Assessment of Selection and Quantification practice of Basic Medical supplies in Public Health Facilities of Jimma Zone Oromia Regional State, South West of Ethiopia.

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A research paper to be submitted to Jimma University Institute of Health Science department of pharmacy in partial fulfillment for the requirement for Masters of Pharmaceutical Supply Chain Management

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ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical

conduct of the research project and for provision of required progress reports as per terms and conditions of the Faculty of Public Health in effect at the time of Grant is forwarded as the result of this application.

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List of Acronyms and Abbreviations

SCM …… Supply Chain Management

PSCM …….…….....Pharmaceutical Supply Chain Management

WHO ……...…….World Health Organization

NEML ……..... National Essential Medicine List

PTC……...……..……. Pharmacy and Therapeutic Committee

LMIS……..……...…… Logistic Management Information System

PFSA……...…….……Pharmaceutical Fund and Supply Agency

HMIS……....Health Management Information System

LMIS……..Logistic Management Information System

DTC…….……....Drug and Therapeutic Committee

RRF……..……..Reporting and Requisition Form

HC……....Health Center

ED…….....Essential Drug List

NEDL…….....National Essential Drug List

ELMI….....Ethiopian List of Medical Instrument

LP……...List of Procedure (medical or surgical)

FMHACA…….……....Food, Medicines and Healthcare Administration and Control Authority

FMOH…….……...Federal Ministry of Health

HCMIS…….……...Health Commodity Management Information System

LIAT…..……..Logistics Indicator Assessment Tool

LSAT……..……Logistics System Assessment Tool

SPSS……..……Statistical package for social sciences

SOP……..……..Standard Operating Procedure

ZHD ……..…….. Zonal Health Department

Abstract

Background: - Selecting medical supplies and equipment is often given little attention; such trend resulted in procurement of inappropriate supplies and equipment. Selection of pharmaceuticals for specific health facility depends on suitability for use by health workers and the staff's capacity. Quantification of medicines is also based on availability of funds, disease pattern with seasonal variation and Lead time. For efficient utilization of resources and better pharmaceutical care, it is good if this selection and quantification process is examined among healthcare professionals.

Objectives: - To assesses selection and quantification practice of basic medical supplies in public health facilities of Jimma zone and Jimma town administration

Methods: - A facility-based cross-sectional study was conducted in 38 public health institutions. Using a stratified random sampling a quantitative data supported with qualitative data was collected. A structured questionnaire was used for the quantitative data, while an in-depth interview with key informants for the qualitative data. Data was cleaned and first entered in Epidata v3.5 then exported to SPSS version 20 for Windows. Descriptive statistics was done. To see the association between factors affecting selection and quantification χ^2 test was done. A significance level for association was determined at p-value of 0.05.

Result: - Among health facilities which has DTC, only 15 (48.4%) were functional, Selection practice of medical supplies by only DTC were only 8(21%). None of health facilities fully consider individual characteristics of medical supplies as selection factors and none of them fully describe these supplies to specify each product they need. Essential logistic records like Stock/Bib cards and dispensing records were not available in more than 50% of these health facilities and hence quantification practice was not evidence based. Point percentage availability of 23 selected common medical supplies was 64.97% and 21.9% of these medical supplies were stocked out at least once during the last one month. Lack of accountability among professionals, lack of management Support and Lack of appropriate professionals especially pharmacist was some challenges identified in this study.

Conclusion: Selection is not performed by Drug and Therapeutic Committee. Quantification of supply quantity was not evidence based. Furthermore, there was a significant association

between performance of selection and quantification practice and availability of these essential medical supplies. Irrational selection and forecasting was one of the causes for low availability of these essential medical supplies in these health facilities.

Key words: Selection, Quantification, Jimma Zone, Public health Facilities

Introduction

1.1 Background

Pharmaceuticals supply chain management represents the whole set of activities aimed at ensuring the timely availability and appropriate use of safe, effective and quality pharmaceuticals and related products and services in any health care setting (1).

Medical dictionary defines Medical supplies "Medical supplies any item that is essential for treating illness or injury. In the working parlance, medical supplies are usually understood to mean articles which are low-cost, disposable, and used in high enough volume that the purchasing department has standing orders in place to ensure that the items of interest (e.g., gloves, gauze, needles and syringes) are never out of stock" (2).

Managing medical supplies and laboratory commodity in any public health facility and at any level requires appropriate Selection, Quantification, Procurement, Distribution and Inventory management (WHO 2006a).

Product selection refers to the process by which preoperative departments, surgical service areas, and hospitals as a whole select, evaluate and ultimately procure the products they use and consume. Quantification is the process used to calculate or estimate the quantities and coast of drugs, medical supplies, and equipment required. According to WHO, Process of selecting essential medicines and medical supplies begins with Establish DTC or drug selection committee, defining a list of common disease for each level of health care, treatment of first choice for each health problems from treatment guidelines (STG) and national formulary system (NDF), and finally deciding which drugs will be available at each level of health care (3).

The selection of medical supplies and laboratory supplies shares many similarities with selection and management of other pharmaceuticals. But the unique features is, selection of medical supplies was based on list of the procedures (medical, surgical, laboratory, etc.) that are performed in that facility, and properly describe each of the supplies and instruments identified based on their unique characteristics, specifically for suturing materials (nature of the Suture, Gauge in EP and/or USP standard, length of thread in cm, length of needle in mm, shape and curvature of needle tip), injection supplies are mainly characterized by disposable/non disposable, gauge, needle length and bevel (WHO/medical devices).

After the list of products has been established, the requirements must be forecasted and quantified the actual amounts to be procured, taking into account quantities in stock and on order,

additional quantities needed to ensure adequate stock levels and buffer stocks, and available financing. This can be accomplished only through regular and accurate reporting and monitoring from each level of the system. Ideally, data should be derived from an LMIS. Alternatively, STGs can be used to develop forecasts using morbidity and demographic data. In many countries, procurement quantities have been based on incomplete data on past use. Failure to use logistics data or patient service data may lead to inaccurate forecasting and results in under stocking and overstocking (MSH/ WHO manual, 1997).

Proper quantification ensures that there is enough stock to meet demands, and avoids both under stocking and overstocking. It is also a useful tool for preparing budget estimates, adjusting quantities to match a fixed budget, and monitoring use of supplies and equipment by health facility staff.

Quantification methods are useful for estimating annual requirements. However, actual annual consumption can be different from estimated consumption. Also, many health facilities place orders more than once a year, either on a regular basis or when the need arises. To calculate the exact quantities to order to ensure there are enough supplies to last until the next order will depend on factors that you can anticipate, such as how much stock is available on hand, how much stock is normally used, how many patients will need to be treated, seasonal demands, lead time and frequency of orders, reserve stock, minimum and maximum stock. Information about these factors should be recorded on stock cards (6, 7).

