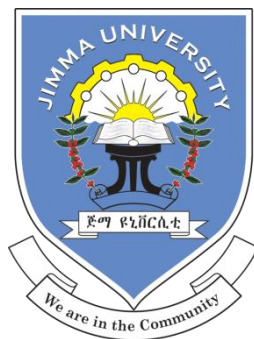


JIMMA UNIVERSITY
FACULTY OF HEALTH SCIENCES
SCHOOL OF PHARMACY



AVAILABILITY OF SELECTED KEY ESSENTIAL RDF MEDICINE AT
SELECTED PUBLIC HELTH FACILITIES IN JIMMA ZONE

BY: EMEBET TESFAYE (B.PHARM)

A RESEARCH PAPER SUBMITTED TO FACULTY OF HEALTH SCIENCES,
SCHOOL OF PHARMACY, JIMMA UNIVERSITY IN PARTIAL FULFILLMENT
OF THE REQUIREMENT FOR MASTERS OF SCIENCE DEGREE IN
PHARMACEUTICAL SUPPLY CHAIN MANAGEMENT

AUGUST 2021

JIMMA, ETHIOPIA

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AUGUST 2021
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DECLARATION

I undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and provision of required progress reports as per terms and condition of the school of Pharmacy in effect at the time of grant is forwarded as the result of this application.

Name of the student: _____

Date _____ Signature _____

Approval of Advisors

Name of Advisor: _____

Date _____ Signature _____

Approval of examiner(s)

Name of examiner: _____

Date _____ Signature _____

Approval of school/department head

Name of school/department head: _____

Date _____ Signature _____

ABSTRACT

Background: *Essential medicines are medicines that satisfy the priority health care needs of the population. These medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price, the individual and the community can afford. This study was aimed to assess the availability of essential medicines at public health facilities and identifying areas where improvement is required.*

Objectives: *Assessing and determining factors affecting availability of selected key medicine at public health facilities of Jimma zone, Ethiopia.*

Methods: *In this study, a cross-sectional survey complemented with a qualitative method was conducted at five hospital and 14 health centers in the Jimma Zone. Mainly the study evaluated the availability of essential medicines with in the last six month and on the day of visit. The quantitative data were encoded to SPSS V.21 software and descriptive statistical analysis was used to determine frequency counts, averages, and percentages. Nineteen in-depth interviews were conducted to collect qualitative data, and the analysis was summarized using thematic analysis.*

Result: *Availability of key essential medicine at selected public health facilities in Jimma zone lies between the ranges of high (>80) at hospitals and fairly high (>50-80) at health centers with the exception of Amoxicillin 250mg/5ml and Glucose 40%.The low availability of Amoxicillin 250mg/5ml and glucose 40% were due to the irregularity and less availability of the product at the supplier level. As these medicines are key essential medicines, their absence largely influence quality of service delivery and client's satisfaction. The study also reviled that in some cases, there are variation in the availability of medicines with different dosage and formulation. Lack of access to basic infrastructure, distance of public health facilities from EPSA Jimma hub, lack of commitment from the drug therapeutics committee, inappropriate forecasting and selection procedure, lead time between order and supply of the medicines, and unstandardized storage condition and a lack of pharmacy professionals were are the main challenges.*

Conclusion and recommendation: *The main reasons for unavailability of these medicines are irregularity and less availability of the product at the supplier level. Key informants also reported that, access to basic infrastructure, distance of public health facilities from EPSA Jimma hub, lack of commitment from the drug therapeutics committee, inappropriate forecasting and selection procedure, lead time between order and supply of the medicines, and unstandardized storage condition and gap in capacity of pharmaceutical professionals were the main challenges. In collaboration with different stakeholders, zonal administration and health bureau should work on enhancement of access to basic facilities. EPSA Jimma hub should improve availability of key essential medicines with the objective of increasing quality of service delivery and client's satisfaction.*

Key words: *Availability, Essential medicine, Jimma Zone, RDF*

**I dedicate this thesis to my beloved family
Thank you very much.**

ACKNOWLEDGEMENTS

First and above all, I praise God, the Almighty for providing me this opportunity and granting me the capability to proceed successfully. This thesis appears in its current form due to his Grace, which enables me to benefit from the assistance and guidance of several people. Completion of this thesis work was possible with the unreserved support of several people. First and foremost, I am extremely grateful and would like to express my sincere gratitude to my principal advisor, Tidenek Mulugeta (MSc.) for her understanding, encouragement, support, and advice. She generously shared with me her immense knowledge, consistent support, dedication, motivation, and all the appreciation.

My special thanks also go to all academic and administrative staff of Jimma University for their unreserved support to make accessible all resources and facilities required for the successful completion of this thesis. In addition I would like to thank all who are participated during in all level of my research.

I would also like to express my sincere gratitude to my family for their love, invaluable understanding, encouragement, trust, tolerance, full support, guidance, and helpful assistance throughout the journey of this study. All have been along with me throughout the study period.

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Abbreviations/Acronyms

DTC:	Drug therapeutics Committee
EFMHACA:	Ethiopian food, medicine, and health care administration and control authority
EPSA:	Ethiopian pharmaceuticals supply agency
FDRE:	Federal democratic republic of Ethiopia
FMoH:	Federal Ministry of Health
GDP:	Good Distribution Practices
HC:	Health Center
IPLS:	Integrated Pharmaceutical Logistics System
MC:	Medical Center
MGD:	Millennium Goal of Development
RDF:	Revolving drug funds
SS:	Supportive Supervision
WHO:	World Health Organization

CHAPTER 1: INTRODUCTION

1. 1. Background of the study

Essential medicines are medicines that satisfy the priority health care needs of the population. These medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price, the individual and the community can afford [1, 2, 3].

Health is an important indicator of the status of development of society & country and medicines are the foundation and fundamental part of every health care system [4]. That is why efforts began to ensure medicines widespread availability within a decade after the first modern medicines became available [5]. World health organization (WHO) in its assembly in 1978 declared and reaffirmed that the availability of essential medicines is a basic component of health care [4]. These medicines are those that satisfy the priority health care needs of the population and are selected with due regards to public health relevance, evidence on safety, efficacy, quality, and comparative cost-effectiveness [6].

Due to inadequate availability of medicines, World health organization (WHO) estimates that, about one-third of the world's population is without access to essential medicines. For this reason, availing essential medicines with affordable price are taken as one of the millennium development goals (MGD) in developing countries [7]. Ethiopia is one of the developing countries in Africa with infectious diseases as a major health problem [8]. The provision of basic health services in the country mostly remains to be the responsibility of the public sector. This relies, among other factors, on availing the most cost-effective medicines that satisfy priority healthcare needs of the population in adequate amount, appropriate dosage forms, and of assured quality at all times [8].

The Essential Medicines List aims to identify cost-effective medicines for priority conditions, together with the reasons for their inclusion, linked to evidence-based clinical guidelines and with special emphasis on public health aspects and considerations of value of money. The core list presents a list of minimum medicine needs for a basic health care system, listing the most efficacious, safe and cost-effective medicines for priority conditions.

Priority conditions are selected on the basis of current and estimated future public health relevance, and potential for safe and cost-effective treatment [49].

The complementary list presents essential medicines for priority diseases, for which specialized diagnostic or monitoring facilities, and/or specialist medical care, and/or specialist training are needed. In case of doubt medicines may also be listed as complementary on the basis of consistent higher costs or less attractive cost-effectiveness in a variety of settings [49]

Based on the common health problems in the country, Ethiopia has developed a national essential medicines list [5]. Essential medicines list is meant to guide the selection, procurement, production, distribution, and storage of medicines. It can also serve as an informational and educational tool for health care professionals involved in the diagnosis and treatment of diseases as well as dispensing of medicines. Furthermore, it can improve availability and promote the rational use of medicines.

The choice of essential medicines depends on several factors, including the public health relevance and sound and adequate data on the efficacy, safety and comparative cost effectiveness of available treatments. Stability in various conditions, the need for special diagnostic or treatment facilities and pharmacokinetic properties are also considered if appropriate. When adequate scientific evidence is not available on current treatment of a priority disease, the Expert Committee may either defer the issue until more evidence becomes available, or choose to make recommendations based on expert opinion and experience [50]. Essential medicines are selected based on disease prevalence, evidence on efficacy and safety, and comparative cost-effectiveness. According to WHO, the number of essential drugs differs based on the level and scope of the health facility.

Since its establishment in 2007 with proclamation number 553/2007 article 9, Ethiopian Pharmaceutical Supply Agency (EPSA), which is a semi-autonomous public organization leads health care supply chain of the country with the mandate of procuring, warehouse, and distribute medical commodities to Ethiopian health facilities in securing availability, accessibility, and affordability of key essential medicines with appropriate quality, safety, and efficacy [9].

A national survey of Ethiopia conducted in 2013 estimates that 70% of key essential medicines are available in the public sector [11] though, the number of drugs in amount and variety required differs in the level of the facility [12, 13]. In consideration of the level of the public health facilities, Ethiopia published a list of medicines specifically for primary public health facilities of the country to cease making available the needed medicines at this facility level [4].

Essential medicines are crucial elements for the health care service sustainability and are helpful to reduce disease burden [2]. Availability of key essential medicines is a crucial element in the delivery of quality health services. Essential medicines satisfies the priority health care needs of a population in any country and their availability and affordability at all times is crucial for the provision of complete health service. [24].

Adequate availability and affordable access to essential medicines are important factors for the quality of health service delivery. Essential medicines are crucial for precaution and therapeutic health services. Most leading causes of death can be prevented or treated effectively by adequate availability and proper supply of key essential medicines [7]. One of the method of increasing availability of essential medicine is financing the supply through the revolving drug medicine fund (RDF) scheme [14].

Revolving drug medicines is a system where the revenue generated from the sale of drugs to patients is used to purchase new drugs and ensure availability and consistent supply [16]. Revolving drug medicine is also seen as a cost-recovery or “user fee” system to ensure that drugs are made available in public health care facilities [14]. It is widely recognized that a well-functioning and efficient supply chain is critical for the provision of public health services and to guarantee the consistent availability at all key health service delivery points [17].

Ethiopia has been facing major public health problems due to lack of availability and access to essential medicines so that a number of people are suffering with diseases that can easily be prevented or treated by consistently making medicine availability[2]. Research studies indicated that consistent supply and availability of key essential medicines can save about 10 million lives every year [3].

However, the actual availability and supply of essential medicines in public hospitals are threatened [7, 9, 11]. Therefore, assessing availability of key essential medicines in selected public health facilities of the Jimma zone will help to identify areas where improvement is required.

1.2. Statement of the problem

Availability of essential medicines in public health facilities are imperative for the effective delivery of health care service and implementation of health care policy [10]. Availability of this medicine leads to customer satisfaction and increases the reputation of the health facility. [18] Though the world health organization (WHO) acknowledges that shortage of medicinal supply a universal challenge [16]. Failure in availability of essential medicines affects all stakeholders, patients, pharmacists, and clinicians [17]. Due to inadequate availability of medicines, World Health Organization (WHO) estimates that, about one-third of the world's population is without access to essential medicines. For this reason, availing essential medicines with affordable price is taken as one of the millennium goal of development (MGD) in developing countries [7].

In developing countries, mostly sub Saharan Africans, lack of availability essential medicines at public health facilities which have adverse economic, clinical and humanistic outcomes to the patient. Patients were more commonly reported to have increased out of pocket costs, mortality, and complaints during times of shortage [21]. The inability to benefit from the availability of essential medicines sets patients at considerable risk of medical complications and deterioration in health status [26]

Ethiopia is one of the developing countries in Africa with infectious diseases as a major health problem [8]. The provision of basic health services in the country mostly remains to be the responsibility of the public sector. This relies, among other factors, on availing the most cost-effective medicines that satisfy priority healthcare needs of the population in adequate amount, appropriate dosage forms, and of assured quality at all times [8]. As part of low-income countries, in Ethiopia poor access to essential medicines is a common public health problem. The cost of treatment of common diseases was found to be unaffordable to the majority of the Ethiopian people [14].

Ensuring availability of essential medicines is difficult in which it requires governments through their policies to keep balance between availability and affordability in consideration of meeting the priority health needs of the population. In most cases, the procurement and supply mechanism of key essential medicines are not accurate as compared to the goal in achieving availability of these essential medicines [19]. Moreover, there should be proper selection, quantification, procurement, and supply management mechanism at different level [20].

Regardless of persistent availability, either of combination or specific problems including lack of an agreed procurement policy, lack of an integrated procurement approach, lack of credible data and information for procurement planning, poor forecasting, funding structures and arrangements results less availability of essential medicines [14, 20].

