Analysis of Supply Chain management of Mother, Neonatal and Child

Health Related Commodities in Public Health Facilities of Addis Ababa

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Analysis of Supply Chain management of Mother, Neonatal and Child Health (MNCH) Related Commodities in Health Facilities of Addis Ababa

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Declaration

I, Meseret Zerihun declared that a thesis entitled with "**Analysis of Supply Chain management of Mother, Neonatal and Child Health (MNCH) Related Commodities in Health Facilities of Addis Ababa"** is my original research work and have never been submitted to any other university for any Diploma or Degree. I also declare that all the resources used under this research has been acknowledged clearly.

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Certification

This is to certify that a research under taken by Meseret **Zerihun** under my advising entitled with: "**Analysis of Supply Chain management of Mother, Neonatal and Child Health (MNCH) Related Commodities in Health Facilities of Addis Ababa"** submitted to the AAU in partial fulfillment of the requirements for the Degree of Master of Arts in Logistics and Supply Chain Management complies with the regulations of the Addis Ababa University and meets the accepted standards with respect to originality and quality.

Name_____

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Abbreviations

AACAHB: Addis Ababa City Administration Health Bureau

AMC: Average Monthly Consumption

BC: Bin Card

CHAI: Clinton Health Access Initiative

DT: Dispersible Tablet

IFRR: Internal Report and Resupply form

FEFO: First Expiry, First Out

FMOH: Federal Ministry of Health

HFs: Health Facilities

HSTP: Health Sector Transformation Plan

IPLS: Integrated Pharmaceutical Logistics System

JSI: John Snow Incorporated

LIAT: Logistic Indicator Assessment Tool

LMIS: Logistics Management Information System

MDG: Millennium Development Goal

MOS: Months of Stock

MMR: Maternal Mortality Ratio

MNCH: Mother, Neonates and Child Health

PFSA: Pharmaceutical Fund and Supply Agency

RMNCH: Reproductive, Maternal, Neonatal, and Child Health

RRF: Report and Resupply Form

SCMS: Supply Chain Management Systems

SDG: Sustainable Development Goal

SOP: Standard Operation Procedure

UNFPA: United Nation Population Fund Association

U5MR: Under 5 Mortality Rate

WHO: World Health Organization

Abstract

This study was aim to the Analysis of Mother, Neonates and Children Health commodities supply chain management in Addis Ababa City Administration Health Bureau facilities using descriptive study by utilizing both primary and secondary data. The quantitative data was collected using modified Logistics Indicator assessment tool from selected health facilities Pharmacy store. From total of 101 health facilities (95 Health centers and 6 hospitals) in Addis Ababa the study sample was selected considering 90% confidence level (z), 10% margin of error (e) and 0.5 estimated outcome of the interest or proportion (p) then by adjusting using finite population correction factor (FPC), 40 health facilities were found and selected using random sampling method by putting all the sites in alphabetic order. Finally, the result was analyzed using SPSS & Excel and presented in graphs and table form. Accordingly, even if 14 Mother, Neonates and Children Health commodities were selected to avail freely at facility level by Federal Ministry of Health, the study found an average of only 7.5 commodities were managed per facility which go as low as 4 and as high as 12. Despite low number of commodities were managed, their recording system was good enough as an average of 98.7% have bin cards in place and 93% were updating their bin cards. Reporting by using Internal Facility Report & Resupply form and schedule showed 75% of facilities were using Internal Facility Report & Resupply form and keeping schedule to resupply the dispensing unit from store. Also, the use of Report & Requisition Form for reporting and resupply found to be 85% of which 75% were sending to Pharmaceutical Fund Supply Agency. But the perceived refill rate was low, as 60% of facilities were perceived they were not refilled according to the request. Their storage condition showed with different criteria as high as 100% and the lowest was 80% of facilities fulfilling the necessary standard for storage. The inventory management was assessment for stock availability in previous 6 months prior to assessment showed an average, maximum and minimum stock out of 57.5%, 95% (Misoprostol Injection) and 12.5% (Amoxicillin 250mg DT) respectively. The same indicator at time of visit also showed an average, maximum and minimum stock out of 56%, 90% and 12.5% respectively. Other important indicator of inventory management was level of inventory (min-max), accordingly for basket of Mother, Neonates and Children Health commodities average number. Hence facilities are well practicing the of LMIS format for recording and reporting but there are high stock out of MNCH commodities in most assessed facilities. In contrast to stock out, for few products there are expiry and fear of expiry as they were over stocked in some facilities. Overall, it is important to integrate MNCH commodities supply chain into IPLS so as to address the issues of both stock out and overstock.

Key Words:IPLS, MNCH Commodity, Overstock, Stock out

<div align="center">**CHAPTER ONE**</div>

1. Introduction

Mother, Neonatal and Child Health is one of the priority area to the Federal Ministry of Health of Ethiopia. Therefore, to attain the goals and objectives of the ministry, it is important to maintain the supply chain performance of these important commodities. Hence, this paper is aim to assess these commodities over all activity in service delivery point of Addis Ababa public health facilities using Logistic Indicator Assessment Tool (LIAT).

1.1. Background of the study

Developing regions account for approximately 99% (302 000) of the global maternal deaths in 2015, with sub-Saharan Africa alone accounting for roughly 66% (201 000), followed by Southern Asia (66 000) (WHO, 2015). Bearing of many children by women of reproductive age during their reproductive life is among the many factors affecting maternal mortality in Ethiopia. Evidence shows that maternal mortality can be significantly reduced with better access to family planning and improved care during and after delivery which include life-saving interventions (FMOH & UNFPA, 2015). Ethiopia has significantly reduced its maternal mortality from the 1990s estimate by an average annual rate of 5 percentage points or more. According to the latest UN estimate, the proportion of mothers dying per 100,000 live births has declined from 1,400 in 1990 to 420 in 2013. The Ethiopian Demographic and Health Surveys of 2011 and 2016 reported maternal mortality rates of 676 and 412 per 100,000 live births respectively. However, Ethiopia still did not meet Millennium Development Goal (MDG) 5, reducing the burden of maternal deaths. Also, while Ethiopia has reduced under-five mortality by two-thirds from the 1990 figure of 204/1,000 live births to 68/1,000 live births in 2012, meeting the target for MDG 4 three years ahead of the deadline, about 190,000 children are still dying every year(FMOH HSTP, 2015)

To accelerate progress and achieve post-2015 sustainable development goals, the Federal Ministry of Health (FMOH) and partners have developed a number of strategic interventions. Availability of and access to Maternal, Newborn and Child Health (MNCH) commodities is one of

the key strategies for prevention of morbidity and mortality in Ethiopia. The FMOH established the Pharmaceuticals Fund and Supply Agency (PFSA) in 2007 to manage the entire public sector health care supply chain. The agency developed and began implementing the Integrated Pharmaceuticals Logistics System (IPLS) in 2009. With the introduction of IPLS, PFSA began implementing an integrated health commodity supply chain intended to include all health program commodities. So far, the IPLS manages various health programs including family planning, HIV and AIDS, tuberculosis, and malaria but not MNCH commodities (JSI, 2017)

1.2.   Statement of the Problem

IPLS is now implemented in almost all of the public health facilities in the country. Routine monitoring reports show that the level of implementation of IPLS is improving over the years, as is the availability of commodities at service delivery points. However, MNCH commodity availability presents current challenges due to, it is not integrated to IPLS and lack standard reporting and resupply system.Hence the facilities are lacking readily available data on stock status, its supply chain system is not standardized nor integrated into IPLS and there is no national supply plan for these commodities, which leads to shortage and ad hoc requests to partners and stakeholders for resources.

2015 surveys done by UNFPA have identified problems with MNCH commodity availability. In this United Nations Population Fund (UNFPA) study showed that only 20 percentfacilities had seven (including two essential) maternal/RH medicines at primary level, with availability increasing at the tertiary level to 86.4 percent (UNFPA 2015). Supportive supervision visits by PFSA and CHAI staff in 2017 found stockout rates of 18 percent for amoxicillin dispersible tablets, 27 percent for oral rehydration salts (ORS), and 9 percent for zinc dispersible tablets(CHAI & PFSA, 2017).

1.3. Objective of the study

The general objective of the study is to analyze the MNCH commodities supply chain management practices in selected health facilities of Addis Ababa City Administration Health Bureau.

Specific Objectives of the analysis

1. To assess MNCH commodities inventory management practice at selected AACAHB facilities.
2. To assess the practice of utilization of recording and reporting formats for logistics management information system in the selected facilities of AACAHB.
3. To identify the practices of storage conditionwithin the health facilities of AACAHB.

1.4. Research question

1. How MNCH commodities inventory management is being practiced at selected health facilities of Addis Ababa?
2. What is the practice of logistics management system at these facilities?
3. To what extent health facilities in Addis Ababa maintain acceptable storage condition for MNCH commodities?

1.5. Scope of the study

Conceptual Scope

Supply chain has five main functions including Warehousing/storage, Sourcing, Product selection/procurement, Inventory management and distribution/transportation (USAID|Deliver Project, 2010) and each function has their own performance indicators. But this paper was not coveredall these functions including product selection, sourcing and distribution/transportation. The main reason for not covering product selection is the products were selected and known by

definition. Transportation/distribution and Sourcing have not been covered due to the study was confined at service delivery point and did not considered other tier of the supply chain.

Geographical Scope

The scope of this study was limited by geography where the study has been held in selected Addis Ababa city health bureau facilities only.

Time scope

The time is limited as the study was for the fulfillment of the master thesis, hence only selected facilities that could been completed in set period of time, May 2018has been managed.

1.6. Significant of the study

To attain the set goals and objectives of Health Sector Transformation Plan (HSTP), one of the important ingredient was the availability of essential health commodities in general. In the case of mother, neonatal and child health, it is important to avail life-saving essential commodities at facility level where customers were served. So, to avail those important commodities there should be well working supply chain system nationally, regionally and facility level. Therefore, this study will help in providing the health bureau with a comprehensive view of all aspects of the MNCH logistics system and to identify MNCH commodities logistics and commodity security issues and opportunities for better implementation of the system.

1.7. Limitation of the study

The main limitation of the study was incomprehensiveness of the scope as it lacks sourcing and transportation/distribution of supply chain functions.

1.8.   Operational definition of terms and Concepts

- **Supply chain management:**Management of material and information flow in a supply chain to provide the highest degree of customer satisfaction at the lowest possible cost.

- **MNCH Commodities:** are medicines, supplies and diagnostic reagents help to diagnose, prevent and treat mother, neonatal and child health related diseases and so as to prevent death.

- **Service delivery point:** health centers and hospitals that deliver service to their clients.

- **Stock out:** the absence of these selected MNCH commodities through MNCH program in a particular facilities as time of visit and within last six months.

1.9.   Organization of the study

In first chapter general information about the study including introduction, statement of the problem, objectives, scope of the study and operational definition. In second chapter review of related literature which include theoretical and empirical literature review and conceptual framework. The third chapter will discuss on methodology of the study. The fourth chapter wasresults, discussion, and interpretation. Final chapter was conclusion and recommendation.

CHAPTER TWO

2. Related Literature Review

In this chapter MNCH supply chain related literatures will be reviewed so as to give an overview of the overall management of the mother, neonatal and child health and importance of related commodities supply chain. Literature was reviewed so as to help to develop a good understanding and insight into relevant previous research and the trends that have emerged. To provide clearer links from the literature to the research objectives and questions, and provide reference point for discussion, data analysis and findings, the main themes derived from the literature were considered (Oppong N. Y, 2013).