The provision of complete health care necessitates the availability of safe, effective and affordable drugs and related supplies of the required quality, in adequate quantity at all times and ensure their rational use. Essential medicines are one of the vital tools needed to improve and maintain health. However, for too many people throughout the world medicines are still unaffordable, unavailable, unsafe and improperly used. WHO estimates about one-third of the world's population is without the access to medicines they need, especially in public sector where generic medicines availability is less than 60% across WHO regions, ranging from 32% in the Eastern Mediterranean Region to 58% in the European Region (WHO, 2011). In the poorest countries of Africa and Asia, as much as 50% of the population lacks such access. (WHO/HAI, 2008) (8, 9).

Pharmaceuticals are costly; represent a large portion of the costs in the healthcare system. The Journal of the American Medical Association found that supplies constitute 25% to 30% of a

hospital's total operating expense. In addition, 25% of those expenses are tied to administration, overhead, and logistics (Neumann, 2003). Similarly, according WHO reports, Pharmaceuticals may constitute as much as 40 percent of health care budget in developing country, yet large portion of the population may lack access to even the most essential medicine and the limited fund available are frequently spent on ineffective, unnecessary, or, even dangerous medication (10).

Ethiopia is one of the developing countries in Africa with infectious diseases are the major health problems. Provision of basic health services in the country mostly remains to be the responsibility of the public sector which relies, among other factors, on availing essential medicines, in adequate amount which needs appropriate selection and forecasting (11).

However, since 2003, the average duration of stock-outs in public health facilities of Ethiopia was 99.2 days. Moreover, the national figure for expiry was reported to be as high as 8%. This was mainly due to the accumulation of medicines that are of little relevance to the catchment population, leading to expiry and wastage of limited resources (FMOH 2003).

As far as my knowledge there was limited information particularly to see the selection and quantification practice of medical supplies among public health facilities in study area and even, in Ethiopia in general. Therefore, this study was designed to assess Selection and quantification practice of basic medical supplies in public health facilities of Jimma zone.

1.2 Statement of the Problem

Choosing supplies and equipment is often given little thought or attention despite of the wide range of products available. The lack of capacity to select, forecast, and quantify product requirements can results in procurement of inappropriate supplies and may leads to loss of valuable resource due to over stock and expiry and frequent stock-out of essential medical supplies used for various examinations and surgical procedures (3).

These medical supplies are used for various examinations and surgical procedures, and absence or lack of such supplies can contribute to the quality of care and influence morbidity and mortality rates. Moreover if supplies like surgical gloves are not continuously available and accessible, the health facility is not able to offer the care and treatment required because cross-infections between patients and health workers was not protected and this further affect demand for health care and quality of health services. Similarly unavailability of essential medical supplies such as sutures, gauze, and bandage can lead to unnecessary referrals to higher-level facilities at the cost of time to the patient and increased patient burdens at the higher facilities; also, unavailability of medical supplies has been reported as one of the delays causing increased maternal deaths (Gabrysch et al, 2009).

Another the most difficult aspects of selection and forecasting supplies in public health facilities was lack of standard list of medical supplies with detailed product specification (size, pack size and stock numbers), with regard to products selection. However in the absence of such standard list the facilities ordered and supplied non approved items and they may procure non relevant supplies leads to over stock and expiry of some unnecessary supplies (WHO laboratory Service and medical supplies). Similarly with regard to forecasting the problem was limited or nonexistent of LMIS data (e.g., Mali, Ethiopia), which weakened the capacity of forecasting (JSI/DELIVER 2004).

According to WHO (2000), fully one-third of the world's population does not have access to essential medicines. In Sub-Saharan Africa and South Asia the figure is closer to 50 percent particularly in rural areas do not have constant access to even the most essential health commodities, WHO/WTO (2001) (1).

According to WHO at national level pharmaceuticals spend 10 to 20 percent health expenditure in industrialized countries but for most developing countries they may represent 20 to 40 percent of total public and private health expenditure. As the individual and house hold level medicines

represent the major out of pocket health expenditure, 60 to 90 percent of house hold health spending go toward medicine (WHO 2000). More than that, shortages of essential medicines, and spending on unnecessary or low-quality medicines also have a high cost - wasted resources and preventable illness and death. Annual expenditure of 1 million USD on pharmaceutical supply results in only USD 300,000 worth of therapeutic benefit to patients due to lack of careful selection, poor quantification, improper storage, expiration theft and other Courses loss of totaling 70 percent of original expenditure (WHO 2004) (3, 11).

In Ethiopia, despite different efforts, still availability of drugs, medical supplies and diagnostic services are the question of community and being the problem of good governance. On the other hand the total wastage rates for medicines in the hospitals were found to be between 0.5% and 9%., the value of wastage was estimated to be 6,254,856.31 ETB, indicating an average wastage rate of 5.27% for eight of the study hospitals in 2005 EC (SIAPS, 2005). In addition, according to report finding of Country wide assessment of IPLS in Ethiopia since 2014 revealed High wastage rate (> 8%). However, the national target in the Health Sector Development Program (HSDP) IV for the medicines wastage rate is below 2%. The actual situation is therefore far from the target (10, 11).

In Ethiopia, studies on pharmaceutical logistics had been largely limited to program drugs such as contraceptives, anti-retroviral drugs, anti-tubercular drugs and anti-malarial drugs (12). As far as my knowledge there was limited information regarding medical supplies, particularly to see the selection and quantification practice of medical supplies among public health facilities in study area and even, in Ethiopia in general.

Bearing the aforementioned facts in mind, this study, therefore, aimed to assess selection, and quantification practice of basic medical supplies among public health facilities in Jimma zone.

1.3 Significance of the study

Quantifying the requirement for medicines is an essential step in the overall process of medicines procurement with the aim of ensuring access to medicines. It follows selection of the list of medicines and should be the basis for budget estimation and the tendering or buying procedure. Quantification seeks to answer the question "how much of each medicine is needed?" It is the process of determining the quantity of each selected medicinal product required to meet the needs of a specified location (clinic, hospital, region or country) or program for a specified period of time. In addition to being a step in the procurement process, quantification of requirements also provides vital information and a basis for managing the distribution of medicines.

As a contribution that would enable constant availability of medical supplies in public health institutions. This will result in improved service provision in the health sector. As well as the study will assist in their endeavor to utilize supply chain management practices to improve selection and quantification in their organizations.

If quantification is not done carefully, or not done at all, it can be one of the causes for supply shortages and surplus waste. As a result limited financial resources are wasted and inadequate treatment may be given.

