppings or insects].)			
8	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.			
9	Products are stored at the appropriate temperature according to product temperature specifications.			
10	Roof is maintained in good condition to avoid sunlight and water penetration.			
11	Storeroom is maintained in good condition (clean, all trash removed, sturdy shelves, organized boxes).			
12	The current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).			
13	Fire safety equipment is available and accessible (any item identified as being used to promote fire safety should be considered).			
14	Products are stored separately from insecticides and chemicals.			
15	Products are stacked at least 10 cm off the floor.			
16	Products are stacked at least 30 cm away from the walls and other stacks.			
17	Products are stacked no more than 2.5 meters high.			

Additional guidelines for specific questions:

Item 2: In noting proper product arrangement, consider the shelf life of the different products.

Item 3: Check cartons to determine if they are smashed due to mishandling. Also, examine the conditions of the products inside opened or damaged cartons to see if they are wet, cracked open due to heat/radiation (e.g., for condoms, because of fluorescent lights), or crushed.

Item 4: Conduct the discarding of damaged or expired products according to the facility's procedures (this may differ from one facility to another). Specify if procedures exist and note what they are.

Item 7: It is important to check the storage area for traces of rodents (droppings) or insects harmful to the products.

Item 8: This refers to either a warehouse secured with a lock or to a cabinet in a clinic with a key.

Item 13: Fire safety equipment does not have to meet international standards. Consider any item identified as being used to promote fire safety (e.g., water bucket, sand). Do not consider empty and/or expired fire extinguishers as valid fire safety equipment.

Product Availability

Table below shows stock status of MCH commodities (specify a full six month period prior to this data collection; and the day of visit)

Column

1. Name of all authorized products that will be counted
2. Record whether or not the product is managed at this facility, answer Y for yes or N if no.
3. Check if the bin card is available, answer Y for yes or N for no.
4. Check if the bin card has been updated within the last 30 days, answer Y for yes or N for no. Note: If the bin card was last updated with the balance of 0 and the facility has not received any re-supply, consider the bin card up-to-date.
5. Record if the facility has had any stock out of the product during the last 6 month period from October 2016, to March 2017, answer Y for yes or N for no.
6. Record how many times the product stocked out during the last 6 month period from October 2016, to March 2017, according to bin cards, if available.
7. Record the total number of days the product was stocked out between October 2016, to March 2017, only
8. For all product described in the table, a stock out in the last six months including the day of the visit please note reason by product based on the choice written below.

Product Description	Managed at this facility?	Stock out today? (Y/N)	Bin card available? (Y/N)	Bin card updated? (Y/N)	Stock out most recent 6 months (Y/N)	Number of stock outs	Total number of days stocked out	Reason for stock out *
Female comdoms								
Implants								
Emergency contrception								
Amoxicillin 250mg dispersible scored tablet								
Oxytocine 10 IU injection								
EitherBenzyl penicillin /Gentamicin Or Both								
Either Betamethasone inje. 6 mg/ml Or Dexamethasone injec 4 mg Or Both								
Magnesium sulfate 500 mg/ml injection								
Misoprostol 200 mcg tablet								
ORS								
Zinc 20 mg scored dispersible tabs								
Chlorhexidine 7.1% gel 25gm								
Resuscitation device (Ambu bag)								
Ampicillin sodium 500mg inj.								
Calcium gluconate 10% Injection								
Dextrose 40% Injection								
DNS (5% + 0.9%)								
Tetracycline 1% eye ointment								
Ferrous Sulphate + Folic Acid 200mg+0.4mg Tablet								
Hydralzine 20mg/ml injection								
Ceftriaxone 1gm injection								
VitaminK 10mg/ml Injection								
Methylergometrine Maleate 0.2mg/ml Inj.								
Diazepam 5mg/ml injection								
Metronidazole Hydrochloride 5 mg/ml intravenous injection								

* Select one reason below for stock-out at the time of survey and insert the number at the space
1. Delays on the part of main source institution to resupply this SDP
2. Delays on the part of warehouse to re-supply this SDP
3. Delays by this SDP to request for supply
4. The item is not available from source of supply
5.Low or no client demand
6. Lack of information about the item
7. Expired
8. Any other reason (please specify)