To insure availability of essential medicines at health facilities, the government of Ethiopia restructured procurement and distribution of pharmaceuticals by establishing an autonomous institution called Ethiopian pharmaceutical supply agency (EPSA), to supply safe and affordable medicines to the public health sector sustainably and initiated drug inventory management using integrated pharmaceutical logistic system (IPLS), and increasing annual budget allocation for procurement of essential medicines [11].

Due to inadequate availability to essential medicines, number of lives are dying every year, number of people are suffering with diseases that can easily be prevented or treated, and wastage of resources and budget are among the major consequences Ethiopia is encountering in the health care system [2]. Based on the common health problems in the country, Ethiopia has developed a national essential medicines list to easily avail essential medicines [5]. Given this facts, to take strategic actions in availing essential medicines at all time and at all health facilities, reliable information is required. Therefore, the aim of this study was to assess availability of essential medicines at public health facilities of Jimma zone

1.3. Significance of the Study

The findings of this study will primarily benefits pharmacy professionals to create alertness about shortage of key essential medicines, and show its public health burden with the need for immediate action to improve availability these medicines. Health care facility managers and stakeholders can get some insight of focus areas on availability of the medicines so that they will develop strategies based on the evidences identified to ensure availability of the key essential medicines. This study also has a potential to be serve as a reference material for any researcher that would like to conduct research on availability of medicines. This result is also important for policy makers to revise the legal document which are affecting the overall process of availability of RDF medicines in all level of health facilities,

CHAPTER 2: LITERATURE REVIEW

2. 1. Essential medicines

According to world health organization (WHO), essential medicines refer to those medicines that satisfy the priority health care needs of the population. They are intended to be available within the context of functioning health systems at all times, in adequate amounts, in the appropriate dosage forms, with assured quality, and adequate information at a price that individuals and the community can afford. [36] They are selected on the basis of disease prevalence, evidence on efficacy, safety and comparative cost effectiveness. The selection of essential medicines is one of the core principles of a national drug policy because it helps to set priorities for all aspects of the pharmaceutical system.[37] This is a global concept which can be applied in any country, in private and public sectors and at different levels of the healthcare system. [37]

There is good evidence that clinical guidelines and essential medicines lists, when properly developed, introduced and supported, improve prescribing quality and lead to better health outcomes but there is also an economic argument. First, in developing countries pharmaceuticals are the second biggest budget line in the health system, after salaries. Second, new essential medicines are expensive [33].

The selection of new essential medicines for public supply, subsidy or reimbursement has enormous financial implications for developing countries. The advantages of limited lists are therefore both medical and economical. From a medical point of view, they lead to better quality of care and better health outcomes and help focus quality control, drug information, prescriber training and medical audit [29].

Economically they lead to better value for money, to lower costs through economies of scale and to simplified systems of procurement, supply, distribution, and reimbursement. All of this is even more important in resource-poor situations where the availability of drugs in the public sector is often unreliable. Under such circumstances, measures to ensure a regular supply of essential drugs will result in real health gains and in increased confidence in the health services [36].

2.2. Availability of essential medicine

Availability of essential drug measures the number of unexpired drugs in a health facility compared to the total expected number of drugs on the list defined by the World Health Organization. To effectively provide essential health services, facilities must have available a minimum level of essential drugs. According to several studies, availability of essential medicines varies across different economic regions of the world. These type of medicines are not available to 33% of world population and 50% of people in poorest countries of Africa and Asia [37].

According to a study conducted in 36 developing and middle-income countries reported that 29–54% medicines are available at public health sector, where Africa recorded the lowest and America the highest [38]. In another study conducted to assess availability of essential medicines for chronic diseases conducted in rural districts of Sri Lanka reported that less than 7.5% of these medicines are available in low and middle income countries but was 28% in Sri Lanka [39].

Despite a high burden of disease in Ethiopia, utilization of health services remains very low, with people visiting a health facility less than once every two years [40]. Even though per capita spending on health has increased over the past years, it heavily relies on household contributions with out-of-pocket expenditure accounting for 30% of total health expenditure [41]. At the same time, the government drug budget per person remains below the WHO recommendation.

In Ethiopia, There are frequent drug shortages in public health facilities. According to a national it is estimated that only 70% of key essential medicines were available in the public health sector. Unavailability of medicines in the public sector compels patients to revert to the private sector. Consequently drugs can take up more than half of the actual cost of a visit, increasing the chance of incurring catastrophic health expenditures and the associated risks of falling into poverty [40, 42, 43].

To address issues of drug availability, the government of Ethiopia supported the creation of revolving drug funds (RDF) as part of the new Health Care Financing Strategy. These funds aim to increase resources at facility-level through the sale of medicines with a mark-up, thereby generating additional funds for the procurement of new drugs and quality improvements. The strategy aims to enhance affordable and sustainable supply of medicines

to the public, improve overall quality of services provided, and promote sustainability of health services [44].

In 2016, population of Ethiopia is estimated to be 100 million of which 85% live in rural area though there is a proportional increase in population [11]. To satisfy drug demand of these populations the Federal Ministry of Health has been working to ensure an efficient and high performing healthcare supply chain that will ensure equitable access to affordable medicines for all Ethiopians.

Based on the common health problems in the country, Ethiopia has developed national essential medicines list [5]. In the past years, significant progress has been made, although various challenges remain an inadequate supply of quality and affordable essential medicines, poor storage conditions, and weak stock management resulted in high levels of waste and stock outs. To address these challenges, the federal ministry of health initiated a comprehensive supply chain strategic planning process, which led to the Ethiopian Pharmaceutical Supply Agency (EPSA) in 2007 [9, 10].

Since its establishment in with proclamation number 553/2007 article 9 EPSA, which is a semi-autonomous public organization leads health care supply chain of the country with the mandate of procure, warehouse, and distribute medical commodities to Ethiopian health facilities in securing availability, accessibility, and affordability of key essential medicines with appropriate quality, safety, and efficacy [9].

As part of a major intervention to improve the supply chain situation in the country, EPSA in partnership with its support partners the USAID | DELIVER PROJECT, Supply Chain Management Systems(SCMS), and others in the sector developed and began implementing the Integrated Pharmaceuticals Logistics System (IPLS). To help health facilities effectively implement IPLS [29].

2.3. Selection criteria of Essential Medicines

The Essential Medicines List aims to identify cost-effective medicines for priority conditions, together with the reasons for their inclusion, linked to evidence-based clinical guidelines and with special emphasis on public health aspects and considerations of value of money. The core list presents a list of minimum medicine needs for a basic health care system, listing the most efficacious, safe and cost-effective medicines for priority conditions. Priority conditions are selected on the basis of current and estimated future public health

relevance, and potential for safe and cost-effective treatment [49]. The complementary list presents essential medicines for priority diseases, for which specialized diagnostic or monitoring facilities, and/or specialist medical care, and/or specialist training are needed. In case of doubt medicines may also be listed as complementary on the basis of consistent higher costs or less attractive cost-effectiveness in a variety of settings [49]

The choice of essential medicines depends on several factors, including the public health relevance and sound and adequate data on the efficacy, safety and comparative cost effectiveness of available treatments. Stability in various conditions, the need for special diagnostic or treatment facilities and pharmacokinetic properties are also considered if appropriate. When adequate scientific evidence is not available on current treatment of a priority disease, the Expert Committee may either defer the issue until more evidence becomes available, or choose to make recommendations based on expert opinion and experience [50]. Essential medicines are selected based on disease prevalence, evidence on efficacy and safety, and comparative cost-effectiveness.

2.4. Cause for unavailability of essential medicines

Availability and consistent supply of essential medicines in public health facilities is expected to be 100% as they are a lifesaving one. But this is not a reality in Ethiopia. Public health facilities purchase medicines from EPSA and make a little effort to obtain this result to obtain this drugs from other sources or suppliers if fail to receive from EPSA through direct procurement.

It is expected that health facilities use all types of procurement methods to ensure the availability of medicines from various sources in situations where products are not supplied through the EPSA. But health facilities are being challenged by different procurement process. Major reasons for unavailability and inconsistent supply of essential medicines in public health facilities in Ethiopian are, The supplier (EPSA) cannot respond effectively to ever increasing need for medicines and information for decision making in procuring medicines is not properly generated by the hospital and when information is available, it is not used to guide the selection and procurement of pharmaceuticals [1].

Consistent supply and availability of essential medicines in the public health facilities are very important for the effective implementation of health care policy [10]. Procurement and

supply management mechanism of these medicines could be considered as one of the most important factor [14]. Different researcher argued that, procurement and supply mechanism of essential medicines are not appropriate as compared to the goal in achieving consistency in supply of essential medicines [19]. Moreover, there should be proper procurement, supply and distribution mechanism at different level [20].

In the context of different developing and developed countries, national drug policy is aimed at ensuring essential, safe, efficacious and cost effective medicines are made available to the entire population of its citizen [4]. Regardless of persistent access to quality medicines [14]. Either of combination or specific problems including lack of an agreed procurement policy, lack of an integrated procurement approach, lack of credible data and information for procurement planning, poor forecasting, funding structures and arrangements results inconsistent procurement and supply of essential medicines [20].

The inability to benefit from consistent supply of essential medicines sets patients at considerable risk of medical complications and deterioration in health status. In developing countries medicines account for 25-70% of overall health care expenditure, compared to less than 10% in high income countries [4]. Moreover, up to 90% of the population in low and middle income countries pay for medicines out of pocket. Therefore, medicines are unaffordable for large sectors of the global population and major burden of government. In addition, essential medicine supply in developing countries frequently faces problems in terms of consistency and availability [28]. Inconsistent supply and shortage of essential medicine creates dissatisfaction due to patients are asked to buy the medicines from private pharmaceutical stores.

2.5 Consequences of unavailability of essential medicine

In developing countries medicines account for 25-70% of overall health care expenditure, compared to less than 10% in high income countries. Moreover, up to 90% of the population in low and middle income countries pay for medicines out of pocket. Therefore, medicines are unaffordable for large sectors of the global population and major burden of government. In addition, supply systems in developing countries frequently face problems regarding efficiency and reliability. The situation is even worse in sub-Sahara Africa and Asia where as much as 50% of the population lack access [54].

A study conducted by WHO in 36 developing and middle income countries shows that, average public sector availability of generic medicines ranges from 29.4% to 54.4%. The inability to benefit from proper medications and supplies puts patients at substantial risk of medical complications and deterioration in health status. The shortages force patients to cope by trying to procure medications from other health providers or from the local market at greater cost, using inappropriate substitute medications, and by seeking treatment abroad. Cancer patients requiring on-going chemotherapy have also been referred outside for treatment. Patients with kidney diseases, transplants, hypertension, blood conditions and chronic illnesses who require a regular regime of medications, some of which are unavailable, are exposed to special risk. Due to the need for vital drugs and supplies that are out-of-stock, surgeries in all major specialties have been either curtailed or stopped altogether [55]

2.6. Conceptual framework

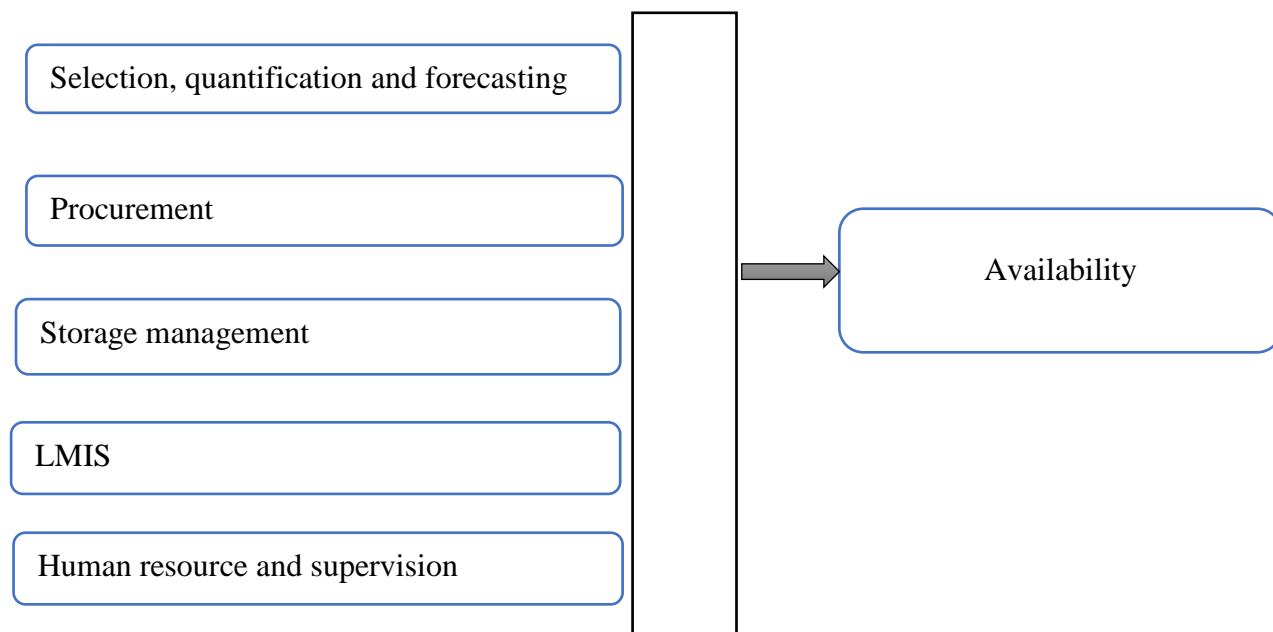


Figure 2.1:A Conceptual framework for the assessment on the availability of key essential medicines at public health facilities of Jimma zone developed after reading different pieces of literature [3, 4,7,9,10,13].