2.1. Theoretical Review

2.1.1. Supply Chain Management definition and concepts

Supply Chainis generally referred to as the alignment of firms that bring products or services to market (Mihai and Irina, 2013). Itconsists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves. Within each organization, such as a manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service (Chopra and Meindl, 2007). Therefore, supply chain is the network of the facilities and activities that performs the functions of

products development, procurement of materials from vendor, the movement of materials between facilities, the manufacturing of products, distribution of finished goods to customers, and after-market support for sustainment (Kyle and Mabert, 2009).

According to the Council of Supply Chain Management Professionals (CSCMP) - Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. According to this definition 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 functions (USAID|Deliver, 2011). Supply chain management is a business practice that aims at improving the way a business sources its raw materials, and delivers its final product to the end users (Simon, 2013).Therefore, Supply Chain management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders.

2.1.2. Supply Chain of the health commodities

Efficient public health supply chain performance is essential for assuring access to health supplies, and thus for positive health outcomes. This is particularly important in most countries in sub-Saharan Africa where large proportion of the population is served by the public and mission health sectors (Simon, 2013). In 2004, WHO study estimated that about one-third of the world's population lack access to essential medicines and diagnostics. In the poorest parts of Africa and Asia, this proportion increases to 50 percent. While the proportion of people lacking access declined from 1977 to 1997, the absolute number increased from 2.1 to 3.8 billion. By improving access to existing medicines and vaccines, an estimated 10 million lives per year could be saved. Medicine access remains one of the leading causes of poor health outcomes and affects the ability of countries to attain their Millennium Development Goals (MDGs). The poor access to medicine

is mainly due to four influencing factors: Rational use, Affordable price, Sustainable financing and reliable health and Supply system (WHO 2004).

 Much of the world's burden of disease could be prevented or cured. There are known, affordable technologies to achieve this. The problem is getting those drugs, vaccines and other forms of prevention, care or treatment to those who need them on time, reliably, in sufficient quantity and at reasonable cost (USAID|Deliver, 2010). Hence,every minute, at least one woman around the world dies from complications related to pregnancy or childbirth; 99 percent of these complications and deaths occur in low-and middle-income countries (LMICs).Inaccessible, unaffordable, and poor quality care are the key underlying reasons for the high burden of maternal morbidity and mortality in LMICs (JSI, 2014).

2.1.3. MNCH Commodities Supply Chain

The MNCH continuum of care is the operational context for health programming to ensure that there is continuity of care for women and children. To improve the overall health of women and children, continuity of care is necessary throughout the lifecycle as well as between places of caregiving(IFRC, 2013).In 2000, the United Nations (UN) Member States pledged to work towards a series of Millennium Development Goals (MDGs), including the target of a three-quarters reduction in the 1990 maternal mortality ratio (MMR; maternal deaths per 100 000 live births), to be achieved by 2015. This target (MDG 5A) and that of achieving universal access to reproductive health (MDG 5B) together formed the two targets for MDG 5: Improve maternal health. In the five years counting down to the conclusion of the MDGs, a number of initiatives were established to galvanize efforts towards reducing maternal mortality. These included the UN Secretary-General's Global Strategy for Women's and Children's Health, which mobilized efforts towards achieving MDG 4 (Improve child health) as well as MDG 5, and the high-level Commission on Information and Accountability (COIA), which promoted "global reporting, oversight, and accountability on women's and children's health". Now, building on the momentum generated by MDG 5, the Sustainable Development Goals (SDGs) establish a transformative new agenda for maternal health towards ending preventable maternal mortality; target 3.1 of SDG 3 is to reduce the global MMR to less than 70 per 100 000 live births by 2030 (WHO, UNICEF, UNFPA & WBG, 2015). In recognition of the need for heightened attention to these issues, in

2014 USAID and the global maternal, newborn, and child health (MNCH) community renewed their commitment to ending preventable child and maternal deaths by 2035. Global targets of an average of fewer than 50 maternal deaths per 100,000 live births and fewer than 20 child deaths per 1,000 live births were set. The achievement of these targets requires a focused, systems-strengthening approach (USAID/SIAPS, 2016).

As part of the Every Woman Every Child movement, the UN Commission on Life-Saving Commodities for Women and Children (UNCoLSC) has identified 13 overlooked life-saving commodities (LSCs) (figure1). These life-saving medicines and health supplies fall along the reproductive, maternal, neonatal, and child health (RMNCH) continuum of care. They were selected based on three criteria which include the diseases or conditions they address contribute substantially to the global burden of disease it is based on their high impact and efficiency in reducing morbidity and mortality across the RMNCH continuum of care; global funding for RMNCH commodities has not been adequate, although reportedly national funding has been improving; and the commodities demonstrated untapped potential and opportunity for innovation and rapid scale-up in product development and market shaping.These lifesaving commodities across the continuum of care include the following according to UN Commission on Life-Saving Commodities for Women and Children:

Reproductive Health

FEMALE CONDOMS

Prevents STIs/HIV and unintended pregnancy

CONTRACEPTIVE IMPLANTS

Prevents unintended pregnancy

EMERGENCY CONTRACEPTIVE

Prevents unintended pregnancy

Maternal Health

OXYTOCINS

Prevents and treats postpartum hemorrhage

MISOPROSTOL

Prevents and treats postpartum hemorrhage

MAGNESIUM SULFATE

Prevents and treats eclampsia

Newborn Health

INJECTABLE ANTIBIOTICS

Treats newborn sepsis

ANTENATAL CORTICOSTEROIDS

Prevents complications of pre-term birth and used for fetal lung maturation

CHLORHEXIDINE

Prevents umbilical cord infections

RESUSCITATION DEVICE

Treats newborn asphyxia

Child Health

AMOXICILLIN

Treats pneumonia

ORAL REHYDRATION SALTS

Prevents dehydration from diarrhea

ZINC

Treats diarrhea

Source: Adapted from Supply and Awareness Technical Resource Team, UN Commission on Life-Saving Commodities for Women and Children. 2014. *Scaling Up Lifesaving Commodities for Women, Children, and Newborns (*UNCoLSC, *2014).*

The main elements of the MNCH commodity management cycle or logistics cycle in terms of overall management and delivering the products required by the customer will be summarized from Handbook of Logistics of USAID|Deliver Project, 2011 as follow:

Fig 1:Logistics Cycle
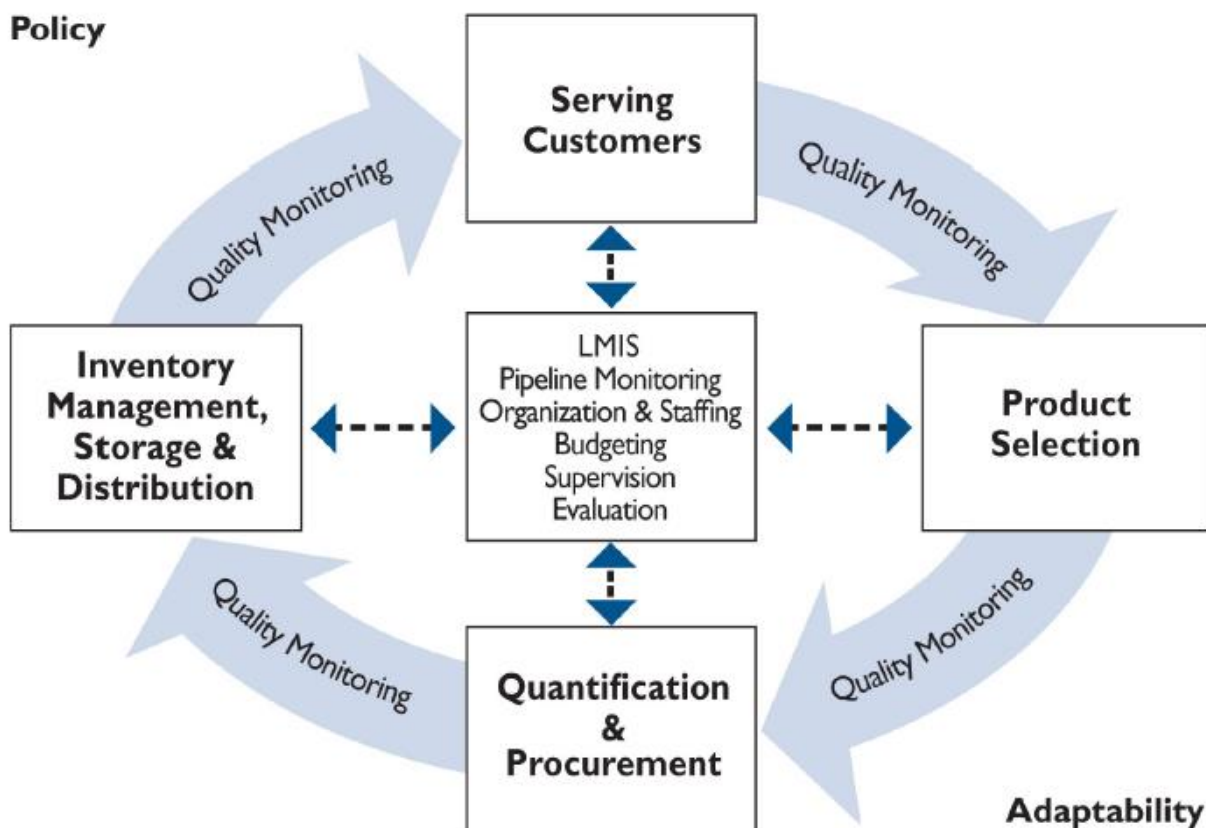
Source: Handbook of Logistics, USAID|Deliver Project, 2011

The commodity management activities set out above are necessary to ensure that the right quantity and quality of commodities reach the right customer at the right place and time.

2.2. Empirical Review

The Federal Ministry of Health (FMOH) has been working to ensure an efficient and high-performing healthcare supply chain that will ensure equitable access to affordable medicines for all Ethiopians (Shewarega et al. 2015). Ethiopia put in Health Sector Transformation Plan (HSTP) of 2015/16 – 2019/20 to reduce death of Neonatal, Child and mother so as to meet the follow on of

MDG, Sustainable Development Goal (SDG). According to the World Health Statistics Report (2014), Ethiopia has achieved MDG 4 target three years earlier by reducing under-five mortality by 67% from the 1990 estimate. The UN Inter Agency Group's (2013) mortality estimate reported that Ethiopia's under-five, infant and neonatal mortality rates were 68, 44 and 28 per 1000 live births respectively. From the year 1990 to 2000, the average Annual Reduction Rate (ARR) of under-five mortality rate (U5MR) was at 2%, which accelerated to 5% since 2000. Notwithstanding the achievement observed in the reduction of under-five mortality rates, about 190,000 children are still dying each year. Moreover, the reduction in mortality in neonatal age groups (48%) is not as impressive as that of childhood mortality (FMOH, 2015).