The study will be a contribution to the increase of the general knowledge of the subject and will act as a reference material for future researchers and scholars interested in related studies.

2. Literature Review

This chapter gives the literature review done by the principal investigator. The reviewed literature covers supply chain management of health commodities, highlight of medical supplies and followed by selection and quantification of pharmaceuticals.

2.1. Supply Chain Management of Health Commodities

Management Sciences for health (2009) describes the commodity management cycle made up of various components and these components are Product selection, Quantification and Procurement, Inventory management (with storage & distribution), and Use (3).

In addition, According WHO Medical Supplies include all medicines and other medical products, in particular those included on the national essential medicines list on the World Health Organization's list of essential medicines, proprietary medicines or generics, and therapeutic food to address acute malnutrition. Similarly medical dictionary define as "Medical supplies any item that is essential for treating illness or injury. In the working parlance, medical supplies are usually understood to mean articles which are low-cost, disposable, and used in high enough volume that the purchasing department has standing orders in place to ensure that the items of interest (e.g., gloves, gauze, needles and syringes) are never out of stock".

2.2. Selection of Essential Medicines and Medical Supplies

According to The Logistics Handbook, A Practical Guide for the Supply Chain Management of Health Commodities, USAID | DELIVER PROJECT, Task Order 1, Product selection is a key element of the logistics cycle, and it has direct impact on others functions of supply chain cycle, Is directly linked to serving customers by defining what products are procured and used in the health system and the range of products that a customer can receive, limiting the variety of products that are used and available at public sector facilities can make the supply chain more manageable. With a designated list of products, the staff at the central warehouse can become more familiar with the products, can ensure that they meet the needs of the program, and can monitor and maintain stock levels of all products throughout the system, it can facilitates access to more affordable commodity prices through economies of scale and reduction of cost for some supplies, because a larger quantity of a smaller number of products is required and more importantly, Selecting products is a prerequisite to quantification, because it identifies the products that should be quantified. Wise health commodities selection underlies all other improvements; that effective management saves money and improves performance; that rational

drug use requires more than drug information; and that systematic assessment and monitoring are essential (3).

According to WHO, Process of selecting essential medicines begins with Establish DTC or drug selection committee, defining a list of common disease for each level of health care, treatment of first choice for each health problems is the basis for essential list of medicines, the national formulary system and treatment guidelines, and deciding which drugs will be available at each level of health care, structure list of pharmaceuticals and finally introduce the list for staffs and update the list. The supply system should the then supply the medicines that have been selected, based on these series of steps (1).

In any logistics system, products must be selected. In a health logistics system, product selection may be the responsibility of a national formulary and therapeutics committee, pharmaceutical board, board of physicians, or other government appointed group. Most countries have developed essential drug lists patterned on the World Health Organization (WHO) Model List. The committee's ability to select from among products is influenced by other elements of the logistics cycle. Perhaps the most important of these is the budget available to purchase the chosen products. For example, boards often choose generic drugs over name brands that may be more expensive. Many programs supplement the development of essential drug lists (which focus on those products deemed most cost-effective in treating priority health problems) with programs to promote rational drug use (9).

A standard list is a model list of standardized medical supplies and equipment, based on the type of preventive care, diagnostic tests and treatments a health facility is expected to carry out. Standard lists assist in making appropriate choices of medical supplies and equipment, which helps to improve patient treatment and care, use of resources and management (6).

2.3. Quantification of essential medicines and medical supplies

In health commodities quantification refers to the process of calculating the quantities of specific commodities required for a health program for a given amount of resources available, e.g. for a given budget (9).

Quantification is the process of estimating the quantities and costs of the products required for a specific health program (or service), and determining when the products should be delivered to ensure an uninterrupted supply for the program determining when the products should be procured and distributed. The ultimate goal of quantifying drug requirements is to ensure that

appropriate drugs are available sustainably to treat; promote and maintain the rational and economic use of drugs. Quantification is not a one-time annual exercise; it is a continuous process that requires ongoing monitoring and routine updates. Quantification, a critical supply chain management activity, links information on services and commodities from the facility level with program policies and plans at the national level to estimate the quantities and costs of the commodities required for a health program. Quantification is important for informing supply chain decisions on product selection, financing, procurement, and delivery (1).

Logistics records are the primary framework for every logistics system. The records are intended to capture critical logistics data at each level of the health system. The data captured on logistics records are then combined to form logistics reports, which are used for crucial decision-making about resupply quantities, forecasting, and procurement decisions (17).

Reviewing the indent books and methods practiced for drug quantification, it can be concluded that no ideal criteria is followed for quantification. Theoretically, quantification of medicines are based on following clauses: – Availability of funds, Human resources capacity, Population coverage, Disease pattern, Seasonal variation in the disease pattern, Rate of monthly drug consumption, Lead time taken for delivery of drugs from the nearest drug warehouse, Time delay between the placing an indent and receiving the orders, Stock keeping – the knowledge of quantity of drugs of each form that is consumed regularly (34).

2.4. Empirical Findings

According to assessment finding of JSS and Oromia Regional Health Bureau, Conducted on Pharmaceutical Supply Chain Management and Pharmacy Services in 154 (107 HCs and 47 HLs) public health facilities of Oromia Regional state, Ethiopia since February, 2016, - Only 41% of HCs had functional DTC which conduct regular meeting and only 19% of HCs had update specific drug list for their facilities, 66% HL & 61.6% HCs use and update Bin card regularly, 30% of HCs had submitted their Pharmacy performance report to ZHD at least once (HMIS Parallel), Availability of laboratory commodity was 64 % in HC and 76% in hospitals. Likewise, among identified Challenges for ensuring SCM in Oromia public health facilities includes Shortage of pharmacy work force (50% of structures in HCs) and high staff turnover, lack of commitment by Some Pharmacy Personnel and Health managers at d/t level on follow up of pharmacy activities and reporting, Poor Documentation and data quality problem, weak communication between PLO and Program officer's levels and b/n PFSA and RHB/ZHD, supply

of unwanted laboratory reagents & drugs and refill of near to expiry by PFSA, national stock out items (Lab. reagents and supplies), absence of d/t guidelines at HFs (STG, Drugs Formulary, Drug List, SOP…)

According to study results on Availability of Essential Medicines, Medical Supplies and Bed Capacity in Hospitals in Tanzania Mainland show that a majority, (94%), of hospitals reported being out of stock of one or more essential medical supplies, 96% were out of stock in one or more essential medicines. The specific items commonly out-of-stock were gloves (in 83% of the hospitals), sutures (48%), and gauze (39%). The majority, 52% and 59% of hospitals were lacking in essential medicines and medical supplies for a period exceeding 4 weeks. It also indicates that this lack of availability of essential medicine was due to poor logistics skills levels of professionals who involved in supply chain was poor (22).