CHAPTER 3: OBJECTIVES AND HYPOTHESIS

3. 1. Objectives

The main objective of the study is to assess and reveal availability of selected key essential medicines at public health facilities of Jimma zone.

3. 1.2. Specific objectives

- ❖ To assess availability of essential medicine at selected public health facilities.
- ❖ To identify factors affecting availability essential medicines
- ❖ To explore challenges of pharmaceuticals management in essential medicine

CHAPTER 4: METHODS AND MATERIAL

4. 1. Study area and period

The study was conducted in selected public health facilities of Jimma zone. The zone is geographically located to the southwest of Ethiopia, 365 km away from the capital city of the country, Addis Ababa covering a total area of 199, 326.28km² which is administratively sub-divided into 21 districts, namely, Jimma City, Agaro City, Kersa, Mana, Seka Chokorsa, Sokoru, Shebe Sombo, Dedo, Gomma, Limmu Kossa, Omo Nada, Gera, Tiro Afeta, Limu Seka, Sigo, Sentema, Chora Botor, Nono Benja, Mencho, Gumay, and Omo Beyem

In the zonal administration, currently, there are a total of 149 health centers and 7 hospitals. The Ethiopian pharmaceutical supply agency Jimma hub is the main source of medicines for these public health facilities [45]. Due to the covid-19 pandemic, study time line was reschedule from its original plan and was undertaken from August 2020 to November 2020.



Figure 4.1 Map of Jimma zone (source: Oromia Bureau of Finance and Economic Development)

4.2. Study design

A mixed research design was employed to study availability of essential medicines. A cross-sectional descriptive study design was used for the quantitative part and a phenomenological study using a key informant in-depth interview was used for the qualitative part.

4.3. Population

4.3. 1. Source population

The source population of this study were all public health facilities in Jimma zone, pharmaceuticals managed under these health facilities and pharmacy professional at the public health facilities.

4.3.2 Study population

The study population were eligible public health facilities in Jimma zone and responsible pharmacy professionals and selected key essential medicine.

4.4. Eligibility criteria

4.4. 1. Inclusion criteria

To capture complete image of unavailability of essential medicines with its associated factor, public health facilities with more than 2 year service year were included in the study. Essential RDF medicine purchased by health facilities and professionals involved in pharmacists, druggist and procurement with more than one year experience was the inclusion criteria for the study participants.

4.4.2. Exclusion criteria

Program medicines were excluded for this study.

4.5. Variables

The study had independent variables (Factors) and dependent variable (outcome).

4.5. 1. Dependent Variable

- Availability of selected key essential medicines

4.5.2. Independent variables

4.5.2.1 Health facility related factors

- Selection
- quantification
- Procurement
- Storage

- LMIS

4.5.2.2. Capacity related factors

- Human resource and supportive supervision

4.6. Sample Size Determination and Sampling Procedures

Based on recommendation of determining minimum representative sample size (i.e. 15%), number of public health facilities were determined using Logistics Indicators Assessment Tool (LIAT) guideline [46]. Therefore, sample size for this study was calculated from the total number of hospitals and health centers while considering both the inclusion and exclusion criteria. From a total of 156 public hospitals and health center, 19 of them (i.e. 5 hospitals and 14 health centers) were considered as sample size for the study. From these 19 health facilities a total of 38 pharmacies professional, 19 of these are store man, 19 of them are head of nurse.

Depending on level of services, scope and access to basic facilities, they were stratified as hospital and health center. The hospitals were further stratified as a medical center, and primary hospital. Thus, one medical center, three district hospitals and one zonal hospital were included. Due to minimum expected year of experience (i.e. two year) and some of hospital were being used as isolation center for Covid19 during the study, two district hospitals were excluded.

Health centers were clustered based on categories of districts (Woreda) and access to basic facilities in the zonal administration. Therefore, 14 health centers were purposively chosen from each category of district (Woreda). Schematic diagram showing the health facility selection procedure (Fig 4.2).

According to WHO key tracer medicines, 21 essential medicine were selected for this study [34]. These medicines are essential revolving medicines that are purchased from the supplier by revenue generated from the sale of drugs to patients [34]. For the reason RDF medicines are not scheduled and fixed, frequent stock-out and customer dissatisfaction has been created. Therefore, from antibiotic, Amoxicillin and Ciprofloxacin with different dosage and formation were considered. From Anti-helment, Albendazole and Mbendazole with different dosage and formation were included. From anti-protozoa different dosage were considered. From Muscle relaxant adrenaline injection were included. From bronco dilator,

Aminophylline injection were included. From supplement, Glucose 40% were considered. From IV fluids, Dextrose in normal saline and Ringer lactate were considered. From Anesthesia, Lidocaine 1% injection were included and from analgesic, paracetamol with different dosage and formation were considered. For the in-depth interview, one pharmacy unit head and store personnel from each public health facilities were identified purposively.

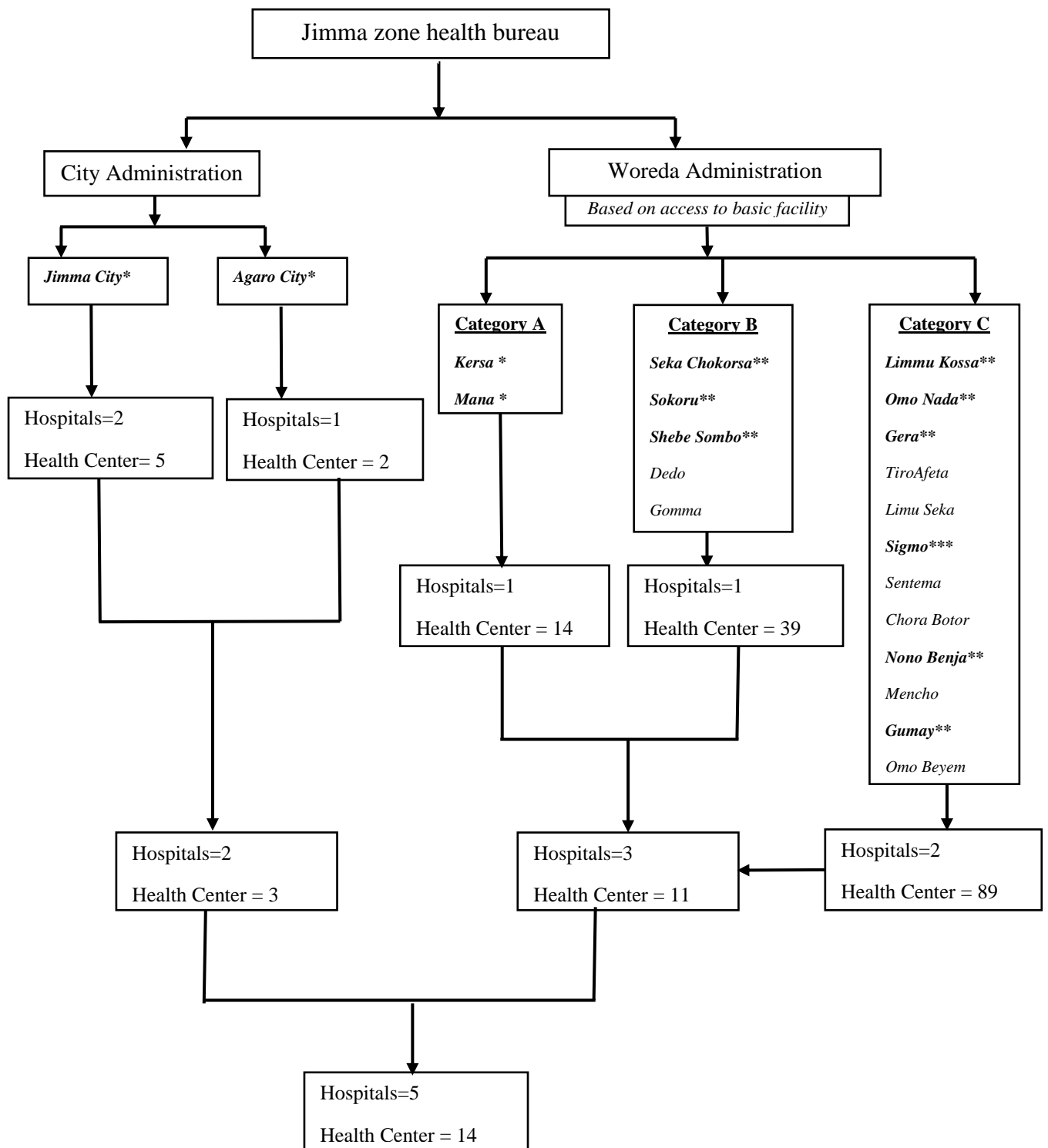


Figure 4.2: Schematic diagram of sampling procedure of the study, Jimma zone, 2020

* Directly selected city administration and Woreda, ** purposively selected Woreda based on location and distance from EPSA Jimma hub.

4.7. Data collection tool

Availability of essential medicines were collected using pre-tested, structured self-administered questionnaires (Annex 1) and checklists (Annex 2) adopted from Logistics Indicator Assessment Tool (LIAT), Logistics System Assessment Tool (LSAT), and indicators developed by John Snow Inc. for UNCoLSC (54–56). Qualitative data were collected using semi structured questionnaires (Annex 3). All the tool were designed in English language.

The self-administered structured questionnaire had three major parts; the first part contained questions regarding demographic data of respondents, the second part contained questions regarding general information, selection, procurement, LMIS. The third part contained question regarding inventory control procedures and storage practice. The observation checklists had three parts; the first part contained questions regarding the availability of medicines on the day of the visit, the second part contained questions used to collect data on availability of these medicines in the past six months, and the third part was designed to collect data on storage condition of the essential medicines.

4.8. Data Collection Procedures

Self-administered structured questionnaires were distributed to pharmacy unit head and store personnel to collect data on factors affecting availability of essential medicines. Semi-structured questionnaires were used to collect qualitative data during the in-depth interviews. Observation checklist were used to evaluate availability of the medicines on the day of visit and in the past six month. In addition to this, the checklist were designed to collect data on management of essential medicines.

On the day of visit, to determine availability and stock out of these medicine, bin cards of the past six months were randomly picked and reviewed, physical inspection were conducted and percentage availability was computed as per WHO recommendation of availability index. The quantitative data collection at the public health facilities were conducted by five trained data collectors under close supervision of the investigator. Data collection procedure and ethical considerations training was delivered to the collectors.

To complement the quantitative data and maintain consistency, nineteen interactive, face to face and in-depth interviews were conducted with pharmacy head and pharmaceutical store

personnel by the investigator. On average, the interview takes 25 minutes. To catch perception of the key informants, the interview were conducted at the health facilities in Amharic and tape-recorded then transcribed to English.

4.9. Data quality management

Due to Covid19 pandemic, pre-test was conducted at one health facility only. Bases on feedback from the pretest and tool evaluation, some modifications were made on the data collection tools before conducting the study. The health facility included in the pre-test was not included in the study. A two-day orientation and training has been given to data collectors. Regular supervision was made by the investigator during data collection to ensure that all necessary data were collected properly. The qualitative data was collected by the investigator.

4.10. Data processing and analysis

Quantitative data was checked manually for completeness & consistency. Then the data was encoded to version 21 of Statistical Package for the Social Sciences (SPSS) software. A descriptive statistical analysis was used to determine frequency counts, averages, and percentages. For the reason that there are small sample size and more than 20% of the cell has less than five observation, fisher exact test were conducted. This test avoids miss interpretation in determining statistical association between dependent, independent variables and predictors of availability of essential medicine. A value less than 0.05 were considered as statistically significant in the tests. The results were presented as frequency tables and graphs. Qualitative data was handled manually and was transformed into categories related to the topics that has been discussed and coded on paper individually in order to identify themes and patterns for thematic analysis. At the end, reports were produced and triangulation of the findings with quantitative results was carried out, and some of the responses were quoted.