To accelerate progress and achieve post-2015 sustainable development goals, the Federal Ministry of Health (FMOH) and partners have developed a number of strategic interventions. Availability of and access to Maternal Newborn and Child Health (MNCH) commodities is one of the key strategies for prevention of morbidity and mortality in Ethiopia. The FMOH established the Pharmaceuticals Fund and Supply Agency (PFSA) in 2007 to manage the entire public sector health care supply chain. The agency together with its partners including the USAID DELIVER Project, Supply Chain Management Systems (SCMS) project, and others in the sector developed and began implementing the Integrated Pharmaceuticals Logistics System (IPLS) in 2009. With the introduction of IPLS, PFSA began implementing an integrated health commodity supply chain intended to include all health program commodities. So far, the IPLS includes various health programs including family planning, HIV and AIDS, tuberculosis, and malaria but not MNCH commodities (Nigatu, 2017). Due to this MNCH commodities stock outs and shortages well recorded at health facilities. Availability of MNCH commodities generally is less than that for other priority program items. For example, an index of contraceptive availability at the health post level showed that in 2016 availability was 81.5 percent (i.e., four out of five priority items on average available), while for maternal health items the availability was only 46.8 percent (slightly less than half of items available), and for child health items, it was slightly better at 57.7 percent. Recent surveys have also identified problems with MNCH commodity availability. A 2015 United Nations Population Fund (UNFP) study showed that only 20 percentfacilities had seven (including two essential) maternal/RH medicines at primary level, with availability increasing at the tertiary

level to 86.4 percent (UNFPA 2015). Supportive supervision visits by PFSA and CHAI staff in 2017 found stockout rates of 18 percent for amoxicillin dispersible tablets, 27 percent for oral rehydration salts (ORS), and 9 percent for zinc dispersible tablets(PFSA & CHIA, 2017).But availability of most of the essential pharmaceuticals was above 90 percent at all levels of the facilities which implemented IPLS (Shewarega 2015).

Therefore, high stock out to these commodities when compared to other related program product and essential health commodities need solution for the better implementation of the program and help to save the lives of new born, mother and children. In general the success of this program is very depend on strong supply chain that can manage the needs of the clients to be served.

2.3. Conceptual Framework of the Study

The conceptual framework is important to show the relationship between variables. Conceptual framework provides a network of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena (Kasahun, 2016). A conceptual framework is a structure of concepts and or theories which are put together as a map for the study and it shows the relationship of research variables (Jabareen, 2009).In this study conceptual framework analyze MNCH commodities management that will affect the service of the health facilities. These include the availability of the products to treat and prevent mothers, children and neonatal. And also their proper management with respect to storage condition. The following diagram will depicts the overall activities of the activities.

Suppliers

Hospital — RRF — **Health Center**

Dispensing unit with in hospital — BC — **Dispensing unit within health center**

IFRR

Service provider

Client

→ Flow of MNCH Commodity

- - → Flow of Information
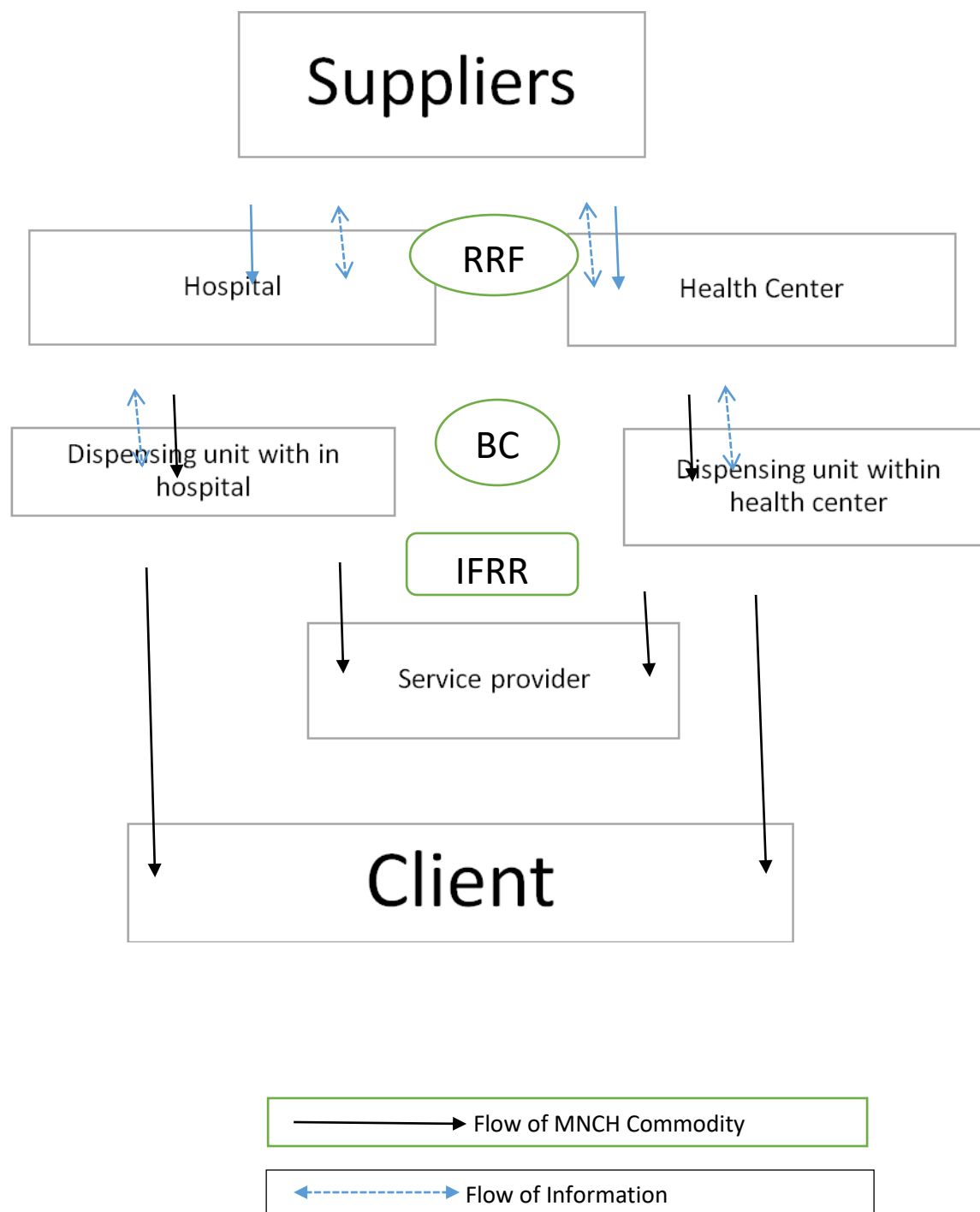
Fig. 2: Management of MNCH commodities at Health facilities (IPLS SOP, 2015)

2.4. Identified Literature Gap

AS MNCH recently starting program and yet to be researched for Supply Chain Management of MNCH Commodity. But there were many researches done on essential health commodities management and give a clear view of their supply chain management. Therefore, this research will help as a starting point to MNCH commodities management and will help in bridging the gap for future studies.

In general supply chain management is the back bone of any firm, whether its activities relay on service like Café & restaurant or to provide goods to its customer like big stores or mixed like health facilities. Hence, it is important to have well designed and functional supply chain to succeed with its business. When it comes to health service where both service and goods are the component of the activities, lack or non-functional supply chain means not only loss of business but also loss of life. Therefore, the supply chain with in the health care system should be well designed and functional with needed characteristics of agility, adaptability and flexibility so as to respond to present dynamic environment both outside and inside.

In Ethiopia to manage the supply chain of public health commodities, there is a system called integrated pharmaceuticals logistics system (IPLS). IPLS is a single integrated pharmaceutical reporting and distribution system based on overall mandate of pharmaceutical fund and supply agency (PFSA). Hence, it manages all the essential program commodities with in it including HIV/AIDS, Family planning, TB, and others. But some programs like mother, neonates and child health, HIV RTK's were yet to be integrated into IPLS.

CHAPTER THREE

3. Research Design and Methods

3.1. Description of Study area

The study has been conducted in Addis Ababa, the capital city of Ethiopia. It was located at the geographic center of the nation and covers about 540 Km². It is administratively sub-divided into 10 Sub Cities and 116 Weredas (City government of Addis Ababa, 2012). According to the City's Health Bureau, the city has 6 hospitals and 95 Health centers under city administration. All the health facilities of the city administration provide MNCH service which depend on the level. For example, health center prioritize in prevention of MNCH including vaccination, family planning and other related activities.

3.2. Research Approach

Research approaches are plans and procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis and interpretation. The overall decision involves which approach should be used to study a topic. There are mainly three approaches: Quantitative, Qualitative and Mixed. Unquestionably, the three approaches are not as discrete as they first appear. Qualitative and quantitative approaches should not be viewed as rigid, distinct categories, polar opposites, or dichotomies (Creswell, 2014). So, the approach for this study was quantitative as quantitative data has been collected to analyze and present quantitatively using descriptive statistics.

3.3. Study Design

Research designs are types of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research design (Creswell, 2014). Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design (C.R.Kothari, 2004).

In this study, a descriptive facility based surveyhas been conducted in selected Addis Ababa public health facilities. The quantitative data collection through questionnaire and check list which was modified from Logistics Indicator Assessment Tool (LIAT) developed by USAID|Deliver Project. Using the tool facilities pharmacy store and relevant units of health facilities has been measured on MNCH Commodity supply chain management.

3.4. Population and Sample design

The population of the study was Addis Ababa City Administration Health Bureau health facilities including hospitals' and health centers' pharmacy staffs working in the store.From total of 101 health facilities (Health centers and hospitals) in Addis Ababa the study sample was selectedas per the formula below. In this formula 90% confidence level (z), 10% margin of error (e) and 0.5 estimated outcome of the interest or proportion (p) were considered.

Hence: $n_o = Z^2 P (1-P)/e^2$ where (Bhandarkar, P. L)

- n_o is the number of sample to be considered
- Z is confidence level corresponds to Z-score
- P is proportion of the sample
- e is error margin

By inserting the above numbers in the formula, the sample could be:

$n_o = (1.645)^2 X 0.5 (1-.5)/0.1^2 = 68$

By adjusting using finite population correction factor (FPC) formula below:

n= n_o N / n_o+ (N-1), where N is the number of population the sample could be drawn.

n= 68 X 101/68 + (101 − 1) = 40

Therefore, the sample size that has been selected was 40. The selection of these sites was done by systematic simple random selection method by listing the sites in alphabetic order and finding the first facility by lottery method and then the rest according to the following k value.

K= 101/40 = 2.5.

By approximating K to 3 and starting with the sites which found through lottery, and then selecting the sites after every three list from alphabetically ordered list of Addis Ababa City Administration health bureau sites were annexed.

3.5. Data source and type

The sources of data for the study was health facility records, pharmacy staff working in the selected health facilities as store manager and physicalobservation. The primary data were collected by observation, physical inventory, and assessment of facility records, Dagu (software application for management of pharmaceuticals) and structured interviews with health-facility pharmacy personnel. Type of data were stock status, availability of expired MNCH commodities, number of stock out days, number of stocked out MNCH commodities and availability of different LMIS formats.

3.6. Data Collection

Quantitative data has been collected using modified logistics indicator assessment tool (LIAT) developed by USAID|Deliver Project for assessment of facility based logistics indicators. These structured tool was used to collected data quantitatively from different source material from health facilities store and relevant units at the facility. And each findings were recorded for analysis.

3.7. Ethical Consideration

Ethical clearance has been obtained from Addis Ababa Public Health research and Emergency management Core Process before starting the research. During data collection each facilities

management and concerned staff has been briefed with the purpose, scope and expected outcome of the study.

3.8. Method of Data analysis and presentation

Collected quantitative data has been categorized and analyzed using descriptive statisticsSPSS 20 and excel spread sheet.Graphs, tables and charts have been used to present all findings.

3.9. Result Dissemination

Results of the study has been disseminated to Addis Ababa Public Health Research and Emergency Core process.

CHAPTER FOUR

4. Interpretation, Results and Discussion

A total of 40 health facilities (38 health centers and 2 hospitals) were assessed from AACAHB facilities using structured assessment tool. As the assessment shows 65% (26) of the store managers were Druggist (diploma in pharmacy), 35% (12) of them were Pharmacists (degree in pharmacy), 2.5% (1) was Clinical Pharmacist and 2.5% (1) not responded. Concerning their service year at the position (as store manager) shows 44.1% of them have less than one year, 36.1% have 1-3years of experience and 19.4% have above 3 years of experience.