According to one study conducted on Assessment of Logistics Management in Ghana Health Service since 2012, the main challenges for availability of essential medicine in these heal facilities were lack of accurate stock cards, and systematic performance procedures and rules to guide staff, lack of understanding of basic issue of proper inventory management system are directly related to ineffective management. It also document that lack of appropriate skill, training gaps on the system and failed to deploying the required quantity of pharmacy professionals, appropriate data on drug consumption and stock position had not been collected regularly from the service center, which resulted serious consequence on the rational use of medicine, quantification and availability of medicine at health facilities of developing countries (42).

Three main challenges to rational procurement are poor quantification, corrupt procurement, tender practices and procedures, and poor financial management and payment methods. Inaccurate quantification is common in the absence of reliable data on illness and usage. It leads to shortages of essential medicines and other supplies and wastage

Similarly, according to the study findings on documenting challenges and viable strategies in the medical supply system of the central province, Papua New Guinea, Pacific Journal Of Medical Sciences, 2013, indicate, limited funding, non-availability of a reliable transport system, inadequate storage space and limited adherence to standard operating procedures (SOPs) of inventory control systems, fragmented communication and collaboration among the different parties that use the system and the ill-defined roles and responsibilities of personnel along the

pipeline contributed to the current breakdown of the supply system in the province.

According to study finding on assessment of health commodities management practice in health care delivery, the case of selected Hospitals in Ashanti region, Ghana and published on European Journal of Business and Social Sciences, Vol. 3, No. 8, Product selection, which is a major step in the commodity management cycle, was almost nonexistent in the district hospitals and KATH. In addition, three main challenges to rational procurement are poor quantification, opaque or corrupt procurement and tender practices and procedures, and poor financial management and payment methods. Inaccurate quantification is common in the absence of reliable data on illness and usage. It leads to shortages of essential medicines and other supplies and wastage (30).

Similarly, another literature, on Assessment of the HIV/AIDS Medical Supplies and Laboratory Commodities Supply Chain in Lesotho, November 2007 proposed that, there is generally poor reporting by health facilities, leading to incorrect quantities being distributed. The lack of standardized quantification methods and tools used by the different authorities has compromised the ability of the facilities to provide reliable consumption data for procurement, severely shortage of staff and a lack of supervisory support and guidance from hospital management and from Ministry of Health and Social Welfare at national level (3).

In addition, According to study findings conducted in Kenya public health facilities specific challenges with the drug supply chain are: Lack of efficient funding and ordering processes means it can take six months to complete tendering process, lack of competent staff, and poor coordination between store manager and medical clinicians.

Again more importantly, Some Country wide assessment on integrated pharmaceutical supply chain management in Ethiopia since 2014 revealed major problems of uncoordinated supply chain management as a result of: poor selection of pharmaceuticals, disorganized and uncoordinated forecasting, Shortage/stock-out of essential pharmaceuticals, High wastage rate (> 8%), Poor storage and distribution and Irrational use of medicines (26). These findings are comparable with study findings on assessment of IPLS for (HIV/ AIDS) and Tuberculosis (TB) Laboratory Diagnostic Commodities management in Public Health Facilities, Addis Ababa, Ethiopia, 2014, which point out “Most facilities do not calculate their consumption accurately and requested huge amount of laboratory reagents”.

Inadequate availability of and access to essential health commodities are major barriers to the delivery of essential health care in developing countries. According to study findings on

Assessment of IPLS for (HIV/ AIDS) and Tuberculosis (TB) Laboratory Diagnostic Commodities management in Public Health Facilities, Addis Ababa, Ethiopia, 2014, availabilities of IPLS recording and reporting formats (bin cards, and IFRR and RRF) were reported in 92.6% of facilities. These findings are comparable with unpublished national IPLS survey in 2014, in which availability of commonly IPLS implementation tools were above 90%. This study also showed that 96% of facilities reported one or more reagents stocked out during the last six months which was higher than in Ghana laboratory logistic system where about 60% facilities experienced at least one laboratory commodities within six months (8).

Similarly, a recent survey in Nepal found that the availability of 32 selected essential reproductive health (RH) commodities in public sector outlets was less than 25 percent Rao and Thapa (2005). In a companion study in Nicaragua, only 20 percent of these medicines were available to public sector clients PATH (2005).

From the above literatures it was possible to understand uncoordinated supply chain management is the major problems of public health facilities as a result of poor selection of pharmaceuticals, lack of standardized quantification methods and tools used by the different authorities, in ability of the facilities to provide reliable consumption data for procurement, shortage of staff and a lack of supervisory support and guidance from hospital management. In addition, there are so many literature was done on supply chain management of health commodity in public health facilities around the world. But still there was a gap on identifying the major problems of health facilities in Ethiopia to implement selection and quantification methods for management of health commodities in general and to implement these methods to manage medical supplies in particular.

According to study findings on assessment on operational status and effectiveness of drug and therapeutics committees (DTCs) at public hospitals in Ethiopia, which was conducted by PFSA in collaboration with WHO and USAID/SIAPS, since 2013, 97.8% Hospitals in Ethiopia established DTC, and from which around 63% of the DTCs had an action plan and 52% of Hospitals have developed facility specific drug list. Similarly, around the world health facilities of many countries (developed /developing) have DTCs among developed countries, in Australia more than 92% of Hospitals, in UK more than 86% Hospitals have DTC, in USA DTC or similar committee is a requirement for accreditation.

According to one study conducted on Determinants of Pharmaceuticals Inventory Control

System Performance in Public health facilities of North Wollo and Waghimera Zones, Northern Ethiopia the overall health facilities pharmaceuticals inventory control system performance is low with only 36 (43%) health facility performed with acceptable level of performance with the mean performance of 51%, the management ownership of health facilities is low with only 40(49%) meet the acceptable level. Management ownership on the system had a positive association with Inventory Control System Performance and found be significant effect on the performance and generally conclude that the poor performance of the effectiveness of pharmaceuticals inventory control system in the study area was due to poor management ownership on the system (support) and the poor skill of the staff on the system implementation. The study was in line with other countries studies, in Indonesia on Pharmaceuticals Inventory management issues found that less management awareness leads in inefficient inventory management of pharmaceuticals in hospital, similarly Studies in South Africa and Kenya showed due to the inventory management system is by inappropriate professionals and lack of management ownership difficulties in getting accurate records of information and product flow, low availability of essential drugs were resulted and challenges and poor inventory practice greatly interrelated with to poor skill level of professionals, lack of management follow up, allocation of inappropriate type of professionals (Management sciences for health,2006) (25).