4.11. Ethical consideration

Before commencing data collection, ethical approval was obtained from the Ethics Review Committee of the faculty of Health Science, Jimma University. Then, the selected health facilities were communicated with formal letter from Jimma University. The study was conducted in the selected health facilities after getting permission from the medical directors

of respective health facilities. Participants of the study were asked for verbal consent before participating in the study. During the consent process, they were provided with information regarding the purpose of the study, why and how they were selected to be involved in the study, and what was expected of them and that they can withdraw from the study at any time. Participants were also assured about confidentiality of the information obtained in the course of the study by not using personal identifiers and analyzing the data in aggregates. Concerning the in-depth interviews, interviews were recorded on digital voice recorder after interviewees gave informed consent. The name of the interviewees and the health facility in which they work were not included in data analysis, and interviewees were assured that the information they provide is only to be handled by the researcher and that it will not be discussed with the health facility administrators or other study participants.

4.12. Dissemination plan

Finding of this study will be presented to Jimma University academic staff and students as part of theses defense. Copies of the study will be available at college of health sciences, school of Pharmacy, dean office, Jimma zone health bureau and at public health facilities included in the study. Effort will be made to present the findings in local and international conferences and the findings will be published in reputable local or international journal to make it accessible to a wider audience.

4.13. Definition of terms

4.13.1. Generic definition

Supply: quantity of goods and services that a producer is willing and able to produce for market transaction at a given price in a given time period

Procurement: acquisition of goods and/or services at the best possible total cost of ownership, in the right quality and quantity, at the right time, in the right place and from the right source for the direct benefit or use of corporations, individuals, or even governments

Pharmaceuticals: Also referred to as medicine, medication or medicament, can be defined as any chemical substance intended for use in the medical diagnosis, cure, treatment, or prevention of disease.

Product: This is anything acquired either as tangible or intangible which closely meets the requirements of a particular need and yield enough satisfaction to justify its continued existence.

Lead time is the length of time between placing an order and receiving the items

Inconsistent supply of essential drug: Drug supplies to health facilities below minimum WHO availability index of the facilities. It is a change in the drug supply that has the potential to compromise patient care.

Consistency supply of essential drug: drug supply to the health facilities in regularly base all over the time in a good quality and sufficiently.

Health Facilities: public hospitals found in Jimma zone who receive pharmaceuticals from EPSA.

4.13.2 Operational definition:

Availability: Selected essential medicine in the health facility providing the service with adequate amount on the day of visit in the store.

High means $\geq 80\%$, fairly high means 50% to 80%, Low means 30%–49%, Very low means $< 30\%$.

Revolving drug fund medicine: those selected essential medicine purchased from the supplier by the revenue generated of drug from the sale of drug to the patient.

CHAPTER 5: RESULTS

5.1 Availability of essential medicines

Amongst key essential medicine included in the study, on the day of visit, as per WHO classification, availability of antibiotic medicines, Anti-Helment, Anti-protozoa, Muscle relaxant, Bronco dilator, IV fluids, Anesthesia and Analgesic were high (80%) in hospitals and fairly high (50-80%) at health center while supplement and Amoxicillin 250mg/5ml were fairly high in hospitals and low rate at health centers (Table 5.1).

Category	List of medicines	Availability on the day of the visit		
		Hospitals N=5 (%)	Health centers N=14(%)	Average availability N=19(%)
Antibiotic	Amoxicillin 500mg caps	5(100)	11(79)	16(89)
	Amoxicillin 250mg caps	5(100)	7(55)	12(77)
	Amoxicillin 250mg/5ml	4(75)	5(41)	9(58)
	Ciprofloxacilline 500mg tab	5(100)	10(72)	15(86)
	Tetracycline eye ointment	5(100)	10(72)	15(86)
Anti-Helment	Mebendazole 100mg	5(100)	9(70)	14(85)
	Mebendazole suspension	5(100)	9(70)	14(85)
	Albendazole 240 tablet	5(100)	10(72)	15(86)
	Albendazole suspension	5(100)	7(55)	12(77)
Anti-protozoa	Metronidazole 250mg	5(100)	9(70)	14(85)
	Metrindazole 125mg/5ml	5(100)	9(70)	14(85)
Muscle relaxant	Adrenaline injection	5(100)	9(70)	14(85)
Bronco dilator	Aminophylline injection	5(100)	11(79)	16(89)
Supplement	Glucose 40%	4(75)	6(43)	10(59)
IV fluids	Dextrose in normal saline	5(100)	9(70)	14(85)
	Ringer lactate	5(100)	10(73)	15(86)
Anesthesia	Lidocaine 1% injection	5(100)	9(70)	14(85)
Analgesic	Paracetamol 125mg/5ml syrup	5(100)	10(72)	15(86)
	Paracetamol 125 mg suppository	5(100)	11(79)	16(89)
	Paracetamol 500 mg tablet	5(100)	10(72)	15(86)

5.1. Facility level availability of key essential medicines in public health facilities of the Jimma Zone, 2020.

5.2 Stock out rates for the essential medicine

Prior to the study, in the past six months, stock out of one or more key essential medication occurred at all public health facilities included in the study. The most frequent stock out essential medicine in both hospital and health center was Amoxicillin 250mg/5ml and Glucose 40% with a mean frequency of 1.0 and 1.1 respectively. The duration of stock out was longer for Amoxicillin 250mg/5ml (45 days) and Glucose 40% (102 days) in health center. In hospital, Glucose 40% was out of stock for about 48 days. The mean stock-out duration was 3.94 days in hospitals and 22.05 days at health centers (Table 5.2)

List of medicines	Days of stock out rates in the past 6 month			
	Hospitals		Health center	
	Days	Mean	Days	Mean
Amoxicillin 500mg caps	0.0	1.0	4	1.0
Amoxicillin 250mg caps	0.0	1.0	45	1.1
Amoxicillin 250mg/5ml	30	1.0	60	1.1
Ciprofloxacin 500mg tab	0.0	1.0	21	1.1
Tetracycline eye ointment	0.0	1.0	12	1.1
Mebendazole 100mg	0.0	1.0	18	1.1
Mebendazole suspension	0.0	1.0	28	1.1
Albendazole 240 tablet	0.0	1.0	15	1.1
Albendazole suspension	0.0	1.0	15	1.1
Metronidazole 250mg	0.0	1.0	17	1.1
Metronidazole 125mg/5ml	0.0	1.0	12	1.1
Adrenaline injection	0.0	1.0	14	1.1
Aminophylline injection	0.0	1.0	22	1.1
Glucose 40%	45	1.1	102	1.8
Dextrose in normal saline	0.0	1.0	8	1.0
Ringer lactate	0.0	1.0	4	1.0
Lidocaine 1% injection	0.0	1.0	10	1.0
Paracetamol 125mg/5ml syrup	0.0	1.0	5	1.0
Paracetamol 125 mg suppository	0	1.0	7	1.0
Total	75	---	419	--
Average	3.94	---	22.05	---

Table 5.2. Stock out status for key essential medicines in public health facilities of the Jimma Zone, 2020.

5.3. Availability related factors

5.3.1 Selection, quantification and forecast related factors

Regarding selection, quantification, and forecasting, pharmacy professionals were filled the questioners prepared to collect the information. Based on the response found from these professionals, they indicated influencing factor like less participation of drug therapeutics committee in selection and quantification of these medicines. 34% of health facilities included in the study have active participation of DTC in the process. This caused preference of well know medicines than pattern of prevalent disease in the area where the facility resides. However, after procurement many of them suggest the inclusion of some essential medicines excluded in the procurement process.

84.2% of the health facilities included in the study had a national key essential medicine list. Of these facilities, all of them had their own medicine list adopted based on the national guideline. The list includes all key essential RDF medicines. 84.2% and 15.8% of public health facilities, drug and therapeutics committee and pharmacy department performed the adoption and selection of key essential revolving drug medicines respectively.

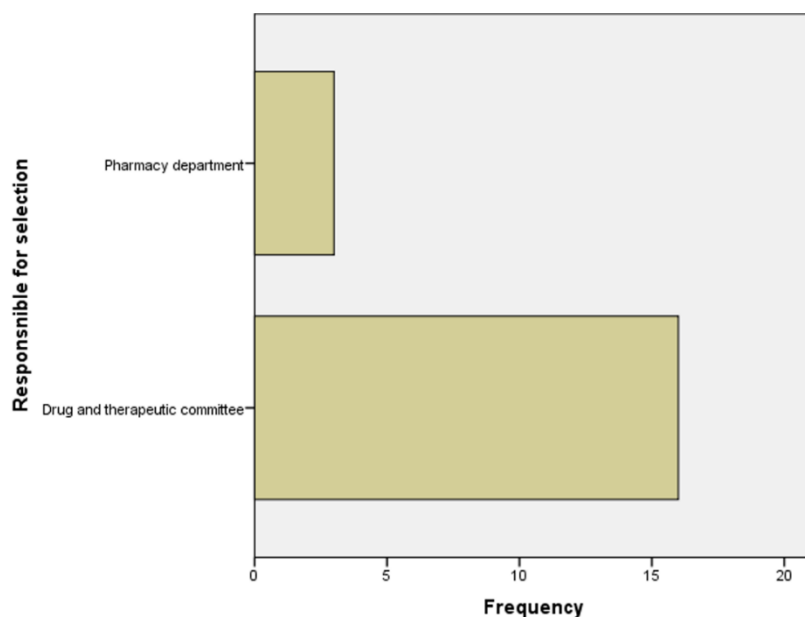


Figure 5.1: Responsible body for selection of key RDF medicines at selected public health facilities of Jimma zone, 2020.

In preparing the key essential list, even though pattern of prevalent disease, efficacy and safety, cost of the drugs, preference for well-known drugs and adopt from the national essential medicine list are considered as a major criteria, preference of well know drugs and pattern of prevalent disease in the areas considered as a major selection criteria. Having this, sixteen heath facilities considered pattern of prevalent disease whereas three of them considered preference of well know drugs as a major selection criteria.

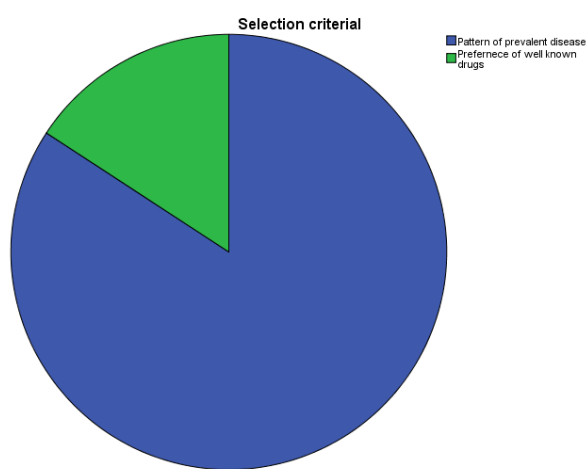


Figure 5.2: Criteria for selection of key RDF medicines at selected public health facilities of Jimma zone, 2020

5.3.2 Procurement related factors

Procurement planning and ordering of key essential revolving drug medicine is responsibility of pharmacy head in 63% of the health facilities, 15.8% head of the facility and 21.2% drug therapeutics committee respectively. 94.7% of health facilities reported to have pharmacist as a member of the tender committee. All health facilities determine the resupply/order quantity of the products by themselves where 94.7% of them were using a consumption based formula to determine the quantity to order.

Based on stock availability of the ordered product at EPSA Jimma hub, the lead-time between ordering and receiving key essential RDF takes less than two weeks for 63.2% of the facilities and from 2-4 weeks for 36.8% public health facilities. According to respondents from all public health facilities included in the study, procurement of key essential RDF medicines were ordered and received by their generic name.

5.3.3 Storage space and inventory management practice related factors

Most of the health facilities have a guideline or established policy for maximum and minimum stock level to be maintain. Whereas, 73.7% of public health facilities practice inventory control guidelines for determining minimum and maximum key essential stock level. This stock level were being reviewed periodically at 94.7% of health facilities and 90.5% of them applied first-to-expire, first-out (FEFO) inventory control procedure while storing and issuing their stock. 68.4% of public health facilities found to have a written guideline for storage and handling of key essential medicines and all these facilities conducted physical inventory of medicines at least once in year. 94.7% of public facilities reported undertaking visual inspection of medicines.