4.1. Logistics Management Information System

An LMIS collects, organizes, and reports logistics data for decision-making. Ethiopia has a well-designed LMIS used for program commodities, including HIV and AIDS, family planning, TB & Leprosy and malaria (Nigatu, 2017). With the introduction of IPLS, various recording and reporting formats were designed for use at different levels of the healthcare supply chain. Availability and usage of standard forms and tools are critical supply chain indicators. At the facility level, bin cards, Internal Facility Report and Resupply Form (IFRR), Health Post Monthly Report and Resupply Form (HPMRR,) and Report and Requisition Form (RRF) were introduced to record commodity transactions and report quantities for resupply (Shewarega, 2015).

Table 1: Facilities using IFRR for internal report and resupply with schedule

Answer	Frequency	Percent	Cumulative Percent
Yes	30	75.0	75.0
No	10	25.0	100.0
Total	40	100.0	

Source: Own survey, 2018.

Accordingly, facilities logistics management information system was measured based on its IPLS implementation status which was measured by use of important logistics formats for recording and reporting MNCH commodities within and from facilities as per the set schedule. Accordingly, 75% (30) of the facilities were using Internal Report and Resupply Form (IFRR) for reporting to the store and resupply of the MNCH commodities (shown in Table 1). As the result shows majority (75%) of facilities were using IFRR to report and resupply MNCH commodities from facilities store. This shows still works to be done as national survey of IPLS revealed 89% usage of IFRR for at least one dispensing unit (Shewarega, 2015). Other report done in four big regions (Amhara, Oromia, SNNP and Tigray) showed 94% IFRR usage (CHAI, 2017). Therefore, it is important to strengthen MNCH internal reporting & resupply system by using IFRR in AACHB health facilities. But the facilities have reason for not using IFRR customized to MNCH, as some of them said lack of sufficient stock for MNCH commodities.

IPLS has a design where every unit within the facility should have regular resupply schedule that a single unit report and resupplied twice or more times per month. The main reason for schedule was to reduce work load of store manager, to make issue data proxy to consumption and to avail all the commodities found in store to be in dispensing unit. So, this is one of important indicatorin IPLS implementation and all (100%) units were expected to have schedule and follow that schedule for resupply. Hence, the measurement of having schedule of internal report and resupply important and showed 75% of facilities have regular schedule for reporting and resupply of MNCH commodities from store as shown in Table 1 above.During national IPLS survey, 83% of the facilities were having schedule and strictly following this schedule for report and resupply to dispensing units (Shewarega, 2015). Therefore, still the assessed facilities were behind the national report even if with the number and quality of staffs AACRH facilities had compared to remote regional facilities, they have to done better than this. Some facilities were arguing that the facilities were not strictly following schedule due to MNCH commodities were not part of IPLS and most products were issued from budget store and sometimes issued to different dispensing units of the facility.

Table 2: Facility using RRF and reporting per schedule for MNCH

	No. of facilities having regular schedule for reporting to supplier	Percentage of facilities having regular schedule for reporting to supplier	No. of facilities using RRF for reporting	Percentage of facilities using RRF for reporting
Yes	33	82.5	34	85.0
No	7	17.5	6	15.0
Total	40	100.0	40	100.0

Source: Own survey, 2018

Reliable recordkeeping is critical for the IPLS to function well, and the information must then be reported to higher levels for effective logistics decision making. One of the primary goals of the IPLS is to enable facilities to produce the bimonthly commodity requests (orders) and resupply form (RRF) to PFSA. PFSA uses the information from the RRF to deliver pharmaceuticals to health facilities, forecast future demands, and make other evidence-based decisions (Shewarega, 2015). So, it important to measure RRF use and reporting for good logistics management practice which include scheduled and regular report and request for resupply of MNCH commodities.

Accordingly, for reporting and request, facilities are expected to send Report and Request Form (RRF) and the assessment for MNCH commodities showed 82.5% (33) of the facilities send their RRF as per schedule and 85% of them use RRF to request and report MNCH commodities, Table 2. This high number of RRF usage for MNCH commodities, which are not integrated to IPLS is due to most of facilities in Addis Ababa were using automated system called Dagu at their facilities. Hence, Dagu has all the program RRF customized and facilities produce during regular reporting period with other program items. Despite the record number of facilities were using RRF, it was lower than the national according to the national survey of IPLS where 98% of facilities assessed were using RRF to send their request to PFSA (Shewarega, 2015).

In addition, the facilities report and resupply schedule/time were measured and showed that 85% of the facilities have schedule to report and request their need to responsible supplying organization, shown in the Table 2. As seen from Assessment of HIV commodities SCM in Addis

Ababa, 100% of facilities assessed submitted their RRF to PFSA as per the set schedule (Berhanmeskel, 2014). Likewise, even if the same was expected to MNCH commodities report and resupply, 82.5% were reporting. This is may be mainly due to MNCH commodities were yet to be integrated to IPLS like other program commodities.

As identified during assessment, although MNCHis not integrated to IPLS means they were not expected to have schedule for sending RRF but this result is mainly due to facilities have schedule for other program products to report for resupply and they included MNCH commodities together.

Table 3: To whom facilities send RRF

Answer	No. of RRF sending to supplier	Percentage per supplier	Cumulative Percent
Sub-city	2	6.0	6.0
PFSA	32	94.0	100.0
Total	34	100.0	

Source: Own Survey, 2018

Ethiopia's pharmaceuticals supply chain for public health facilities in general and program products in particular mandate PFSA to get report and resupply facilities according to the report. It was well written in IPLS SOP (PFSA, 2015), PFSA was mandatedto availaffordable andqualitypharmaceuticalssustainablytoallpublichealthfacilitiesandensuretheirrational   use. Therefore, facilities were assessed to whom they send their RRF for resupply. From 34 (85% of total 40) facilities, majority of the facilities 32 (94% of RRF sending) were send their RRF to PFSA for resupply as shown in Table 3 above. Only two (6%) facilities were send their report for Sub-city for resupply of MNCH commodities.

Table 4: From where they supplied MNCH commodities

Answer	Frequency	Percent	Cumulative Percent
Sub city	2	5.0	5.0
NGO	2	5.0	10.0
PFSA & Sub City	6	15	25.0
PFSA	30	75.0	100.0
Total	40	100.0	

After sending the report, facilities were expected to be refilled with the request they send. Accordingly, there are almost three suppliers for MNCH commodities, even if the report were send only to PFSA and Sub-city. These suppliers are 75% (30) from PFSA, 15% (6) from PFSA & Sub-city and 5% (2) from Sub City and 5% (2) from other (mainly NGOs). This also reveals the problem with MNCH commodities, as per the IPLS the sole supplier for program commodities was PFSA but for MNCH it hasn't worked due to it's not integration to IPLS. This was well described in assessment of HIV commodities in AACHB facilities (Berhanmeskel, 2014) as 100% of facilities were sending their RRF to PFSA and supplied by PFSA especially for ARV drugs.

Table 5: Facilities Re-filled as per the report and request

	No. of facilities Re-filled as per request	Percentage of facilities Re-filled as per request	Cumulative Percent
Yes	16	40.0	40.0
No	24	60.0	100.0
Total	40	100.0	

Source: Own Survey, 2018.

IPLS SOPs recommend that, for program commodities, PFSA resupplies facilities with the requested quantities within one month of receiving the request. For products procured through the revolving drug fund (RDF), if the product is not available at the PFSA store, facilities can buy products from PFSA or other vendors anytime without a specific resupply schedule (Shewarega, 2015). In contrast to what SOP recommend assessedfacilities' perceived orderrefill rate versus request shows below expected as shown in the Table 5.

As shown in the table above only 40% (16) of facilities were re-filled as per the report and request sent for resupply from respective suppliers. The remaining 60% (24) were showed unsatisfactory refill rate with respect to the report and requisition sent for refilling.National IPLSsurvey showed 37% perceived order refill rate that align with what was found in this assessment (Shewarega, 2015). But assessment of HIV commodities showed 59.2% which was better than the MNCH commodities perceived refill rate (Berhanmeskel, 2014).

4.2.　Storage condition of MNCH Commodities

Storage ensures the physical integrity and safety of products and their packaging, throughout the various storage facilities, until they are dispensed to clients. An important goal in storage of health products is the correct staging of health products to ensure that orders can be filled and distributed (USAID|DELIVER Project, 2011). Storing products below standard storage condition will affect the shelf life of the product, leads to damage, expiry and different types of wastage.

Storage condition of the facilities were assessed using modified USAID/DELIVER Project storage assessment tool to explore facilities that maintained minimum storage condition. Accordingly, all 40 facilities were visually inspected to fill the assessment tool.

Fig. 3: Storage Condition of Health Facilities Assessed for MNCH Commodity Management
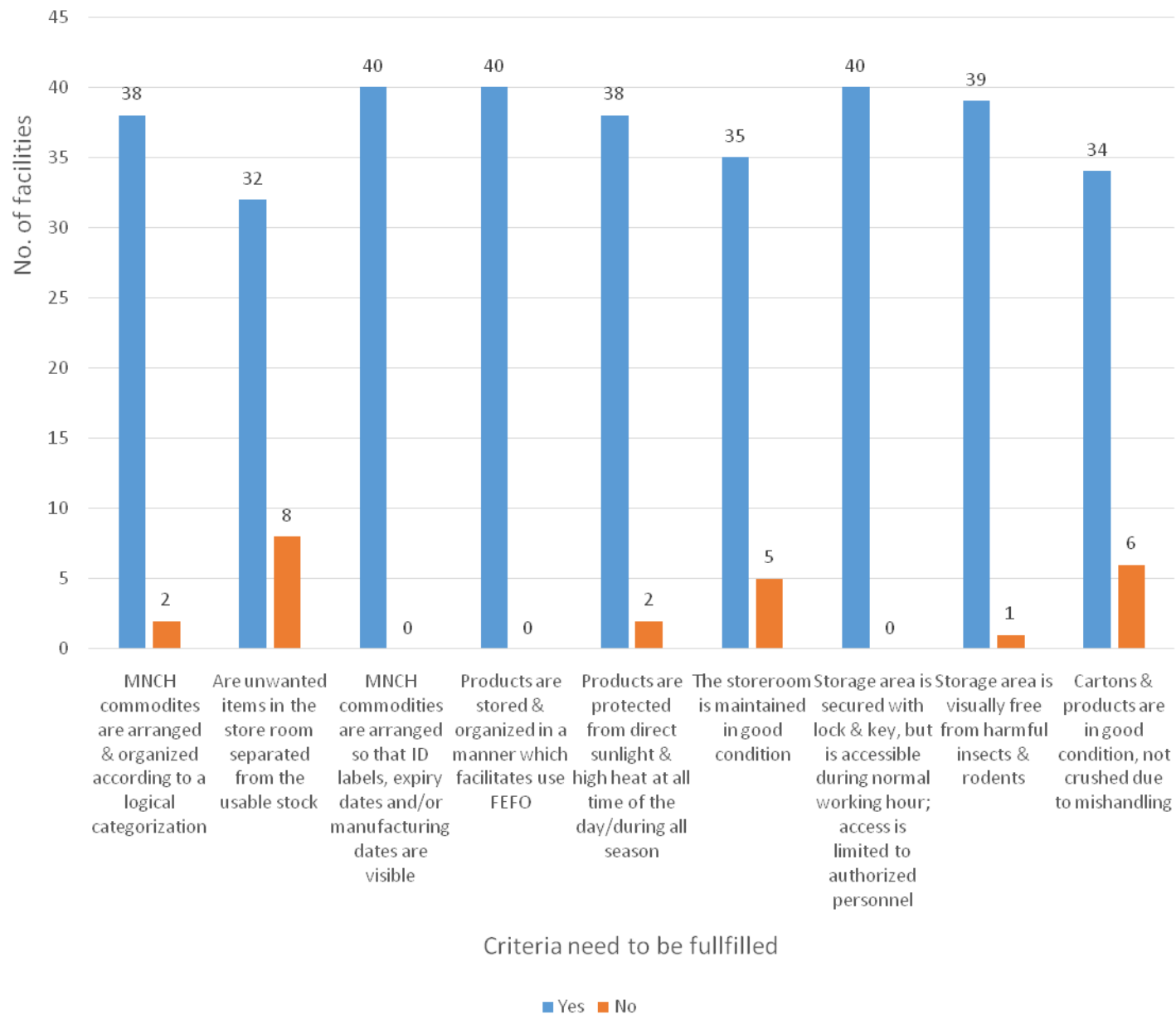
Source: Own Survey, 2018.