- **Ask the person /people you interviewed if they want to ask you any questions. Comments or general observation on products management:**

- **Thank the person/people who talked with you. Reiterate how they have helped the program achieve its objectives and assure them that the results will be used to develop improvements in logistics system performance.**

Notes/comments

Order Fill Rate

Health facility assessment to monitorPercentage Difference between Quantity Ordered and Quantity Received for life saving MCH commodities

INSTRUCTIONS

1. Enter the date the last order was placed for the regular order period (do not enter date/ quantities for emergency orders or other orders outside of the established order period).
2. Enter the quantity ordered of each product for the last order period for which products were received (do not include quantities on order that have not yet been received).
3. Enter the date the last delivery was received.
4. Enter the quantity received.

S.N	Product	Date last order Placed	Quantity ordered for last order period	Date last delivery received	Quantity received in last order period
1	Female comdoms				
2	Implants				
3	Emergency contrception				
4	Amoxicillin 250mg dispersible scored				
5	Oxytocine inj.10 IU				
6	Benzylpenicillin /Gentamicin				
7	Either Betamethasone inje. 6 mg/ml Or				
8	Magnesium sulfate inj 500 mg/ml				
9	Misoprostol 200 mcg tabs				
10	ORS				
11	Zinc 40 mg scored dispersible tabs				
12	Chlorhexidine 7.1% gel 25gm				
13	Resuscitation device (Ambu bag)				
14	Ampicillin sodium 500mg injection				
15	Calcium gluconate 10% Injection				
16	Dextrose 40% Injection				
17	DNS (5% + 0.9%)				
18	Tetracycline 1% eye ointment				
19	Ferrous Sulphate + Folic Acid				
20	Hydralzine 20mg/ml injection				
21	Ceftriaxone 1gm injection				
22	VitaminK 10mg/ml Injection				
23	Methylergometrine Maleate 0.2mg/ml				
24	Diazepam 5mg/ml injection				
25	Metronidazole Hydrochloride 5 mg/ml				

Jimma University

Institute Of Health Sciences

School of pharmacy

Questionnaire for key informant Interview

Informed consent form

Hello, My Name is Addisalem Geremew.My colleague is _____.

I am a postgraduate student in PSCM at Jimma University and I am conducting a research study on Assessment of Maternal and Child Health Commodities supply chain management practice in selected public Health Facilities under Jimma branch of PFSA and I would like to ask you a few questions about Maternal and Child Health Commodities supply chain management. So this type of research can be used to assess the current supply chain and it will provide an input for future improvement.

All response will be kept confidential that means your response will only be shared with evaluation team members and we will ensure that any information we include in our report does not want to and you may end the interview at any time. May I continue?

If the respondent agrees to continue, ask if he/she has any questions. Respond questions as appropriate and then ask QI.

1) Quantification and forecasting
    a) Describe methods used for quantification of MCH pharmaceutical requirements?
    b) Describe duration of data used for Quantification and forecasting process of the MCH commodities?
    c) Describe the Quantification and forecasting process of the MCH commodities?
    d) Who Quantify and forecasts the commodities?
    e) When is Quantification and forecasting done?
    f) How frequently is Quantification and forecasting done?
    g) What factors does take into consideration in the preparation of Quantification and forecasts?
2) Inventory control procedure
    a) Describe what type of inventory control systems is used and describe the system?

b) How does each level of the system calculate resupply quantities?
c) What are the challenges of the PFSA regarding inventory management?
d) Describe the implementation and usage level of LMIS by the branch

3) Warehousing and storage
   a) Describe the branch's warehousing and storage practice?
   b) How do you describe the capacity the branch's warehouse?
   c) What are the activities that are carried out at the warehouse?
   d) Describe usage and keeping of records of the warehouse?
4) Supply chain challenges
   a) What are the supply chains related challenges?
   b) What are the challenges being faced in relation to supply and demand?
   c) What are the challenges related to internal operations?
   d) What are the challenges facing from external environment?

THANK YOU VERY MUCH FOR TAKING YOUR TIME!