Based on the data acquired from respondents, 63.2% of the facilities reported that, there is an adequate storage capacity for the facilities to handle currently available medicines and 47.4% of the facilities mentioned having a storage capacity that can handle all the quantities needed to ensure that no stock out occur at any time of the year. Written procedures or guidelines for disposing damaged and expired products were available at 84.2% public health facilities. However, only at 47.2% of them disposes damaged and expired products according to the guideline.

Majority of public health facilities were equipped with a functioning refrigerator.78.9% of the facilities refrigerators were located away from surrounding object and the temperature chart was up-to-date only in 21.1% of the facilities. Most of the health facilities have a guideline or established policy for maximum and minimum stock level to be maintain. Whereas only 73.7% of public health facilities practice inventory control guidelines for determining minimum and maximum key essential RDF stock level. This stock level were being reviewed periodically at 94.7% of health facilities and 90.5% of them applied first-to-expire, first-out (FEFO) inventory control procedure while storing and issuing their stock.

5.3.4 LMIS related factors

Classical bin card registration were in use at all health facilities included in the study from which 78.9% of them maintains quantities of key essential medicines received, issued and balance at hand after each transaction using stock card. On top of this, on the day of visit at aforementioned health facilities, in addition to bin card and stock card 67.2% of health facilities were using automated system to manage key essential medicines.

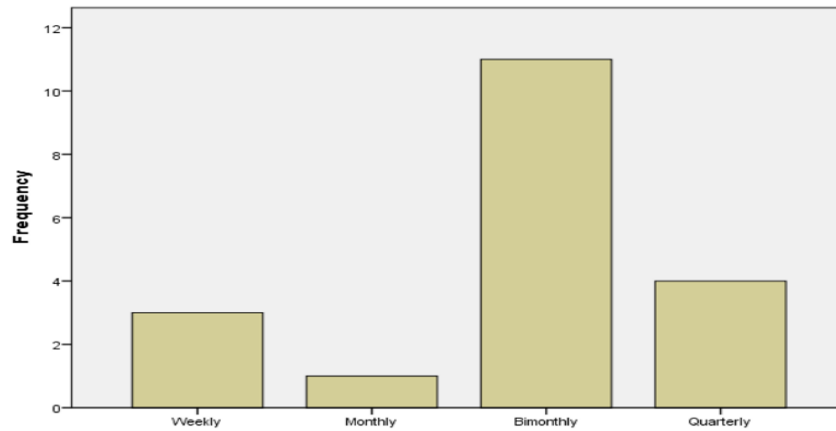


Figure 5.3: Duration between ordering & receiving key essential medicines at selected public health facilities of Jimma zone, 2020

On the day of visit, 63.2% health facilities in Jimma zone reported that, they have made their last order in the interval of two month, 26.3 of them in less than a month and 10.5 made their last order three month ago.

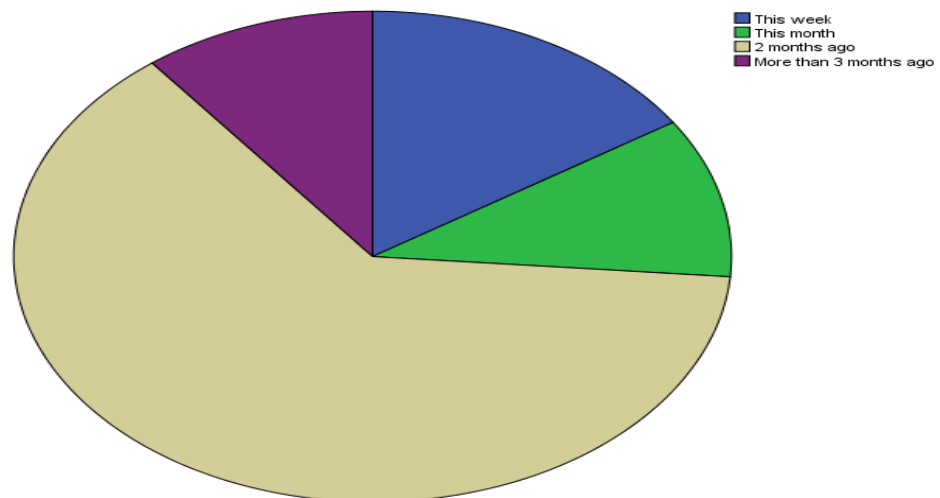


Figure 5.4: The last time RRF sent for key essential medicine to EPISA Jimma hub for the selected public health facilities of Jimma zone, 2020

78.9% of respondents in charge of the logistic activities in selected health facilities indicated that, learnt management and operation of integrated pharmaceutical logistics system from a formal training while 21.1% of them gained the knowledge from on the job training.

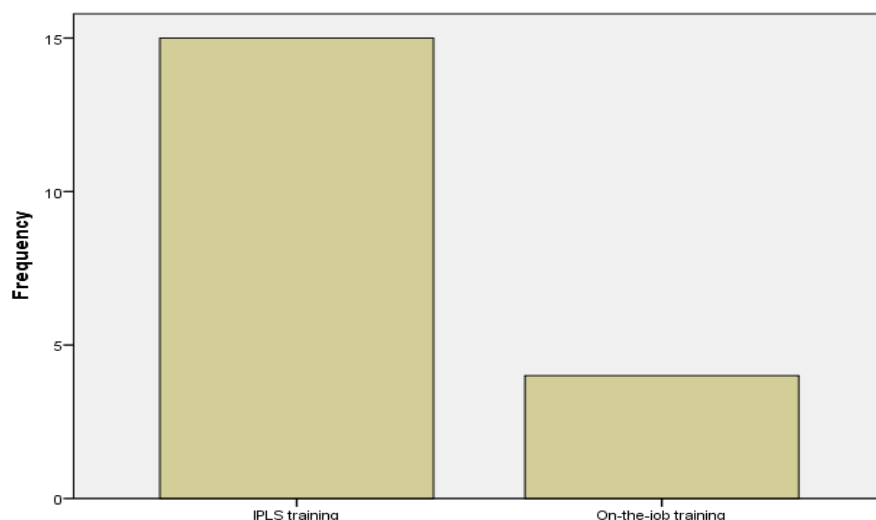


Figure 5.5: Modality of IPLS knowledge gained at selected public health facilities of Jimma zone, 2020

5.4. Inferential Statistical Analysis

Fisher exact test were performed to determine the main factors for the availability of key essential medicines. As shown in the table below, there is an association between availability of essential medicine with respect to availability of facility level essential medicine adopted from national essential medicinal list as a selection criteria ($p=0.020$). Facility level determination of resupply quantity ($p = 0.035$) and lead time between order and supply of the medicines ($p = 0.046$) also shown association with availability of key essential medicines. In addition to this, stock and inventory information ($p = 0.05$) shown an association with the availability. On top of the aforementioned associations, storing and issuing stock according to first-to-expire, first-out ($p = 0.018$) and storage space and practice ($p = 0.040$) shown a strong association with regard to availability of essential medicines (table 5.3)

Variable		Fisher exact test	p-value
Selection	Is there any documented policy or guideline for medicine selection?	8.339	0.020*
	How often is the policy document revised?	2.040	0.809
	Does the health facility have its own essential medicine list (formulary)?	3.092	0.538
	Are key essential RDF medicines included in the list (if partially included list on the comment section)	2.851	0.482
	Is there a national essential medicine list available in the health facility?	7.128	0.773
	Who performs the selection of key essential RDF medicines in your facility?	6.096	0.871
Procurement	Who is responsible for procurement planning and ordering of the pharmaceuticals?	15.545	0.095
	Does the tender committee of the health facility have a pharmacist as a member?	2.176	0.533
	Who determines this facility's resupply quantities?	7.122	0.035
	How are the facility's resupply/order quantities determined?	4.741	0.686
	On average, approximately how long does it take between ordering and receiving key essential RDF medicines from EPSA?	12.979	0.046*
	Is procurement done by generic name? If not for all, specify the name of products procured by brand name)	0.653	1.00
LMIS and Inventory Control Procedures	Do you use the following stock keeping logistics forms to manage key essential RDF medicines in this facility?		
	Stock cards	1.713	0.814
	Bin card	0.653	1.00
	Inventory control card	3.677	0.342
	What LMIS forms do you use for reporting/ordering?	4.448	0.198
	Do LMIS report forms include the following?	4.925	0.125
	Is the information system automated?	0.653	1.00
	How often these are LMIS reports sent to the higher level for products integrated in IPLS?	2.996	0.449
	When was the last time you sent an order/report for key essential RDF medicines at this facility?	13.226	0.756
	How did you learn to complete the forms/records used at this facility	16.307	0.044*
	What form do you use for receiving key essential RDF medicines from suppliers?	5.053	0.664
	What form do dispensary units use to request key essential RDF medicines from store?	3.092	0.538

	Are there guidelines and established policies for maximum and minimum stock levels that should be maintained?	2.541	0.393
	Are the inventory control guidelines for products applied and stock levels generally fall between maximum and minimum	2.281	0.678
	Are stock levels (maximum and minimum) for products reviewed periodically?	1.405	1.00
	Does the health facility have a policy of storing and issuing stock according to first-to-expire, first-out (FEFO) inventory control procedures?	10.086	0.018*
Storage practice	Does the facility have written guidelines for storage and handling of all products?	1.405	1.00
	Does the health facility conduct at least one physical inventory of all products annually?	6.683	00.05*
	Is the existing storage capacity adequate to handle the current quantities of products?	2.542	00.417
	Can the existing storage capacity handle all the quantities needed to ensure that no stock outs occur?	2.040	0.040*
	Are visual inspections of products conducted at the storage facility?	4.926	0.125
	Are there written procedures or guidelines for disposing damaged and expired products?	1.229	0.897
	In practice, are damaged and expired products disposed according to the disposal guidelines?	4.624	0.197

Table 5.3 Fisher exact test for predictors of availability of essential medicines at selected health facilities of Jimma zone, 2020

Key: * Variables which showed association with availability of key essential medicines

5.5 Qualitative result

In-depth interview were conducted at all public health facilities included in the study. Pharmacy head and storage managers were key informants of this information. Both responsible personnel clearly indicated challenges on availability of essential medicines. From the in-depth interviews, four major themes related to availability of medicines were identified, i.e., forecast and selection, procurement process, storage condition and capacity related challenges.

5.5.1 Forecasting and selection related challenges

At some public health facilities included in the study were facing difficulties in the selection of key essential medicines. From the discussion with the key informants, majority of respondents said that:

“In some cases we use procurement list than key essential medicines adopted from national guideline published by federal ministry of health (FMoH) resulting a challenge on proper forecasting and selection of these medicines to be available in a less adequate manner”

Even though all key informants agree on the importance and presence of pharmacist in the DTC during selection process of these medicines, informants responded that:

"DTC members mostly do not attend DTC meetings. However, after procurement many of them suggest the inclusion of some essential medicines excluded in the procurement procedure causing shortage of availability of these medicines

On top of the aforementioned challenges, key informants also indicted that:

“At times un availability of these essential medicines at Ethiopian pharmaceutical supply agency Jimma hub negatively affect the selection practice as well”

The informants also recommended that *“DTC member to strictly attend meetings and forward expected recommendation while making selection”*.

Regarding forecasting, informants identified that, frequent stock out of Key essential RDF medicines affected the accuracy of forecasting. While explaining this, some of key informants responded:

“When you are stock out, you don’t serve your clients, and therefore you don’t get the actual consumption data at the end so that the forecasting will be biased”

5.5.2 Procurement related challenges

At public health facilities included in the study, consumption based procurement planning and ordering of essential medicine is a responsibility of pharmacy head. While planning and ordering for procurement, stock out at EPSA Jimma hub considered as a major challenge by most of public health facilities. If EPSA Jimma hub is out of stock for these products, key informants mentioned that, lengthy and bureaucratic bid process to procure medicines from private wholesalers is very challenging.

Most of key informants from public health facilities included in the study agreed that, direct procurement and credit service from EPSA Jimma hub reduced procurement burden. Though financial settlement for the credit service has its own challenge. In addition to this, EPSA Jimma hub receives order at any time and recommend health facilities to collect procured products on the fixed schedule. According to some key informants, EPSA Jimma hub provides key essential medicines that has short expiry date. As a result, the health facilities purchase quantity less than what was planned to be procured.

As one of key informant responded:

"EPSA Jimma hub offers you to purchase some drugs that have only 2 or 3 months of expiry date. If you refuse to purchase, they will not give you a permit to purchase from private suppliers. If you purchase that, it may expire before it is consumed."

The main issue which has been raised by multiple key informants was that not all needed essential medicines were available at EPSA Jimma hub which caused diverse problems in the procurement process.

As one of key informant responded:

“Since EPSA Jimma hub usually does not provide drugs adequately, we are forced to purchase drugs continuously. We don't purchase key essential medicines for two or three months of stock.”