According to one study conducted in Indonesia, since 2012, poor inventory control system in hospitals resulted due to high work load and service volume of the health facility. The work load relationship of this study does not much with other studies in Gondar Ethiopia which indicate that poor inventory control system in health facilities was not due to high work load and there was no positive relationship of the health facility volume (high or Low) with the pharmaceuticals inventory control system performance (27).

2.5. Conceptual Framework

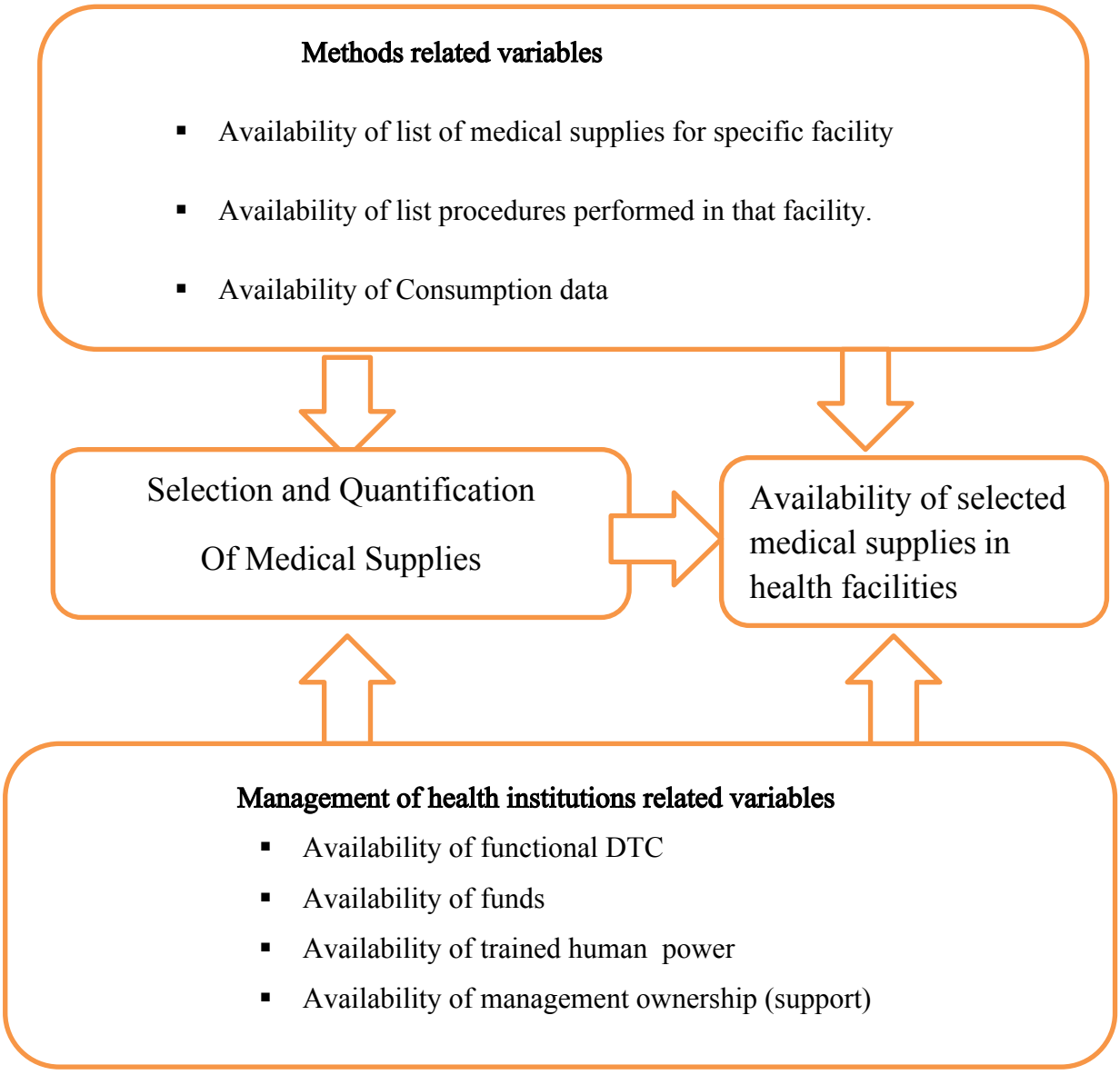

Figure 1 Conceptual frame work developed by principal investigator.

3. Objective

3.1 General Objectives

To assesses selection, and quantification practice of basic medical supplies in public health facilities of Jimma zone and Jimma town administration, June 20, 2016 to July 15, 2016.

3.2 Specific Objectives

- To asses selection practice for basic medical supplies in public health facilities.
- To assess quantification practice of basic medical supplies in public health facilities.
- To assess availability of basic medical supplies in public health facilities.
- To assess the challenges associated to selection and quantification of basic medical supplies in public health facilities.

4. Methodology

4.1 Study Setting and Period

The study was conducted in Jimma zone and Jimma town administration public health facilities, Oromia regional state, south west Ethiopia from January 30, 2016 to June 2, 2016. Jimma Zone is one of the seventeen Zones in Oromia Regional State which is situated about 354 kilometers away from Addis Ababa. The Zone has a total of 1200 health professional from different disciplines and 117 health posts, 114 health centers (HCs), and three district hospital owned by government. In addition the Jimma town has a total of 136 health professional from different disciplines and 4 Health Centers (HCs), and one District hospital owned by government. Generally, there are a total of 122 health facilities owned by government from which four (4) are District hospital, and 118 Health Centers (HCs).

4.2 Study Design

In this study facility-based cross-sectional quantitative and qualitative Study was employed.

3.3 Source population

All public health facilities found in Jimma zones and Jimma town administrations was source populations.

4.4 Study population

Selected public health facilities who fulfill the inclusion criteria

4.5 Inclusion and Exclusion Criteria

4.5 Inclusion Criteria

All public health facilities engaged in primary health care tiers of Ethiopia.

4.5.2 Exclusion Criteria

All public health facilities below six months of service were not included since it is not possible to measure their practice validity.

4.6 Variables

4.6.1. Dependent variable

Selection and quantification practice of basic medical supplies in public health facilities of Jimma zone.

Availability of basic medical supplies in public health facilities of Jimma zone.

4.6.2. Independent variables

- Availability of functional DTC

- Availability of appropriate documents and lists of the procedures (medical/surgical) that are performed in that facility to select medical supplies.
- Availability of management ownership or support
- Availability of budget
- Availability of trained human power for selecting and managing medical supplies.
- Availability of standard list of medical supplies for specific facility
- Availability of essential records (stock records or consumption data) used for quantification of medical supplies
- Availability of quantification tools

4.7 Source of Data

The primary sources of data for the study were obtained by in-depth interview using a structured questionnaire from those who directly involved in the supply chain management process like head of pharmacy staff and managers of selected health facilities. Additional qualitative data was collected by observation, assessment of facility records record like bin cards, dispensing records, list of products procured over a defined period of time and written document of standard list of medical supplies.