National IPLS assessment result of (Shewarega, 2015) revealed and average 55% of facilities assessed were above an average of 80% of criteria or more. Another report by CHAI, 2017 in four big regions (Amhara, Oromia, SNNP & Tigray) also revealed majority (88%) of stores were dry

and clean; 86% had sufficient light and were well ventilated; 84% had separated their expired/damaged/quality defected items; 90% FEFO was implemented and 63% sufficient space was there for all commodities.

When we compare 2015 result by national IPLS survey and 2017 result of 2nd supportive supervision with this finding, facilities in ACAHB has better record of warehousing as the assessment confirmed that well, seen from Fig.2. As, 95% (38) facilities arranged and organized MNCH commodities according to the logical organization needed to implemented. 80% (32) health facilities were separated unwanted items from store room where MNCH commodities were store. All assessed facilities (100%) were maintained MNCH commodities arrangement by making visible the ID, expiry date, and/or manufacturing date; in manner that assist FEFO and their stores were secured with key and lock. 95% (38) of facilities MNCH commodities were protected from direct sunlight and high heat all the time. 87.5% (35) health facilities store condition were maintained which include cleanness, no trash, sturdy shelves & boxes well organized. 85% (36) health facilities MNCH cartoons and products are in good condition. 97.5% (39) of the store were free from harmful insects and rodents.

4.3. Inventory Management of MNCH Commodities

Inventory management of MNCH commodities were assessed for their supply/management by the facilities, availabilities of BCs, updating of the BCs, number of stock outs in last 6 months, stock out at the time of visit, level of inventory (month of stock available) and availability of expired products at the facilities.

MNCH commodities managed at the facilities

Table 6: Number and Percentage of MNCH commodities managed by each facility

Name of facility	No. of items managed	% of items managed
Ferese Meda HC	11	78.6
Hiwot Amba HC	10	71.4
Gutomeda HC	6	42.9
Arada HC	6	42.9

Janmeda HC	6	42.9
Abebe Bikila	7	50.0
Lideta HC	6	42.9
A/Ketema W10 HC	6	42.9
Beletshachew HC	6	42.9
Yeka HC	7	50.0
Felege Melese HC	9	64.3
Ginbot 20 HC	6	42.9
N/L/Woreda 11 HC	7	50.0
Kazanchis HC	12	85.7
Entoto Fana HC	10	71.4
Korea Zemach HC	8	57.1
Maichew HC	9	64.3
Churchil HC	8	57.1
T/Haimanot HC	8	57.1
Aware HC/Yeka W6	6	42.9
Beata HC	7	50.0
Shiro Meda HC	9	64.3
Meshuawalekia HC	11	78.6
A/Ketema Woreda 9	10	71.4
Milinium HC	9	64.3
Zewuditu Hospital	7	50.0
Absinia HC	8	57.1
Abinet HC	5	35.7
A/Ketema W3 HC	7	50.0
Afinchober HC	6	42.9
Arada K/Woreda 4	6	42.9
Adis Gebeya HC	11	78.6
Simegn Kebede HC	5	35.7
Gerji HC	7	50.0
Goro HC	5	35.7
Saris HC	6	42.9
Kolfe Woreda 3 HC	9	64.3
Kolfe Woreda 9 HC	6	42.9
Tibebe Bekechen HC	9	64.3
Ghandi HL	4	28.6
Max	**12**	**85.7**
Min	**4**	**28.6**
Average	**7.5**	**53.8**

Source: Own Survey, 2018.

Fig. 4: MNCH Commodities Management by Facilities
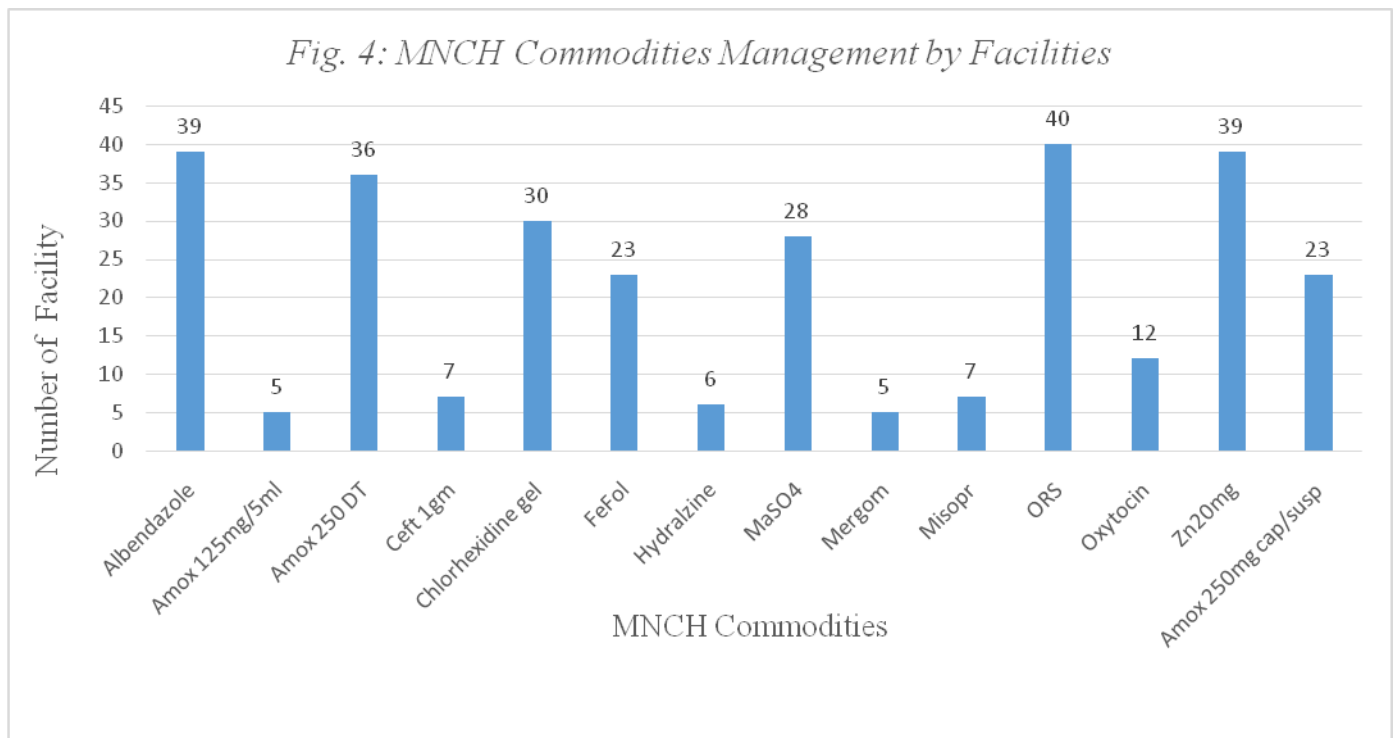
Source: Own Survey, 2018.

As part of the Every Woman Every Child movement, the UN Commission on Life-Saving Commodities for Women and Children (UNCoLSC) has identified 13 overlooked life-saving commodities (LSCs) (figure1). These life-saving medicines and health supplies fall along the reproductive, maternal, neonatal, and child health (RMNCH) continuum of care. They were selected based on three criteria which include the diseases or conditions they address contribute substantially to the global burden of disease it is based on their high impact and efficiency in reducing morbidity and mortality across the RMNCH continuum of care *(UNCoLSC, 2014).*

Therefore, FMOH adopted the list and selected fourteen MNCH commodities so as to be managed by the program (MNCH) and expected to be managed in all level of health facilities to prevent and treat mother, neonatal and child health problems. From those selected list only one product (ORS) was managed by all assessed forty facilities with highest management rate. The lowest managed commodities, managed by only in five (12.5%) health facilities were Amoxacillin 125mg/5ml suspension and Methylergometrine Malate injection. Also, fourteen of the selected MNCH commodities were expected to be managed in all facilities but the result shows only an average of

7.5 (53.8%) commodities were managed per facility as shown in Table 6. Only one health facility has managed 12 (85.7%) MNCH commodities which is the highest and 4 (28.6%) MNCH commodities which is the lowest number managed by a single facility, shown in Fig. 3.

Bin cards available and updated

Bin card is an individual stock keeping record that holds information about a single product by lot number or batch number (USAID|DELIVER Project, 2011). So, bin Card per product is one of important activity in inventory management. Therefore, its consistent and accurate use is essential for facilities inventory management.

Table 7: Availability and Use of BC per MNCH product

S. No	Name of Product	Managed at facility	Availability of BC		Update of BC	
			No of facility	% facility	No of facility	% facility from available facility
1	Albendazole 400 mg tab	39	38	97	36	92
2	Amoxicillin	5	5	100	5	100
3	Amoxicillin 250 mg	36	35	97	33	91.6
4	Ceftriaxone 1 g/mL	7	7	100	6	85.7
5	Chlorhexidine gel	30	29	96.7	27	90
6	Ferrous Sulphate + Folic Acid	23	23	100	20	87
7	Hydralazine 20 mg/ml	6	6	100	6	100
8	Magnesium Sulphate 50%/20	28	27	96	26	92.8
9	Methyl-Ergometrin Maleate	5	5	100	5	100
10	Misoprostol 200 mcg tab	7	7	100	7	100
11	ORS	40	39	97.5	37	92.5
12	Oxytocin 10 units/ml	12	12	100	10	83
13	Zinc 20mg Dispersible tab	39	38	97.4	35	90
14	Amoxicillin 250mg caps or	23	23	100	23	100
	Average			98.7%		93%

Source: Own Survey, 2018.

Different studies in Addis Ababa and nationally showed consistency with the use of bin cards for commodities facilities were managing. Study on ARV drugs SCM in Addis Ababa (Berhanmeskel, 2014) showed an average of 91.3% of facilities have bin cards for ARV drugs in assessed facilities. National IPLS survey (Shewarega, 2015) also revealed 73% of facilities on average use bin cards to manage their commodities.Accordingly, the availability and consistent use of bin cards for MNCH commodities were assessed in all the selected facilities, as shown in Table 7above. It shows an availability of bin cards for MNCH commodities as good enough as 100% for majority of managed MNCH commodities and the minimum was for Magnisium Sulphate

injection with 96% availability of bin card across assessed facilities. When we compare the availability of bin cards for MNCH commodities, it showed some improvement from above studies with an average of 98.7%.

Concerning updating of bin cards, facilities were expected to update their bin card whenever there is flow of MNCH commodity from or to store room. Updating bin cards were used to assess the quality of data by cross-checking the accuracy of the bin card balance with the physical count for each of the MNCH commodities on the day of the visit. A bin card with no discrepancy between the bin card and the physical count is considered accurate. Hence, during assessment balance left in bin card versus physical count were checked for updating bin cards.