Even if essential medicines are available at EPSA Jimma hub, there are times that the hub did not provide medicines in a quantity that each health facilities needed. Majority of key informants mentioned that, they could not procure key essential medicines in the summer season due to the hub in Jimma will remain close for the annual physical inventory.

Based on the information acquired from key respondents, if essential medicines are out of stock at the hub, they procure medicines from private suppliers by competitive bid approach. The competitive approach requires out of stock clearance from the hub and a minimum of three competitive supplier are expected to bid. Sometimes, getting the clearance takes time which increases lead-time. According to some key informants,

“In case if there are only two bidders in the bid process, as the rule says, you must wait until the third bidder is available. Therefore, this also increase lead time of the supply.”

In some cases, even after the bid winner had been announced, there were situation where the winner delay or even not make the delivery. Inadequate quality of customer service at both the hub and private supplier can also be considered as a major procurement challenge.

Explaining this one KI said that:

“Multiple health facilities submit their purchase request many of the health facilities procure EPSA Jimma hub almost at similar time, there will be multiple requests that will not be easily manageable. For this reason, employees from the hub side gives you frequent appointment to collect the medicines” Therefore, this created customers dissatisfaction.

5.5.3 Storage related challenges

Storage space was identified as a major challenge especially at public health facilities under category two and three Woreda(s). (Woreda(s) are categorized in to three based on access to basic facility). Majority of key informants responded that, storage space and facilities are a determinant on storage condition while other key informants responded that, adequate storage spaces facilitates proper storage practice of key essential medicines.

Summary of responses from KI:

"We are using a building room which was not properly constructed and facilitated for pharmaceutical store. For this reason, different pharmaceutical products are piled and stocked one over the other. Therefore, we are not even able to practice FEFO methods. Even though it's recommended to keep clean medical stores, due to the small size of the store room, we are not able to keep clean the store. Due to cleanness issues, sometime you might even see products damaged by rats"

As some key informants responded, on top of the inadequate storage space and facility, program drugs that had been supplied to the public health facilities on push base worsen the problem. Moreover, some respondents mentioned that expired products, most of which were program drugs tied up the spaces available for the usable stocks.

To improve the storage condition and facility, some key informants recommended that pharmaceutical stores should be reconstructed according to standards, minimizing push delivery of program medicines, frequent disposal of expired medicines and well-trained and dedicated janitors who keeps the store clean.

5.5.4 Capacity related challenges

Potential training and capacity building topics that will impact and improve planning, consistent supply, logistics management practice of essential medicines and service delivery were suggested by key informant includes and not limited to store management and health commodity management information system (HCMIS).

key informant suggested that: *"training that will improve forecasting and selection, awareness on procurement procedure and legislation, logistics management practice, store management and health commodity management information system will improve service delivery at the facility level"*

Majority of key informant responded that, supportive supervision and close follow up would have an impact on consistent supply and availability of essential RDF medicines. They also indicated that, the supportive supervision would have positive impact in identifying strength and weakness, so that pharmaceutical professionals and other stakeholders will collaborate in overcoming weaknesses to deliver a minimum standard service. In the other side, some key informant suggested that,

“Supportive supervision without consistent supply and availability of essential medicine will not have an impact”

CHAPTER 6: DISCUSSION

According to the WHO, essential medicines are priority health care needs and are expected to be available at all times within a functioning health care system in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price, the individual and the community can afford [1, 2, 3]. Improving the availability and affordability of essential medicines is one of the most important objectives for any national medicines' policies. Poor availability and less affordability of essential medicines remains a major public health problem for the majority of the population in most parts of the world. This study revealed availability of essential medicines in those selected public health facilities.

At the facility level, it is clear that a strong supply chain system, proper stock management system and qualified staff will improve consistent supply and availability of key essential medicine. In order to ensure availability of essential medicines, proper pharmaceutical logistics and management approaches must be in place.

Accord to the finding of this study, It was found that the overall availability of selected essential medicines was high (> 80 %) at hospitals and fairly high at health center (50-80%) at health center with the exception of exception of Amoxicillin 250mg/5ml and Glucose 40%. Amoxicillin 250mg/5ml and glucose 40% were fairly high in hospitals and low rate at health centers. The low availability of these two medicines affects the patients who cannot afford to buy the medicines from private pharmaceutical stores so it needs investigation.

Availability of drugs largely influence service delivery quality of the facility and client's satisfaction. In this study, it was found that average availability of key essential medicines at public health facilities of Jimma zone lies between the ranges of high and fairly high with the exception of Amoxicillin 250mg/5ml and Glucose 40%. This is in line with the study conducted in Sri-Lanka (84%) [48]. However, it deviated from the study finding conducted in rural areas of Hubei Province of China (44.4%) [47]. this might be due to the difference in the type of facilities included in the china study, where private facilities were also considered.

Similar to a finding obtained in from a study conducted in eastern Ethiopia [50], in some cases, there was a variation in the availability of specific medicines with different dosage

and formulation. Amoxicillin 250mg/5ml, which was available in nine health facilities, can be a good example. In this regard, the study also revealed that, the low availability of antibiotic medicines (Amoxicillin 250mg/5ml) is due to the irregularity and less availability of the product at the supplier level.

Antibiotic, anti-helment, anti-protozoa, Muscle relaxant, Bronco dilator, Supplement, Intra Venus fluid, Anesthesia and Analgesic medicines are reasonably available at public hospitals as compared to health centers included in the study. However, availability of Amoxicillin 250mg/5ml and Glucose 40% at both hospital and health center are being threatened without the impacted of the level of the facility.

From the in-depth interviews, the majority of health facilities did not give attention to the drug therapeutics committee resulting poor forecasting and selection, and maximum lead time between ordering and receiving these medicines. Thus, they use procurement list. This resulted, the less availability of key essential medicines at the facility level.

Prior to the study, in the past six months, stock out of one or more essential medication occurred at all public health facilities included in the study. The most frequent stock out essential medicine in both hospital and health center was Amoxicillin 250mg/5ml and Glucose 40% with a mean frequency of 1.0 and 1.1 respectively. The duration of stock out was longer for Amoxicillin 250mg/5ml (45 days) and Glucose 40% (102 days) in health center. In hospital, Glucose 40% was out of stock for about 45 days. However, essential medicines included in this study were out of stock for longer period as compared to those in the study conducted in Hubei Province of China wherein the stock-out duration was 26.4 days [47]. The possible reason could be the difference in the economic category of these two counties, difference in lead time between ordering and receiving the medicines, access to basic facilities and length of time under consideration to review logistic records.

Amoxicillin 500mg caps, Amoxicillin 250mg caps, Amoxicillin 250mg/5ml, Amoxicillin 1250mg/5ml, Ciprofloxacin 500mg tablet, and Tetracycline eye ointment were available in 91.87%, 64.27%, 47.92%, 81.32%, 89.37%, and 84.34% of public health facilities respectively. The low availability of Amoxicillin 250mg/5ml is due to the irregularity and less availability of the product both in public and private suppliers.

Antibiotic medicines are consistent and available at public hospitals as compared to health centers included in the study. However, consistency and availability of Antibiotic are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Mebendazole 100mg, Mebendazole suspension, Albendazole 240 tablet and Albendazole suspension were available at 79.21%, 81.43%, 83.74%, and 63.91% of public health facilities respectively. The better availability of anti-helment is due to better knowledge and awareness of the professionals.

As indicated in antibiotic medication, Anti-helment medicines are also consistent and available at public hospitals as compared to health centers included in the study. However, consistency and availability of Anti-helment are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Metrindazole 250mg and Metrindazole 125mg/5 ml were available at 81.74% and 81.74% of public health facilities respectively. As indicated in anti-helment medication, Anti-protozoa medicines are also consistent and available at public hospitals as compared to health centers included in the study. However, consistency and availability of Anti-protozoa are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Adrenaline injection were available at 79.23% of public health facilities. As indicated in Anti-protozoa, muscle relaxant are also consistent and available at public hospitals as compared to health centers included in the study. However, consistency and availability of muscle relaxant are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Aminophylline injection were available at 92.12% of health facilities included in the study. As indicated in muscle relaxant, bronco dilators are also consistent and available at public hospitals as compared to health centers included in the study. However, consistency and availability of bronco dilators are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Glucose 40% were available only at 49.67% of public health facilities included in the study, which is less than the average. As compared to health centers, Glucose 40% were available at public hospitals. However, consistency and availability of supplement are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Dextrose in normal saline and Ringer lactate were available at 81.97% and 84.12% of public health facilities respectively. As compared to health centers, intra Venous medications were available at public hospitals. However, consistency and availability of intra Venous medications are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Lidocaine 1% injection were available at 79.34% of public health facilities included in the study. As compared to health centers, anesthesia were available at public hospitals. However, consistency and availability of anesthesia are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability of these medications is being impacted by the level of health facility (hospital and health center).

Paracetamol 125mg/5ml syrup, Paracetamol 125 mg suppository and Paracetamol 500 mg tablet were available at 83.64%, 83.67% and 84.98% respectively. As compared to health centers, analgesic were available at public hospitals. However, consistency and availability of analgesic are not questionable at any level of health facilities; this group of medicines are available at public hospitals in a good rate. This might show that, consistency and availability

of these medications is being impacted by the level of health facility (hospital and health center).

In addition to this, the key informants stated that, unclear and improper forecasting and selection, lengthy procurement process, unstandardized storage condition and shortage of skilled human power affected the proper availability of these medicine at the facility level. Therefore, In order to ensure availability of essential medicines, proper pharmaceutical logistics and management system, proper forecasting and selection, strong supply chain system, proper stock management system, adequate and proper storage space, and recruiting qualified staff will improve availability of essential medicine.

CHAPTER 7: CONCLUSION AND RECOMMENDATION

7.1 Conclusion

In general, on the day of visit, the overall availability of essential medicine were high at hospitals and fairly high at health centers. However, Amoxicillin 250mg/5ml and Glucose 40% were available at fairly high rate at the hospital and low at health center. As these medicines are essential medicines, their absence largely influence quality of service delivery and client's satisfaction. The main reason for unavailability of these medicines are irregularity and less availability of the product at the supplier level. Key informants also reported that, access to basic infrastructure, distance of public health facilities from EPSA Jimma hub, lack of commitment from the drug therapeutics committee, inappropriate forecasting and selection procedure, lead time between order and supply of the medicines, and unstandardized storage condition and gap in capacity of pharmaceutical professionals were the main challenges.

7.2 Recommendation

According to the research findings, Jimma zone health bureau should work on capacity building activities focused on logistics management in collaboration with different stakeholders. Zonal health bureau and Woreda level health offices should improve supportive supervision (SS). EPSA Jimma hub should improve availability of essential medicines. Public procurement agency should revise the directive on public procurement of goods. Future surveys and policy interventions focusing on the supplier side should be conducted. Pharmaceutical Storage space should be built or constructed as per the standards.

CHAPTER 8:

8.1. Strength and Limitation of the study

The result only aims to give impression of the availability of essential medicine in Jimma zone and it's not intended to give representative picture of the situation in the Oromia region. Representative sample from each category of public health facility were included. It includes representative sample of city administration and different Woreda. The study focused on key essential medicines only. Lack of similar studies conducted in similar settings. Finding of this study were only from public health facility perspective and doesn't include private health facilities.

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ANNEXS:

ANNEXS I: QUESTIONNAIRE:

JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES SCHOOL OF GRADUATE STUDIES DEPARTMENT OF PHARMACY INFORMATION SHEET AND CONSENT FORM

My Name is Emebet Tesfaye. As a postgraduate student at Jimma University School of pharmacy graduate program in pharmaceutical supply chain management, currently, I and my supervisor are undertaking a research study entitled “Assessment in consistent supply of key essential fund medicine at Jimma zone public health facilities”. The main Objective of the study is to assess and reveal consistence supply of key essential fund medicine at selected public health facilities in Jimma zone.

I would like to ask you some questions about key essential RDF medicines procurement process and availability in your health facility by using indicator-based logistic information assessment tool and logistic indicator assessment tools. The purpose of visiting this health facility is to assess the stock status and procurement process of key essential RDF medicines in your health facility. The result of this study is expected to identify the major gaps in the availability of key essential RDF medicines. After I get your consent, my colleague and I will collect the data confidentially. Moreover, I would like to visit the storage areas to count the products you have in stock today, the last six months, and observe the general storage conditions.

Since you involve in this study, I will take 20– 30 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 supply chain management system for these medicines. This assessment 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 each question. You have the full right to refuse your participation in the study. But I encourage your full participation

as the answers you give on this form and your participation are very important to this study.

Would you be willing to participate in this study?