4.8 Sample size estimation and sampling techniques

4.8.1 Sample size

Sample size was calculated by using single population proportion formula assuming 50% prevalence of poorly functioning selection and quantification practice for medical supplies due to lack of previous study, 15% margin of error and 95% confidence interval (15, 16).

The general formula for calculating the minimum sample size for a very large population (N>10,000) is

$$n = [\, z^2 \times p\,(1-p) \times f \,] \,/\, m^2$$

Where: n = required sample size

z = the value of the confidence level of 95% = 1.96

p = 0.5. Therefore, when implementation status is unknown, 0.5 will be used

m = margin of error (at 15% m = 0.15)

f = design effect for three strata (1.3)

Therefore: - $n = [(1.96)^2 \times 0.5(1- 0.5) \times 1.3] / (0.15)^2$

n = [3.842 x 0.25x1.3] /0.0225

n = 55.4 = 55

However, if sample is to be taken from a relatively small population (N <10,000) the above equation needs to be multiplied by the Finite Population Correction (FPC) factor: (15)

n = n/ [1+ ((n-1)/N)]

Accordingly the sample size generated from the above equation needs to be multiplied by the Finite Population Correction (FPC) factor. For this purposes, the formula can be expressed as:

New n = n/ [1+ ((n-1)/N)]

Where: New n = the adjusted new sample size

N = the population size (122)

n = the sample size obtained from the general formula (55)

New n = 55/ [1 + ((55 – 1)/122)]

New n = 55/1.442

New n = 38.2 = 38 facilities

4.8.2 Sampling techniques

A stratified random sampling method was used to create different strata according to type of facility. Accordingly, a total of 122 public health facilities involving in supply chain of medical supplies and other health commodities was listed and can serve as a sampling frame. These include 4 Primary hospitals, 28 A type health centers (high volume) and 90 B type public health centers (medium volume). However; based on the above calculation the adjusted sample size is 38 public facilities. Then these facilities were selected from each stratum by using systematic random sampling proportionate to their size of strata.

4.9 Data collection Procedure

4.9.1 Data collection instrument/ tools

The Logistics Indicators Assessment Tool (LIAT), a standardized quantitative data collection tool developed by the USAID | DELIVER PROJECT, is used as the starting point to develop the instrument. The tool is adapted to the Ethiopian context, including the IPLS-specific implementation indicators. By considering the pharmaceutical supply chain management practice of the country the tool is modified to be best suit of the situation at hand. The modification made to include some information specifically related to criteria for selection of medical supplies, description of medical supplies, and list of some medical supplies to check their availability.

4.9.2 Data collection Techniques

The primary quantitative information was collected through interview using the structured questionnaire with health-facility pharmacy personnel and other staffs involved in selection and quantification of health commodities, observation and assessment of facility records like bin cards, dispensing records and list of products procured over a defined period of time. In addition a qualitative data was collected using in-depth interview with principal respondent's including head of pharmacy staff and managers of selected health facilities, observation, physical inventory, and assessment of facility records was employed.

4.9.3 Measurements

The following list of medical supplies and product categories were part of the scope of measurements in this study at each public health facilities.

Surgical Sutures

- Absorbable sutures
- Non absorbable sutures

Injection Supplies: include

- Syringe and Needles
- IV Cannulas, and
- Scalp vein sets

Tubes and drains:

- Naso-gastric tube
- Foley catheter
- Endo tracheal tubes

Protective supplies:

- Surgical Gloves
- Examination Gloves

Supplies for Surgical Dressing: include

- Absorbent Cotton
- Absorbent Gauze
- Gauze Bandage
- Adhesive Tape

4.9.4 Data collectors

The data collectors who were participate in this study was 4 with diploma level of education who able to facilitate the data collection process in health delivery point. There were two supervisors to follow, control, check the daily activity and who can support the activity of the self-administered data collection.

4.9.5 Data quality control

The quality of the data was assured through careful design, pre-test of the questionnaire and providing proper training of the data collectors and supervisor for a two day long on the data collection procedure and objectives of the study. A pretest was conducted in 5% of the sample population at public health facilities which were not included in the study. Based on the pre-test finding some modification to the instrument was made. The collected data on daily basis was checked by supervisor and the necessary feedback was offered to data collectors in the next day morning before starting the daily activity of data collection.

4.9.6 Data analysis procedures

The collected data was entered using Epidata Version 3.5 and was exported to SPSS version 16.0 for analysis. Frequency, mean, standard deviation and percentage will be used to describe the data. Crude association between dependent and independent variables will be assessed by chi square test at 95% confidence interval.

4.10 Ethical clearance

A letter of ethical clearance was obtained from Jimma university ethical review board before the commencement of the study. Prior to launching the result of the assessment, District health offices and the management from the respective facilities, was informed about the study. Each official in each health facility was communicated with describing the objective of the study to get permission. During data collection, each respondent was told the purpose, scope, and expected outcome of the study. Respondent who are not interested to participate or to answer a specific question in the study could decline or discontinue at any time they prefer. All data are anonymous; no individual or facility was identified in any reports or any publication based on this study.

4.11 Operational Definitions

Selection is process of evaluating and selecting medical supplies among available alternatives that satisfy majority of common health problems of local community.

Quantification is the process of estimating the quantities and costs of selected medical supplies required for a specific health program (or service), and determining when the products should be delivered to ensure an uninterrupted supply.

Product availability: - is the amount of medical supplies stock on hand at the time of visit.

Management ownership (support): is the level of the management of health facilities on system follow up which include establishing DTC, maintaining functionality of DTC, enforce staff to maintain stock records, receiving of stock status report, conducting supervision, allocating appropriate human resource, provision of feed backs, provision of training for staff and others.

Health facilities service volume level: is work load of health facilities and considers low if daily patient load is less than or equal to 50 patients, medium provide service in between 50- 79 per day and high if serves greater than or equal to 80 patients per day according to the FMOH of Ethiopia and additional other four questions which are ART implementing sites, more than 5 dispensing units implementing IPLS, HCMIS implementing sites, at least 3 years since implementing the system and considered high volume when serving more than 80 patients and any three from the rest four or serving more than 50 patients and the all other four criteria (FMOE).

5. Result

Basic Characteristics

A total of 38 public health facilities were involved in this study from them 2 were hospitals, 9 were type A health centers and the rest 27 were type B health centers. From total of 38 public health facilities majority of them 76.3% had access for road and water supply 65.8% to their facility. In addition 84.2% of them had access for operational electricity and 84.2% of them had had access for external means of communication such as land line telephone and internet services.