Different studies in updating of bin cards shows varying number. National MNCH assessment showed the bin cards that were being kept were found to be up-to-date: from 87 to 100 percent of items had up-to-date bin cards (Nigatu, 2017). Other national study, survey of IPLS revealed on average 77% of the facilities were updating. Accordingly, from this assessment reasonable facilities were updating their MNCH commodities during any movement of the product. As the above table shows the lowest percentage for updating was shown for Oxytocin injection with 83% update, highest was 100% and an average update of 93%.Overall, use of bin cards and updating were in acceptable range compared to other studies as most facilities were using and updating their bin cards.

4.4.   MNCH commodities stock Availability

Any health logistics and inventory systems final goal is availing needed commodities to client/patient and increase the outcome of the health service. Therefore, stock outs to essential MNCH commodities means mothers, neonates and children are at risk of their life. As seen from our previous results, facilities are yet to manage all the selected MNCH commodities, only 7.5 out 14 products on average were managed per facility. In addition, it will be difficult if from these 7.5 of the commodities, some are stocked out.

Stock out within last six months

Data was collected for items stocked out, how many times facilities had stocked out and for how many days/how long stocked out. This information is useful in showing the availability MNCH commodities, in determining whether facilities chronically or intermittently stock out.

Fig. 5:Percentage of facilities Stockedout per MNCH commodity in last six months
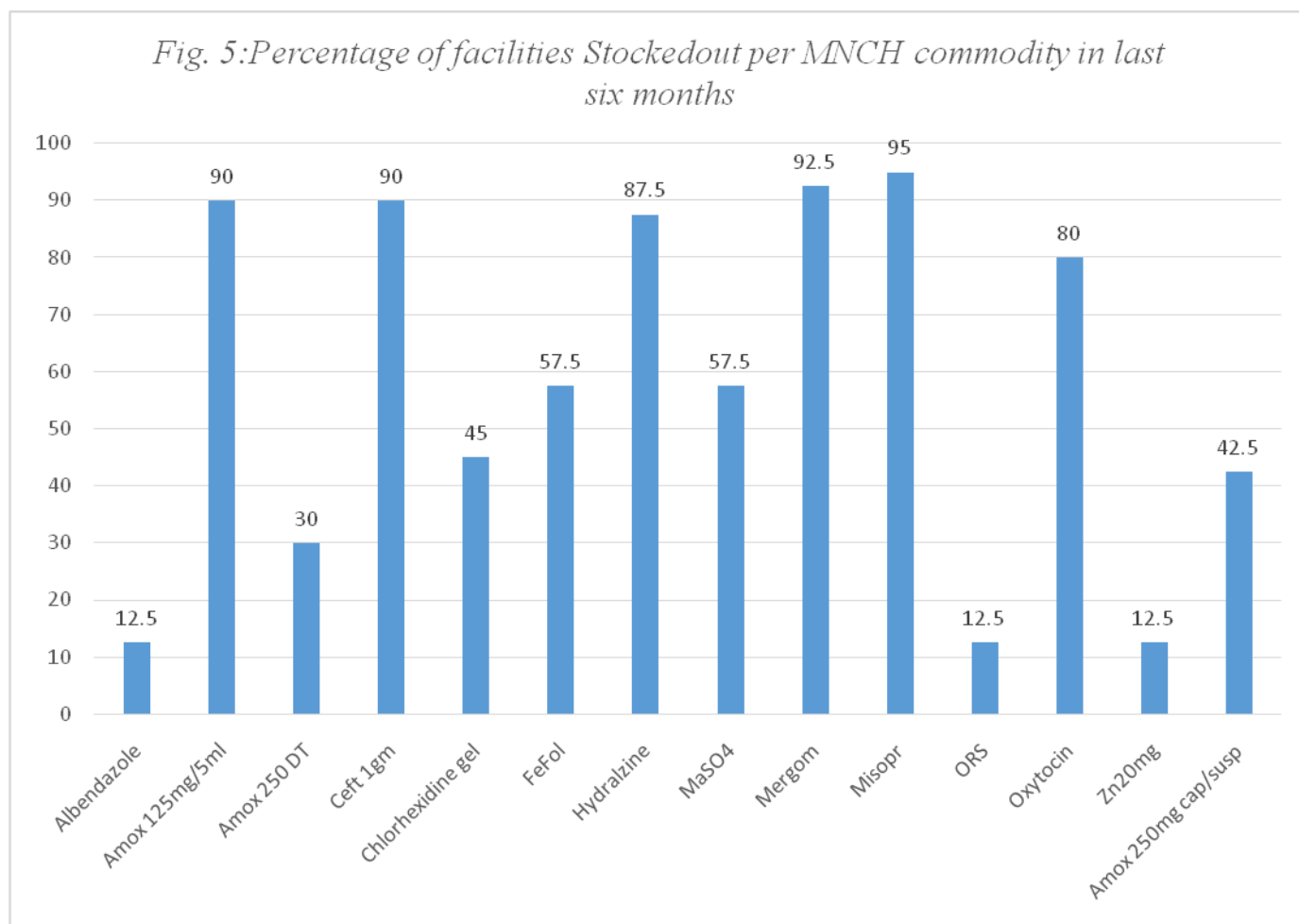
Source: Own Survey, 2018.

Hence, data were collected for stock out of MNCH commodities in last six months from bin cards and Dagu software for each of the MNCH products. In this analysis MNCH commodities not managed by facilities were considered as stock out and availability was assessed only through

program store. The figure 5 above shows that maximum of 95% stock out for Misoprostol injection and minimum of 12.5% stock out for Albendazole 400mg, ORS and Zinc 20mg tablet in last six months. In 2017, national assessment of MNCH commodities (Nigatu, 2017), Misoprostol injection was with the highest stock out (77%) followed by Chlorhexidine Jell (74%) and lowest stock out rate for Oxytocin inject (9%). Even if the two results showing varying stock out rate for different products they have similarity as most of products showed stock out. In this assessment the stock out rate vary from 12.5% (for Albendazole tablet & ORS) to 95%(Misoprostol injection).

Frequency and Duration of stock outs in last six months

Frequency and duration of stock shows the extent at which facilities are suffering from not having the needed MNCH commodities to treat, alleviate and prevent any suffering of their clients/patients.

Fig. 6: Number of stockouts inlast 6 months & Mean number of days of stockouts in last 6 months
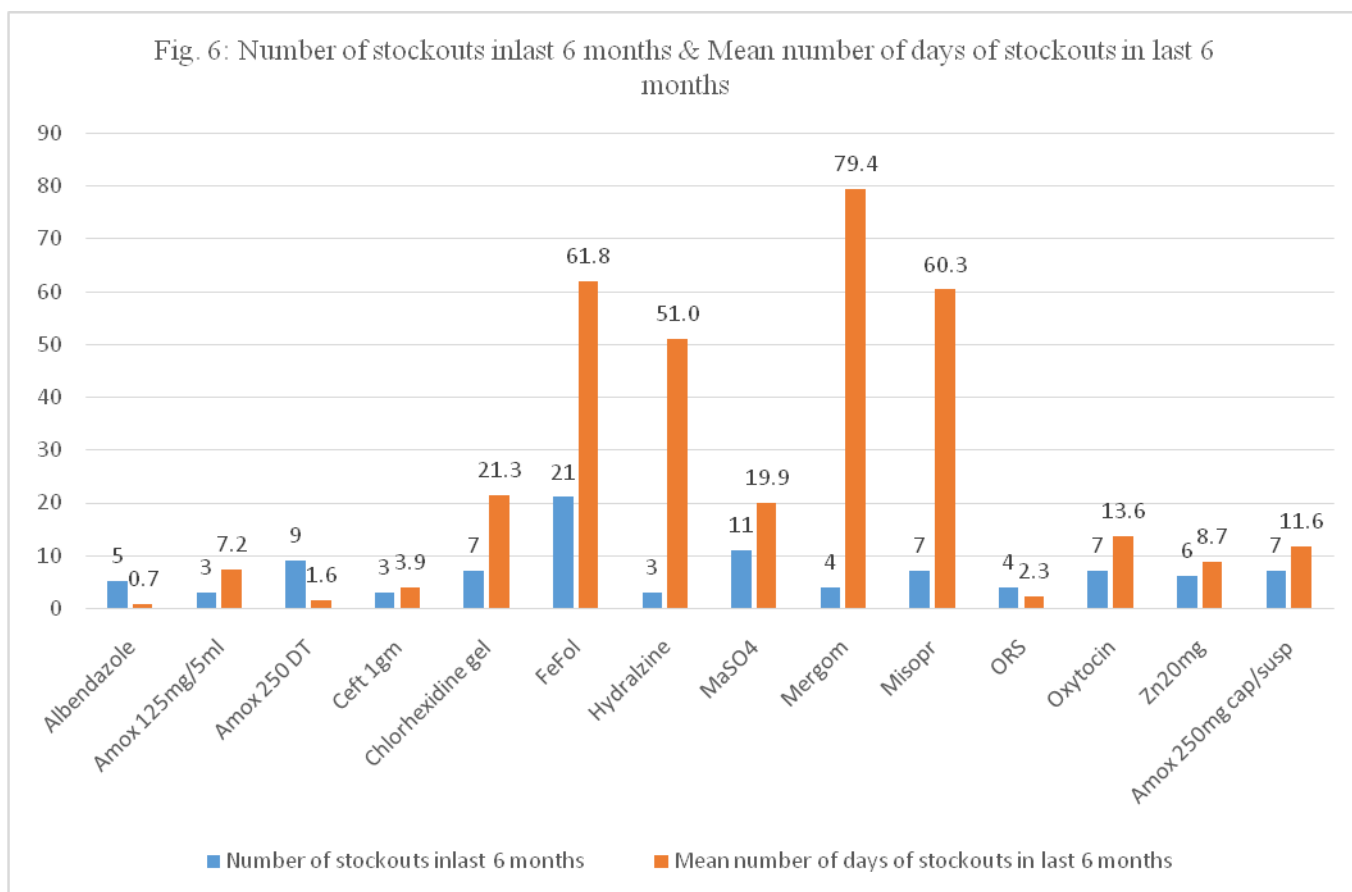
The number of stock out for Ferrous Sulphate + Folic Acid tablet in previous six months was the highest, 21 times stocked out but the highest average days of stock out was recorded for Methylergometrine (79.4 days) in facilities which are managing them showed in fig.5. Similar assessment done nationally shows the days stocked out ranged from a low of 39 days (21 percent of the time) for ferrous Sulphate + Folic acid tablets, to a high of 136 days (76 percent of the time) for Chlorhexidine gel (Nigatu, 2017). Therefore, both studies shows there are big problem with the availability of MNCH commodities both nationally and in Addis Ababa.