Interview accepted. If the interviewee responds “Yes”, please sign and proceed.

If you have any questions concerning the study, please call for principal investigator Emebet Tesfaye, 0913953097 (MSc Candidate in PSCM), JU, institute of health, school of pharmacy.

Signature of respondent -----

Signature of the interviewer -----

Date: _____ (Day/month/year)

Thanks very much for your participation

ANNEX II. CONSENT FORM

I am informed fully in the language and I understand about the aim of the above-mentioned research. I understood the purpose of the study entitled “Assessment on Consistency of Key Essential RDF Medicines in Public Health Facilities in Jimma Zone”. I have also read the information sheet or it has been read to me. In addition, I have been told all the information collected throughout the research process will be kept confidential. I _____, after being fully informed about the detail of this study, hereby gave my consent to participate in this study and approve my agreement with signature.

Participant Name _____ signature _____ Date _____

Investigator name _____ signature _____ Date _____

Informed consent form for qualitative study

I am a postgraduate student in PSCM at Jimma University, and I am conducting a thesis on Assessment on Consistent Supply of Key Essential RDF Medicines in Public Health Facilities in Jimma Zone. I would like to ask you some questions about consistency supply of key essential RDF medicines. Therefore, this research can use to assess the current supply of key essential RDF medicines in public health facilities. Thus, it will provide input for future improvement in consistent supply of key essential RDF medicines.

All response will be kept confidential, and we will ensure that any information we include in our report does not expose to others. 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 to inquiries as appropriate and then ask the question.

የመረጃ ወረቀት

እኔ ስሜ እመቤት ተስፋዬ ይባላል ። የመጣሁት ከጅም ዩኒቨርሲቲ ፋርማሲ ት/ት ክፍል ነው ። በአሁኑ ሰዓት እኔ እና አማካሪዬ በጂማ ዞን በተመረጡ የህዝብ ጤና ተቋማት ውስጥ በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት መኖር አለመኖሩን ለመገምገም የምርምር ስራ በማከናወን ላይ ነን። ይህንን ጥናት የማድረገው የ ማስተርስ (MSc) ፕሮግራም የመድኃኒት አቅርቦት ሰንሰለት አስተዳደር (PSCM) መመርቂያ እንዲሆነኝ በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት መኖር አለመኖሩን ግምገማ ላይ ጥናት ለማድረግ ነው ። በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት መኖር አለመኖሩን ለመገምገም አንዳንድ ጥያቄዎችን ልጠይቅዎት እፈልጋለሁ። በአመልካች-ተኮር የመደሀኒት ማኔጅመንት አፈፃፀም መሳሪያዎችን በመጠቀም በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት መኖር አለመኖሩን አንዳንድ ጥያቄዎችን መጠየቅ እፈልጋለሁ ።

ይህንን የጤና ተቋም የመጎብኘት ዓላማ በዚህ ተቋም ውስጥ የመድሀኒት ሁኔታን ፣ በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት መኖር አለመኖሩን ለመገምገም እና የበለጠ መረጃ ለመሰብሰብ ነው ። ተቋማቱ ውስጥ ያለው አፈፃፀም እና አፈፃፀሙ የዚህ ጥናት ውጤት በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት ዋና ዋና ክፍተቶችን ለመለየት የታሰበ ሲሆን የ መድኃኒቶች ቋሚ አቅርቦት መኖሩን ለማረጋገጥ የሚረዱ መፍትሄዎችን ያስገኛል ። እኔ የእርስዎን ስምምነት ከደረስኩ በኋላ እኔና የሥራ ባልደረባዬ የሚሰጡንን መረጃ ሚስጥሩ የተጠበቀ እንዲሆን እናደርጋለን። በተጨማሪም ፣ የ ዛሬን እና ያለፉትን ስድስት ወራት መድሀኒቶችን ለመቁጠር የማጠራቀሚያ ቦታዎችን(የ መድሀኒት መጋዘን) መጎብኘት እፈልጋለሁ እና አጠቃላይ የማጠራቀሚያ ሁኔታዎችን የሚመለከት መረጃ እሰበስባለሁ።

በዚህ ጥናት ውስጥ ተሳታፊ ስለሆኑ ፣ ጊዜዎን ከ 20 እስከ 30 ደቂቃዎችን እወስዳለሁ ። ነገርግን ይህ ጥናት ምንም አይነት ጥቅም ጥቀም የለውም ። በዚህ ጥናት ውስጥ በመሳተፍ አሁን ምንም ዓይነት ክፍያ ወይም ጥቅም አያገኙ ይሆናል ። ነገር ግን የግምገማው ውጤት ለእነዚህ መድኃኒቶች ያልተቆራረጠ የመደሀኒትአቅርቦት እንዲኖር የውሳኔ ሃሳቦችን ለማጎልበት እና የአቅድ ማሻሻል መረጃን ይሰጣል ። ይህ ግምገማ የተቆጣጠሪ ጉብኝት አይደለም ፣ እናም የግለሰቦች የሰራተኞች የስራ አፈፃፀም እየተገመገመ አይደለም። እኛ ማንኛውንም የግል መለያዎችን አንወስድም። የተሰበሰበው መረጃ ምንም ዓይነት የግል የማድረግ ችሎታ ሳያደርግ በጠቅላላው ይተነትናል ። ምንም ዓይነት ያለመመቻት ወይም ጥርጣሬ ከተሰማዎት በማንኛውም ጊዜ ከጥናቱ መውጣት ይችላሉ። ከዚህ በተጨማሪም እያንዳንዱን ጥያቄ የመመለስ ግዴታ የለብዎትም። በጥናቱ ውስጥ ያለዎትን ተሳትፎ መቃወም ሙሉ መብት አልዎት ፣ ነገር ግን በዚህ ቅጽ ላይ የሚሰጡዎቸውን መልሶች እና የእርስዎ ተሳትፎ ለዚህ ጥናት በጣም አስፈላጊ ስለሆኑ ሙሉ ተሳትፎዎን አበረታታለሁ ። በዚህ ጥናት ውስጥ ለመሳተፍ ፈቃደኛ ነዎት?

ቃለመጠይቅ ተቀባይነት አግኝቷል- አዎ----- አላገኘም -----:: ቃለ-መጠይቁን ተጠያቂው “አዎ” ብሎ ከመለስ ፣ እባክዎ ይፈርሙ እና ይቀጥሉ። የጥናቱን ጉዳይ በተመለከተ ማንኛውም ጥያቄ ካለዎት እባክዎን ለዋና ተመራማር እመቤት ተስፋዬ ፣ በ ስልክ ቁጥር፣ 0913953097 (በ PSCM እጩ ተመራቂ) ፣ ጂማ ዩኒቨርሲቲ ፣ የጤና ኢንስቲትዩት ፣ የፋርማሲ ትምህርት ቤት ይደውሉ ።

ቃለ መጠይቁን የሚሳተፈው ሰው ፊርማ ----- የጠያቂው ፊርማ-----

ቀን: - _____ (ቀን / ወር / ዓመት)

ለተሳትፎዎ በጣም እናመሰግናለን።

ANNEX. የስምምነት ቅጽ

ከዚህ በላይ ስለተጠቀሰው ምርምር ዓላማ በተረዳሁት ቋንቋ ሙሉ መረጃ ተሰጥቶኛል ። የጥናቱን ዓላማ “ _____ ” ተረድቼያለሁ። እንዲሁም የመረጃ ወረቀቱን አንብቤያለሁ። በተጨማሪም በምርምር ሂደቱ ውስጥ የሚሰበሰቡት መረጃዎች ሁሉ በሚስጢር እንደሚጠበቁ ተነግሮኛል ። እኔ _____ የዚህ ጥናት ዝርዝር መረጃ በደንብ ስለተረዳሁ በዚህ ጥናት ውስጥ ለመሳተፍ ፍቃደኛ መሆኔን በፊርማዬ አረጋግጣለሁ ። ቃለ መጠይቁን የሚሰተፈው ሰው ፊርማ ----- የጠያቂው ፊርማ----- ቀን: - _____ (ቀን / ወር / ዓመት)

በጂማ ዩኒቨርሲቲ በፒ.ሲ.ኤም. የድህረ ምረቃ ተማሪ ነኝ እናም ጂማ ዞን በተመረጡ የህዝብ ጤና ተቋማት ውስጥ በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት መኖር አለመኖሩን ግምገማ እሰራለሁ ። ስለ በጣም አስፈላጊ የሆኑ በግዢ የሚመጡ መድሀኒቶች ቋሚ አቅርቦት መኖር አለመኖሩን ግምገማ አንዳንድ ጥያቄዎችን መጠየቅ እፈልጋለሁ ። ስለዚህ ይህ ምርምር የህዝብ ጤና ተቋማትን ያልተቆራረጠ የመደሀኒት አቅርቦት እንዲኖር የውሳኔ ሃሳቦችን ለማጎልበት እና የእቅድ ማሻሻል መረጃን ይሰጣል። ሁሉም ምላሾች በሚሰጥር ይያዛሉ ፣ በሪፖርታችን ላይ የምናካትተው ማንኛውም መረጃ ለሌሎች እንደማይጋልጥ እናረጋግጣለን ። ቃለመጠይቁን በማንኛውም ጊዜ ማቆም ይችላሉ ። መቀጠል እችላለሁን? መልስ ሰጭው ለመቀጠል ከተስማሙ ማን እንደሆነ ጥያቄ ያቅርቡ / ያሏት። ለጥያቄዎች ተገቢውን መልስ ይስጡ እና ከዚያ ጥያቄውን ይጠይቁ

Odeeffannoo qorannichaa

Anni maqaankoo Imabeet Tasfaaye jedhamaa. Kanan dhufee Yuunivarsiitii Jimmaa kutta barnootaa faarmassi irrati. Yeroo amaan kana anif barsisaanko wallin ta'udhaan bufataale fayya bulchinsaa godina jimmaati filataman kessati qoranno hala dhihessi qorichoota barbachisa bitaadhan maamiltootaaf dhihataan sakata'u dhaaf qo'anoo nigegeesinaa. Qoranno kana kan gegesinu xuumunra barnootakoo faarmaasi sadarkka digrii lamafaa illalchisee yemu ta'u. Kaayyon walii galaa qorannoo kanaa hala dhihessi qorichoota barbachisa bitaadhan maamiltootaaf bufataale fayya bulchinsaa godina jimmaati filatamanitti dhihataan sakata'u dha. Bu'aan qorannoo kanaa qooda fudhattoota tajaajila dhihessi qoriachaa sadarkaa garaa garaa irra jiraniif. Qondaaltotaa mootumaa naanno fi fedderaalaa, Ogessota dhihessi qorichaa fi Ogessota qorichaatif. Akkasumas bu'aan qorannoo kanaa maxxanfamuun namoonni biro akka dubbisaniif fi qorannoo walfakkaataa biro hojjechuuf akka ka'umsaatti akka itti fayyadaman ni taasisaa.

Duraan dursa qorannoo kana keessatti hirmaachu kessanitif galatefachaa gaaffilee hawaasummaa, hala dhihessi qorichoota barbachisa ta'aani issin gaafana. Gaaffilee hunda sirriti debisuf haalan daqiiqaa 20 hanga 30 isinitti fudhata. Qorannoo kana keessatti hirmaachuu keesanif miidhan isinira gahuu danda'u hinjiru. Qorannoo kana keessatti hirmaattaniif bu'aan kallattiin argattan jiraachu dhabu danda'a ta'a. Haataa malee deebin isin nuuf laattan hala dhihessi qorichoota barbachisa ta'anifi haanqina issan qabani addan baasun gara fuulduraatti tajaajila fooyya'iinsa qabu laachuf gargaaraa. Iccitiin keessan qorannoo kana keessatti ni eegama. Maqaan keesani fi wantootni isin ibsaa danda'an kan biroon hin barreeffaman. Qorannoo kana keessatti hirmaachuu fi hirmaachuu dhiisun guutummaan guututti mirga keesanidha. Yeroo barbaaddanittis qorannoo kana addaan kutuu ni dandeessu.

Gaaffii yoo qabaatan amma ykn booda gaafachuu ni dandeessu. Booda gaafachuu yoo barbaaddan oddefano armangaditti ibsamee irrati qunnamuu ni dandeessu.