The two hospitals have pharmacist as principal person (store man) for managing medical supplies. However only 4(44.4%) of type A health centers and 14(51.8%) of type B health centers had pharmacist for managing medical supplies and other pharmaceutical (Fig 2)

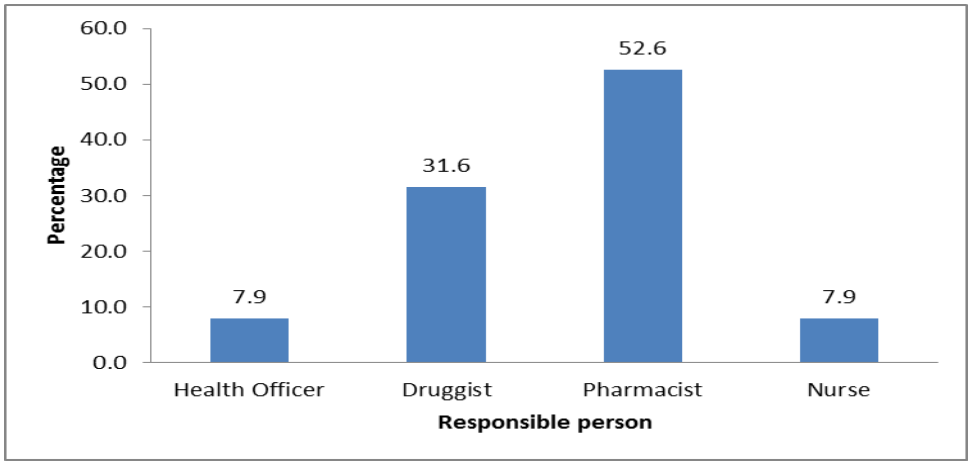

Figure 2: Principal person responsible for managing medical supplies in the health facilities of Jimma Zones, July, 2016.

Majority 31(81.6%) of public health facilities in Jimma zone established DTC in their facility. However only 15(39.5%). In addition from 31 facilities who establish DTC only nearly half 15(48.4%) of them were functional. Likewise, only 11(35.5%) of them members were multidisciplinary and Minute of meeting was recorded and filled in only 10(32.2%) of the facilities (Table 1).

Table 1 Establishment and Functionalities of DTC in health facilities of Jimma Zone, July 2016.

Characteristics	Yes N (%)	No N (%)
Establishment of DTC in the facility	31(81.6)	7(18.4)
Functional DTC of the facility	15(48.4)	16(51.6)
Member of DTC multi-disciplinary	9(29)	22(71)
Health facility management support DTC	11(35.5)	20(64.5)
Minutes of all DTC meeting recorded and filled	10(32.2)	21(67.8)

Practice of Selection of medical supplies by DTC in the health facilities of Jimma Zone were only 8(21%). On the other hand majority of them 68.4% were select only by pharmacy or other health professionals (fig. 3).

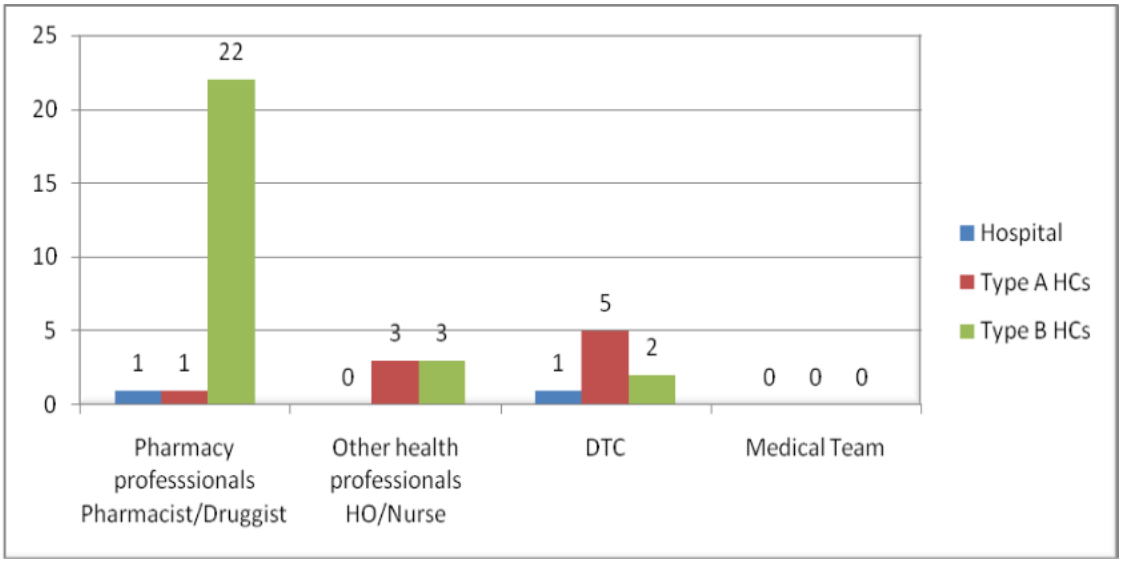

Figure 3: Responsible body for selecting medical supplies in the health facilities of Jimma Zone, July 2016.

Regarding availability of essential documents and references which are necessary for selection medical supplies only 15(39.4%) of health facilities had essential list of medical supplies (ELMS) and 18(47.4) had list of procedures that are performed in their facility. In like manner availability of standard treatment guideline (STG) and national drug formulary (NDF) in these health facilities were less than 60 % (figure 4).

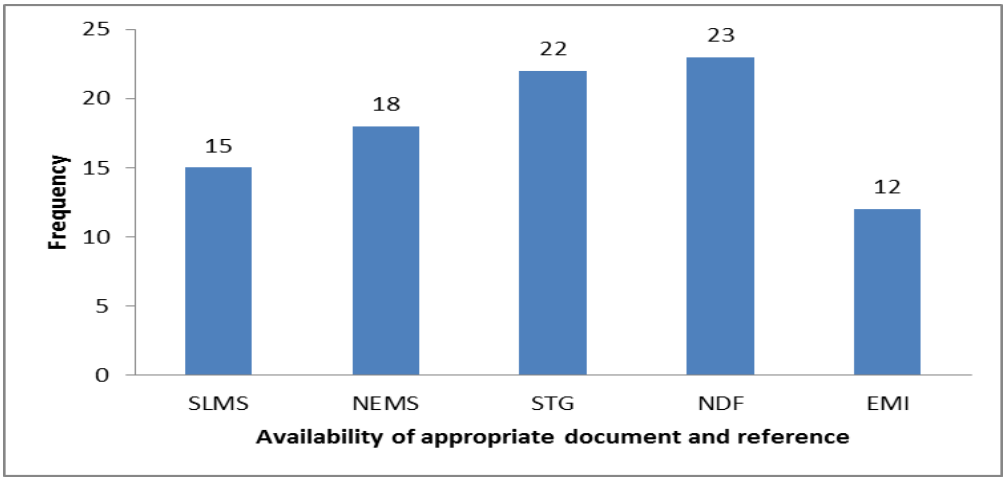

Figure 4: Percentage of health facilities which have appropriate documents to select medical supplies in Jimma Zone, July 2016.