Stock out of MNCH commodities on the Day of visit

Fig.7: Percentage of facilities stocked out on the Day of visit per MNCH commodities
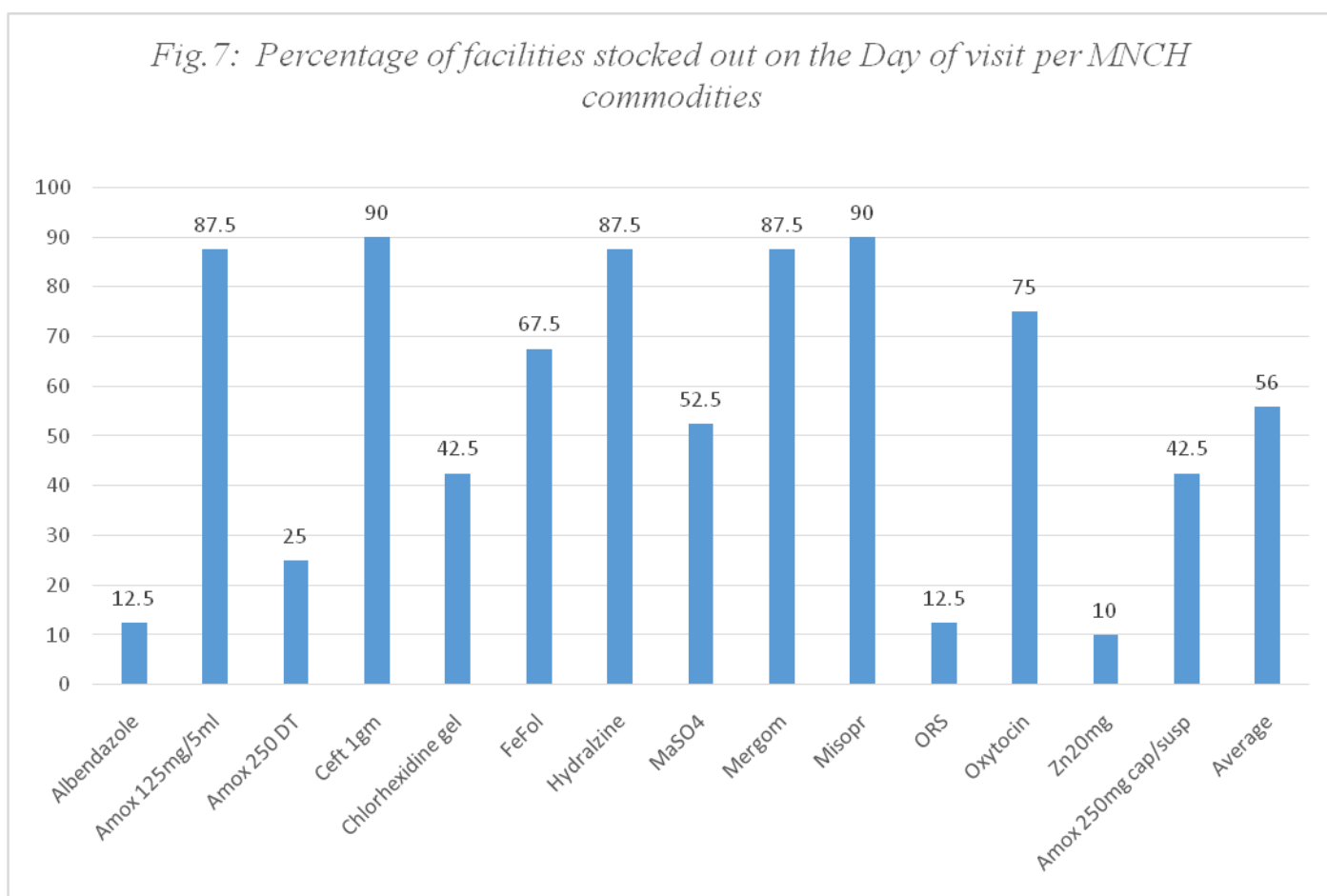
MNCH commodities availability was also assessed on the day of visit and showed almost similar result for most products. As the highest stock out on the day of visit for Misoprostol injection (90%) and lowest for Zinc 2mg tablet (10%) with average stock out of 56%, as seen from figure 6. For similar assessment done nationally the result showed maximum stock out of Misoprostol injection (64%) & Methylergometrine (54%) and lowest for Oxytocin (0%) (Nigatu, 2017). When this result was compared with essential medicine availability found from national IPLS survey, where average availability was 89 percent for the basket of commodities, for all facilities. Of the 27 items assessed, availability was at 90 percent or greater for 18 items and 81 percent or greater for all but three items (Shewarega, 2015).

Stock on Hand (Months of stock) available

As per the Integrated Pharmaceutical Supply System (IPLS) products managed by facilities should have minimum and maximum inventory level. According to the IPLS hospitals and health centers set to have maximum and minimum level of 4 months and 2 months respectively. So, proper inventory management of MNCH commodities ensure these target all the time. In this assessment facilities were assessed for the level of inventory for all the MNCH commodities they are managing using issue data from main store to calculate AMC and then months of stock.

Fig. 8: Inventory Level (months of stock) of MNCH commodities with in Facilities on the day of visit
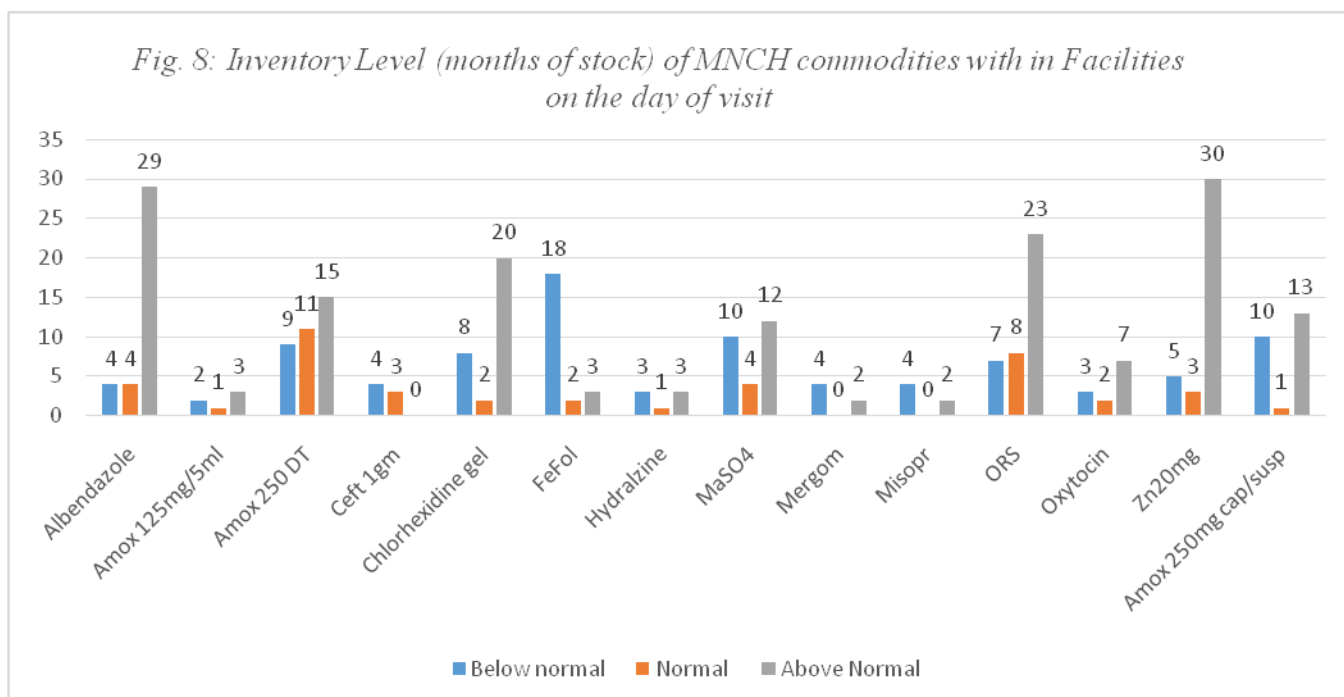
Source: Own Survey, 2018.

As per the figure 8 above, most of the MNCH commodities were not stored according to the standard in most facilities.For example facilities stocked normal (2-4 MOS) varies from zero (for Methylergometrine injection) to eleven facilities (for Amoxicillin 250mg DT). When we see overstock/above normal (> 4 MOS) it varies from two facilities to thirty facilities. In general, for basket of MNCH commodities average number of facilities stocked as normal, below normal and above normal were 3, 6.5 and 11.5 respectively. Therefore, this may leads to stock out or overstock which were affecting both the client service as well as store management.

Availability of Expired MNCH commodity

Expiry of pharmaceuticals were inevitable but it should be minimized and separated when expiry. But the expiry of above recommended amount of medicines highlights a problem with the supply chain, which includes medicine selection, quantification, procurement, storage, distribution and use. World Health Organization recommends about 2% of wastage from all the products managed with in specified year, which mainly due to expiry and other reasons.

Fig. 9: Avialabilty of Expired MNCH commodities
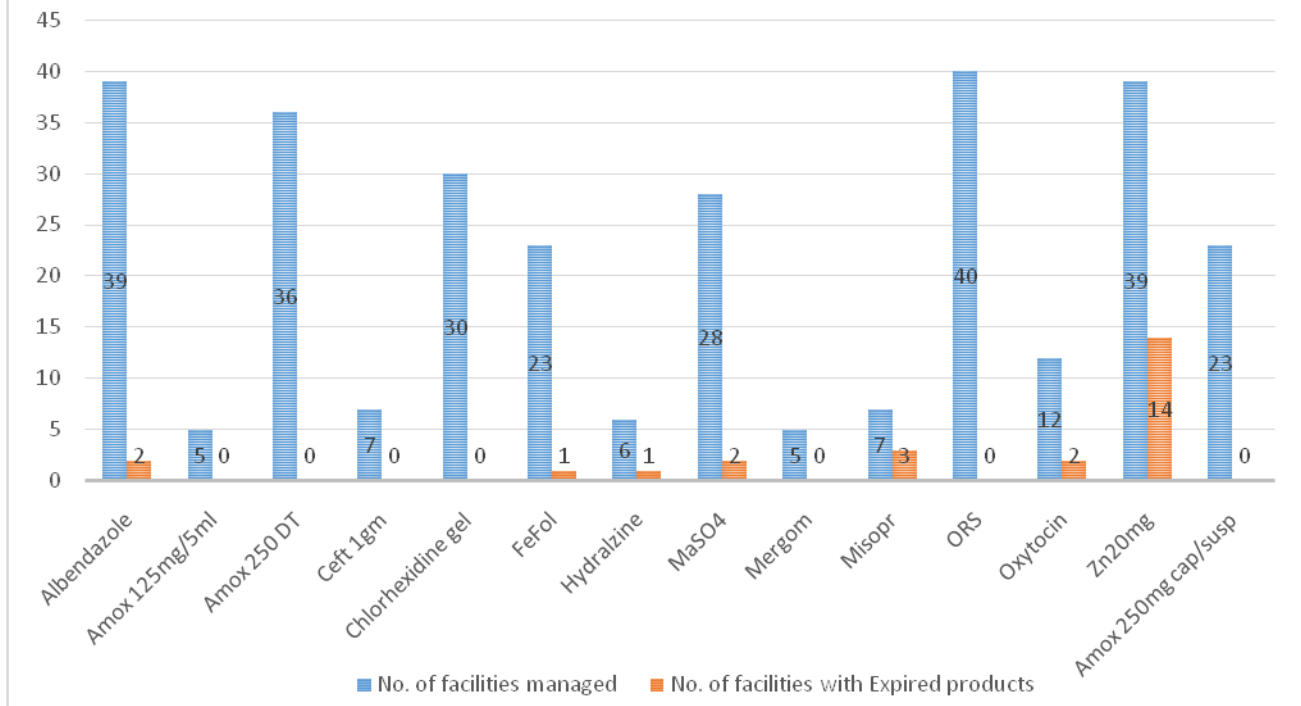
Source: Own Survey, 2018.

During assessment facilities were assessed for availability of expired MNCH commodities in their store room. Relatively few facilities have some MNCH commodities expired and found in store room with highest of 36% (14 out of 39) of facilities for Zinc 20mg tablet. The above figure shows over all availability of expired MNCH commodities in store room.