Maqaa: Imabeet Tasfaaye Imelli: mebayee@gmail.com Lakk. Bilbila: +251913953097

Instruction

Please respond to all questions based on your own judgment, regardless of what others expect or what is socially acceptable. **Please circle or put \surd and provide answer to the open ended questions**

Part I: - Respondent Information

1. Your highest education qualification

- PHD
- MSC/MA
- BSC/BA
- Diploma
- Other(Specify)_____

2. Your job position and title _____

- Pharmacy administration
- Senior pharmacist
- Pharmacist
- Clinical pharmacy
- Druggist

3. Year of Experience

- <2
- 2-5
- 6-10
- >10

4. Gender

- Male
- Female

5. Level of hospital you are currently working for

- Primary hospital
- Referral hospital
- Medical center (higher level)

6. Your department_____

.
.

Questions for the pharmacy head

General Information

1. Number of years and months you have worked at this facility?

Year_____ Month_____

2. Number of pharmacy professionals in the health facility

A. Pharmacist _____

B. Druggist _____

C. Pharmacist (MSc)_____

D. Pharmacist (PhD)_____

3. Is supplies/stock management the primary role of the pharmacy head at this facility?

A. Yes

B. No

1. Selection

1. Is there any documented policy or guideline for medicine selection?

A. Yes

B. No

2. How often is the policy document revised.

A) Annually

B) Between 2 to 4 years

C) More than 4 years

3. Does the health facility have its own essential medicine list (formulary)?

A. Yes

B. No

4. Are key essential RDF medicines included in the list (if partially included list on the comment section)

A. Yes

B. No

Comment_____

5. Is there a national essential medicine list available in the health facility?

A. Yes

B. No

6. Who performs the selection of key essential RDF medicines in your facility?

a. Drug and therapeutic committee

b. Pharmacy department

c. Management committee

d. Other specify _____

7. What are the criteria for medicine selection in the health facility? (Circle all applies)

a. Pattern of prevalent disease b. Efficacy and safety c. Cost of the drugs d. Preference for well-known drugs e. Adopt from the national essential medicine list

f. Others (specify) _____

2. Procurement

1. Who is responsible for procurement planning and ordering of the pharmaceuticals?

a. Pharmacy head

b. Head of the health facility

c. Drug and therapeutic committee

d. Finance department

e. Other (specify) _____

2. Does the tender committee of the health facility have a pharmacist as a member?

A. Yes

B. No

3. Who determines this facility's resupply quantities? (Circle all that apply, for public health facility)

a. The facility itself

b. Higher-level facility

c. Other (specify) _____

4. How are the facility's resupply/order quantities determined?

- a. Consumption based formula (any calculation)
- b. Don't know
- c. Guess
- d. Other means _____

5. On average, approximately how long does it take between ordering and receiving key essential RDF medicines from EPSA?

- a. Less than 2 weeks
- b. 2 weeks to 1 month
- c. Between 1 and 2 months
- d. More than 2 months
- e. Other (specify) _____

6. Is procurement done by generic name? If not for all, specify the name of products procured by brand name)

- A. Yes
- B. No

3. LMIS (for public health facilities)

1. Do you use the following stock keeping logistics forms to manage key essential medicines in this facility? (Circle all that applies)

- A. Stock cards A. Yes B. No
- B. Bin card A. Yes B. No
- C. Other specify _____

2. What LMIS forms do you use for reporting/ordering?

- A. Report and requisition form A. Yes B. No

B. Other (Specify) _____

3. Do LMIS report forms include the following?

A. stock on hand A. Yes B. No

B. quantities used A. Yes B. No

C. losses and adjustments A. Yes B. No

4. Is the information system automated?

A. Yes B. No

5. How often are these LMIS reports sent to the higher level for products integrated in IPLS?

(Circle all that apply.)

A. Monthly B. Bimonthly C. Quarterly

D. Semi-annually E. Annually

F. Other (specify) _____

6. When was the last time you sent an order/report for key essential medicines at this facility?

A. Never B. Within the last month

C. This month D. 2 months ago

E. 3 months ago F. More than 3 months ago

7. How did you learn to complete the forms/records used at this facility (Circle all that apply.)

A. IPLS training

B. On-the-job training

C. Never been trained

D. Other (specify)

Questions for the store manager

Inventory Control Procedures

1. Are there guidelines and established policies for maximum and minimum stock levels that should be maintained?

A. Yes

B. No

2. Are the inventory control guidelines for products applied and stock levels generally fall between maximum and minimum? A. Yes B. No

3. Are stock levels (maximum and minimum) for products reviewed periodically?

A. Yes

B. No

4. Does the health facility have a policy of storing and issuing stock according to first-to-expire, first-out (FEFO) inventory control procedures?

A. Yes

B. No

Storage practice

1. Does the facility have written guidelines for storage and handling of all products?

A. Yes

B. No

2. Does the health facility conduct at least one physical inventory of all products annually?

A. Yes B. No

3. Is the existing storage capacity adequate to handle the current quantities of products?

A. Yes

B. No

4. Can the existing storage capacity handle all the quantities needed to ensure that no stock outs occur?

A. Yes

B. No

5. Are visual inspections of products conducted at the storage facility?

A. Yes

B. No

6. Are there written procedures or guidelines for disposing damaged and expired products?

A. Yes

B. No

If no skip question 7

7. In practice, are damaged and expired products disposed according to the disposal guidelines?

A. Yes

B. No

ANNEX III: Observation checklist

1. Stock status of key essential RDF medicines (fill in the columns based on physical inspection and inspection on inventory cards)

No	Product	Stock out today? (Y/N)	Stock out most recent 6 months (Y/N)	Number of stock-outs	Total number of days stocked out
1	Amoxicillin 500mgcaps				
2	Amoxicillin 250mgcaps				
3	Amoxicillin 250mg/5ml				
4	Ciprofloxacin 500mg tablet				
5	Mebendazole 100mg				
6	Mebendazole susp				
7	Albendazole 240 tabe				
8	Albendazole sus				
9	Metrindazole 500mg				
10	Metrindazole 250mg				
11	Metrindazole125mg/5ml				
12	Tetracycline eye ointment				
13	Adrenaline (Epinephrine) injection				
14	Aminophylline injection				
15	Glucose 40%				
16	Dextrose in normal saline				
17	Ringer lactate				

18	Lidocaine 1% injection				
19	Lidocaine 2 % injection				
20	Paracetamol 125 mg 5 ml syrup				
21	Paracetamol 500 mg tablet				

2. Storage Conditions (encircle all criteria that are fulfilled)

- a. Pharmaceuticals are arranged and organized according to a logical categorization.
- b. Bin cards are used and updated regularly? (Observe by checking five or more sample bin cards.)
- c. Unwanted items (damaged or expired drugs, non-pharmaceutical items, etc.) are separated from the usable stock (in the store or outside).
- d. Products are arranged so ID labels, expiry dates, and/or manufacturing dates are visible.
- e. Products are stored and organized in a manner that facilitates use of first-to-expire, first-out (FEFO).
- f. Products are protected from direct sunlight and high heat at all times of the day/during all seasons.
- g. Storeroom is maintained in good condition (clean, no trash, sturdy shelves, and boxes well organized).
- h. Current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).
- i. Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.
- j. Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of bats and/or rodents [droppings or insects].)
- k. 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.

ANNEX IV: In-depth interview guide

Name of the interviewer_____

1. What are the challenges you face in the logistics management of key essential RDF medicines?

I. Probe on selection

II. Probe on forecasting

III. Probe on procurement

IV. Probe on storage

2. How does the facility cope with inadequate storage space and condition?

I. Probe on storage conditions that need improvement, if any (e.g., cleanliness, organization, temperature, building structure, etc.).

3. Describe notable problems encountered in the past year, if any, regarding wastage due to damage or expirations. Please note product, location, approximate amount of goods, and actions taken.

I. Probe on expired products

II. Probe on resupply of near expiry products

III. Probe on stock outs

4. From where your health facility gets resupply or procure the key essential RDF medicines?

I. Probe on products from EPSA - their availability and quality

What are the major factors affecting availability of these products?

5. Capacity building on key essential RDF products

A. training

- Was there any training for professionals involved in the management of these products?

- On what aspects of these products do you want to get training?

B. Supportive supervision

What do you think is the impact of supportive supervision and close government follow up on improving the supply chain management as well as the availability of the commodities?

7. Do you think availability of staff with good logistics management knowledge and experience will improve the availability of the commodities?

8. What do you think as the possible solutions to improve the availability of the commodities?

I. Probe on efforts to be made by health facilities

II. Probe on the role of government

III. Probe on the role of health professionals

ANNEX V: List of key essential RDF medicines

No	Essential RDF medicines	Unit
1	Amoxicillin	500mg caps
2	Amoxicillin	250mg caps
3	Amoxicillin	250mg/5ml
4	Amoxicillin	1250mg/5ml
5	Ciprofloxacin	500mg tablet
6	Tetracycline	eye ointment
7	Mebendazole	100mg
8	Mebendazole	suspension
9	Albendazole	240 tablet
10	Albendazole	suspension
11	Metrindazole	250mg
12	Metrindazole	125mg/5ml
13	Adrenaline (Epinephrine)	Injection
14	Aminophylline	Injection
15	Glucose	40%
16	Dextrose	normal saline
17	Ringer lactate	
18	Lidocaine	1% injection
19	Paracetamol	125 mg 5 ml syrup
20	Paracetamol	125 mg suppository

21	Paracetamol	500 mg tablet
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Socio demographic distribution of respondents

Including Jimma and Agaro city administration, 19 health facilities (5 hospitals and 14 health centers) found in Jimma zone were included in the study. Data collected from respondents in charge of pharmacy administration and store managers with response rate of 94.6%.

Health Facilities		Academic Rank			Total
		Msc/MA	Bsc/BA	Diploma	
Facility Level	Health center	0	10	14	24
	Primary Hospital	0	7	3	10
	Medical Center	1	1	0	2
Total		1	18	17	36

Academic rank composition of respondents

Health Facilities		Gender		Total
		Male	Female	
Facility Level	Health center	16	8	24
	Primary Hospital	10	0	10
	Medical Center	2	0	2
Total		28	8	36

Gender composition of respondents

Health Facilities		Experience				Total
		<2	2-5	6-10	>10	
Facility Level	Health center	4	13	5	2	24
	Primary Hospital	1	6	2	1	10
	Medical Center	0	0	1	1	2
Total		2	10	6	1	36

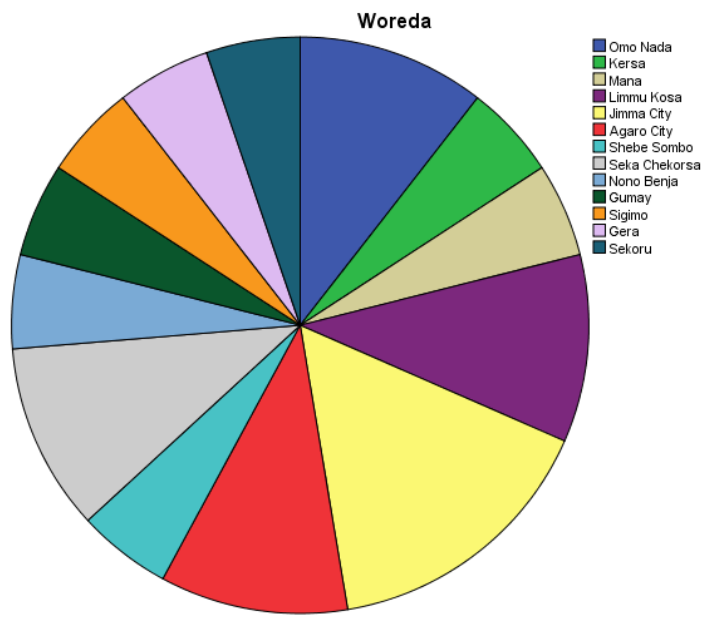
Service year (experience) composition of respondents

Health Facilities		Job Position				Total
		Pharmacy administratio n	Senior pharmacist	Pharmacist	Druggi st	
Facilit y Level	Health center	0	2	8	14	24
	Primary Hospita l	1	2	7	0	10
	Medical Center	1	0	1	0	2
Total		2	4	16	14	36

Job position composition with respect to facility level

No	Name of city/admin/woredas	Facility level			In %
		Hospitals	Health center	Sub Total	
1	Jimma City	1	2	3	15.79
2	Omo Nada	1	1	2	10.53
3	Seka Chekorsa	1	1	2	10.53
4	Agaro City	1	1	2	10.53
5	Limmu Kosa	1	1	2	10.53
6	Mana	0	1	1	5.27
7	Shebe Sombo	0	1	1	5.27
8	Kersa	0	1	1	5.27
9	Sekoru	0	1	1	5.27
10	Gera	0	1	1	5.27
11	Sigimo	0	1	1	5.27
12	Nono Benja	0	1	1	5.27
13	Gumay	0	1	1	5.27
	Total				

List of Woreda and number of health facilities included in the study



Composition of Woreda included in the study