CHAPTER FIVE

5. Summary, Conclusion and Recommendation

5.1. Summary of findings

The research collected quantitative data for analysis of supply chain management practice of MNCH commodities in Addis Ababa selected health facilities and analyzed the data using descriptive SPSS and excel. As per the study different indicators of the SCM was analyzed and presented using table and charts. These results were summarized as following summary findings.

LMIS reporting and recording formats were well used at facilities as the result showed 75% of facilities were uses IFRR with schedule for report and resupply of MNCH commodities. 85% of facilities were reports MNCH commodities using RRF to suppliers. Only 40% were resupplied per the requested quantities of MNCH commodities. Also health facilities storage condition were assessed using 9 criteria and an average of 95% health facilities were fulfilling the criteria. Bin card availability showed an average of 98.7% facilities have bin card for MNCH commodities with update rate of 93%.

Average number of MNCH commodities manage per facility showed 7.5 out of 14 expected important list with minimum of 4 and maximum of 12 MNCH commodities. This result showed high stock out of the commodities in health facilities. Hence, stock out in last six month showed as high as 95% for Misoprostol injection and as low as 12.5% for three commodities. In contrast to the high stock outs for some products, the study also found that high overstock of other products like Zinc tablet where more than 100 months of stock during assessment and expired MNCH commodities in the store room. The frequency and duration of stock out with the previous six month showed chronic stock out for some of products like Ferrous Sulphate + Folic Acid tablet, Methylergometrine injection and Misoprostol injection where the stock out days averaged 61.8, 79.4 and 60.3 days respectively.

5.2. Conclusion

The analysis has found important issues that need to be addressed by different parties in the health sector in general and supply chain in particular.Finding showed there are best practice of use of different reporting and recording systems in AACHB facilities for both internal (IFRR, bin card and schedule) and external (RRF). In the case of RRF, the use of automated system (Dagu

software) in the store assisted well as indicated by almost all store managers of the assessed facilities. The main problem was insufficient/undersupply of the requested MNCH commodities from supplier mainly PFSA, only 40% of assessed facilities were refilled as per their request.

Another best practiced indicator for good supply chain management was storage condition which was above the set value (80% of the needed criteria) by all the assessed facilities, where they averaged 95% of the criteria with minimum for one indicator, 80% (separating expired items).

The main challenge identified in this assessment was the problem with managing and availing MNCH commodities at facilities. Even if it was agreed and included in policy to have 14 selected essential MNCH commodities in the program and making them available to all mothers, neonates and children seeking for them, only 7.5 of them on average managed in facilities. This even went down to 4 products in some facilities and maximum of 12 in one facility. Hence, this had made the products high stock out at assessed facility level with average stock out of 56% at the time of visit which went as high as 90% stock out for two products (Ceftriaxon 1gm and Misoprostol injection). When compared with recent (2017) national assessment for MNCH commodity assessed by JSI|AIDSFree project, the same commodity (Misoprostol injection) has showed highest stock out rates but with 77% stock out.

IPLS is Forced Ordering Maximum/Minimum Inventory Control System, with two months review period, two months minimum level and four months maximum level. Accordingly, facilities are expected to manage with respect to this standard. But the assessed facilities are far beyond this concept for MNCH commodities, only Amoxicillin 250mg DT has managed in 31% of facilities according to the principle. The rest of products were below or above the needed level of quantity in most assessed facilities. This contradicts with level of stock out found which is also high reaching 95% for products like Misoprostol injection. In the same way, Zinc 20mg tablet has highest stock level in most assessed facilities as high as more than 100 months of stock in one of assessed facility. Zinc 20mg tablet has not only highest level of stock but also found expired in 14 (35%) health facilities.

5.3. Recommendations

As seen from the assessment, MNCH commodities stock out is very high and stock level for available products were either above or below the recommended level. Therefore, it is important:

- Integrating reporting and supply of MNCH commodities within IPLS so as to have regular, direct delivery to health facilities with other program commodities.
- Products like Chlorihexidine Jell and Zinc 20mg tablet were in very high stock and expiry in most facilities, so it is important to have clear guide of treatment and distribute to facilities for proper use of these products.
- During assessment facilities were demanding the inclusion of supplies like disposable syringe and gloves as they were complementary products for those selected MNCH commodities. So, it is important to address their request for full implementation of the program.
- Further study on source of budget, and product use and challenges related to MNCH commodities management.

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Annex 1: List of MNCH commodities to be assessed

S.No	Name of the product	Used for
1	Albendazole 400 mg tab	Child
2	Amoxicillin 125 mg suspension	Child & Neonatal
3	Amoxicillin 250 mg Dispersible tab	Child
4	Ceftriaxone 1 g/mL	Child & Neonatal
5	Chlorhexidine gel	Neonatal
6	Ferrous Sulphate + Folic Acid 150 mg + 0.5 mg tab	Mother
7	Hydralazine 20 mg/ml	Mother
8	Magnesium Sulphate 50%/20 ml	Mother
9	Methyl-Ergometrin Maleate	Mother
10	Misoprostol 200 mcg tab	Mother
11	ORS	Child & Neonatal
12	Oxytocin 10 units/ml	Mother
13	Zinc 20 mg Dispersible tab	Child
14	Amoxicillin 250mg caps or 250mg/5ml suspension	Child

Annex 2: Data Collection Tool

Date: _____

Type of Facility: _____

Name of Facility: _____

Sub-City: _____   Woreda: _____

S. No	Questions	Code Classification	Comment /Go to
General Information			
01	Name and title and of person interviewed		
02	Number of years and months you have worked at this position?		
03	Educational back ground		
LMIS formats and its use			
01	Are the facility use Internal Report and Requisition Form (IFRR) that are customized for MNCH commodity?	Yes 1 No 2	
02	Are the unit that manage MNCH have regular schedule for report and request?	Yes 1 No 2	
03	At the MNCH unit Bin Cards (BC) are managed and updated?	Yes 1 No 2	
04	Is the facility have regular report and requisition time/schedule for MNCH commodities?	Yes 1 No 2	
05	Is the facility use report and requisition form (RRF) for MNCH commodities?	Yes 1 No 2	
06	To whom the facility send their request?	RHB 1 Sub city 2 PFSA 3 Other (Specify) 0	
07	From where are the facility is supplied with MNCH commodity?	RHB 1 Sub city 2 PFSA 3 Other (Specify) 0	
08	Do the facility get the commodities as per the report and request sent?	Yes 1 No 2	

Storage Condition

This is based on visual inspection of the storage facility; note any relevant observations in the comments column. To qualify as "yes," all products and cartons must meet the criteria for each item.

S. No	Questions	Code Classification		Comment /Go to
01	MNCH commodities are arranged & organized according to a logical categorization.	Yes	1	
		No	2	
02	Are unwanted items (damaged or expired drugs, non-pharmaceutical items, etc.) in the store room separated from the usable stock?	Yes	1	
		No	2	
03	MNCH Commodities are arranged so that ID labels, expiry dates, and/or manufacturing dates are visible.	Yes	1	
		No	2	
04	Products are stored & organized in a manner which facilitates use of First-to-expire, first-out (FEFO).	Yes	1	
		No	2	
05	Products are protected from direct sunlight and high heat at all times of the day/during all seasons.	Yes	1	
		No	2	
06	The storeroom is maintained in good condition (clean, no trash, sturdy shelves, and boxes well-organized).	Yes	1	
		No	2	
07	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.	Yes	1	
		No	2	
08	Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of bats and/or rodents [droppings or insects].)	Yes	1	
		No	2	
09	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	Yes	1	
		No	2	

Product	Unit	Managed at facility Y/N	BC Available Y/N	BC Updated Y/N	Stock out most recent 6months month Y/N	Number of Stock out	Total number of stock out days	Stock out today Y/N	SOH today (Quantity)	AMC (Number of months taking 6 months)	Availability of expired MNCH commodities Y/N

D. **Store Stock Data for MNCH Commodities (for the past 6 months and day of visit)**

Albendazole 400 mg tab											
Amoxicillin 125 mg suspension											
Amoxicillin 250 mg dispersible tab											
Ceftriaxone 1 g/mL											
Chlorhexidine gel											
Ferrous Sulphate + Folic Acid 150 mg + 0.5 mg tab											
Hydralazine 20 mg/ml											
Magnesium Sulphate 50%/20 ml											
Methyl-Ergometrin Maleate injection											
Misoprostol 200 mcg tab											
ORS											
Oxytocin 10 units/ml											
Zinc 20mg Dispersible tab											
Amoxicillin 250mg caps or 250mg/5ml suspension											

Annex 4: List of Facilities of the Addis Ababa City Health Bureau ordered alphabetically

1	Ababa Bikila Hc	35	Gotera Masalecha HC	69	Saris HC
2	Abenet HC	36	Gutomeda HC	70	Selam Fire HC
3	Abyssinia Hc	37	Hidasse HC	71	Selam HC
4	Addis Hiwot HC	38	Hiwot Amba HC	72	Serti HC
5	Addis ketema W3 HC	39	Janmeda HC	73	Shegole HC
6	Addis ketema W7 HC	40	Kality Catholic HC	74	Shiromeda HC
7	Addis Teay Hc	41	Kality HC	75	Simegn Kebede HC

#	Name	#	Name	#	Name
8	Afenchober HC	42	Kassanchis HC	76	Sumit HC
9	Akaki HC	43	Kebena HC	77	Teklehaimanot HC
10	Akaki kaliti HC	44	Kela HC	78	Tibebe Bekechene HC
11	Alembank HC	45	Kilinto HC (Akaki Kalit)	79	Tirunesh Bejing
12	Amoraw HC	46	Kirkos HC	80	Tuludimtu HC
13	Arada HC	47	Kolfe HC	81	Woreda 01 HC Yeka
14	Baeta HC	48	Kolfe W9 HC	82	Woreda 07 HC Yeka
15	Beleteshachew HC	49	Korea Zemach Hc	83	Woreda 1 Kolfe susbity
16	Bole 17 HC	50	Kotebe HC	84	Woreda 10 HC (A/Ketema)
17	Bole 17/2 0 HC	51	Lideta HC	85	Woreda 10 HC (N/L)
18	Bole Bulbula HC	52	Lomimeda HC	86	Woreda 10 HC Yeka s
19	Chefe HC	53	Maichew HC	87	Woreda 11 HC Yeka
20	Chirchil Hc	54	Meri HC	88	Woreda 12 HC
21	Dafim Hidase HC (Lideta)	55	Meshuwalekia HC	89	Woreda 13 HC Yeka
22	Dilfre HC	56	Mikililand health center	90	Woreda 14 HC
23	Efoyita HC	57	Minilik HS	91	Woreda 2 HC
24	Entoto Fana HC	58	N/s w06 HC	92	Woreda 3 Kolfe susbity
25	Entoto No. 2 HC Yeka subcity	59	N/S/L Wereda 03 HC	93	Woreda 5 HC
26	Entoto No.1	60	N/S/L Wereda 05 HC	94	Woreda 6 HC
27	Felege Hiwot Hc	61	N/S/L Wereda 09 HC	95	Woreda 6 HC (Kolfe
28	Felegemeles HC	62	N/S/L Wereda 11 HC	96	Woreda 8 Kolfe subciity
29	Fere Meda Hc	63	N/S/L Wereda 12 HC	97	Woreda 8 Milinium HC
30	Gandi HS	64	NSL Woreda 01 Hc	98	Yehidase Fire HC
31	Gelan HC	65	Philipos HC	99	Yeka HC
32	Gergi HC	66	Ras Desta HS	100	Yekatit 12 HS
33	Ginbot 20 Hc	67	Rasemeru HC	101	Zewditu HS
34	Goro HC	68	Samen HC		