Among general criteria's for selection of medical supplies specific characteristics of individual medical supplies are not considered among hospitals and only one hospital consider disease pattern and availability of products in national list. Similarly consideration of specific characteristics, disease pattern and availability of products in national list were generally less than 43% in type A HCs and less than 40% in type B HCs. On the other hand consideration of general criteria's for selecting medical supplies like specific characteristics, disease pattern, level of the facility and availability of products in national list are not applicable in 3 of type A and in 6 of type B health centers (Figure 5).

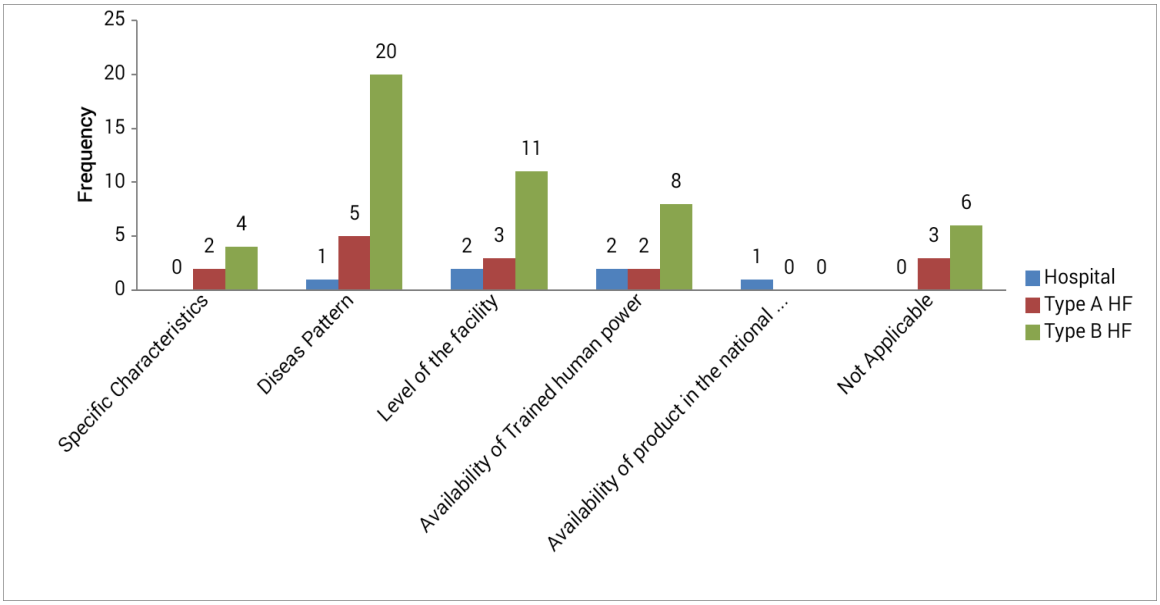

Figure 5: Number of health facilities who consider General criteria's for selecting medical supplies in Jimma zone health facilities, July 2016.

Regarding consideration of selection factors for suturing agents like length of thread in cm, length of needle in mm and shape and curvature of needle tips were almost not considered in all facilities and generally less than 4(44%) in type A and less than 10(37%) in type B health centers. Likewise consideration of selection factors like length of thread in cm, and length of needle in mm, during selection of suturing agents were not applicable in 2 (22.2%) of type A and in 7 (25.9%) type B health centers (Table2).

Table 2: Frequency of health facilities in Jimma Zone by level for consideration of selection factors during selection and description of surgical sutures, July 2016.

Factors considered	Frequency for consideration of such factors during selection of surgical sutures		
	Hospital	Type A HC	Type B HC
Name and nature of the suture	2(100%)	7(77.8%)	19(70.4%)
Gauge in EP and USP standard	2(100%)	4(44.4%)	10(37%)
Length of the thread in cm	0(0%)	2(22.2%)	5(18.5%)
Length of the needle in mm	0(0%)	1(11.1%)	4(14.8%)
Shape and curvature of needle tip	1(50%)	1(11.1%)	0(0%)
Not Applicable	0(0%)	2(22.2%)	7(26%)

In a like manner, regarding selection of injection supplies characteristics like needle length, external diameter, bevel type and type and viscosity of the medication were not considered in both Hospitals during selection of injection supplies and selection factors like needle length, external diameter, bevel type, age of the patient and type and viscosity of the medication were not fully considered and generally less than 3(33%) in type A and less than 10(37%) in type B health centers (Table 3)

Table 3: Frequency of health facilities in Jimma Zone by level for consideration of selection factors during selection and description of injection supplies, July 2016.

Factors considered	Frequency for consideration of such factors during selection of Injection Supplies		
	Hospital	Type A HC	Type B HC
Size of Needle	2(100%)	6(66.7%)	18(70.4%)
Needle Length	0(0%)	3(33.3%)	10(37%)
External diameter	0(0%)	1(22.2%)	4(18.5%)
Bevel Type	0(0%)	1(11.1%)	1(14.8%)
Age of the patient	1(50%)	2(22.2%)	8(0%)
Type and viscosity of medication	0(0%)	1(11.1%)	4(26%)
I don't know	0(0%)	2(22.2%)	7(77.8%)

Similarly consideration of selection factors for surgical glove like hand size of professional, allergy of some professionals, material from which it was produced and lubricants were considered only in 1 hospital, as well as selection factors for surgical glove like hand size of professional, allergy of some professionals and lubricants were only considered in less than 37% of type A HCs and type B HCs (Table 4).

Table 4: Frequency of health facilities in Jimma Zone by level for consideration of selection factors during selection of surgical glove, July 2016.

Factors considered	Facility type		
	Hospital	Type A HC	Type B HC
Size of the gloves	2(100%)	6 (66.7%)	19 (70.4%)
Hand size of professional	1(50%)	3 (33.3%)	10 (37.0%)
Allergy of some professionals	1(50%)	1 (11.1%)	3 (11.1%)
Material from which it was produced (Late or non-latex synthetic polymers)	1(50%)	5 (55.6%)	14 (51.9%)
Lubricants	1(50%)	1 (11.1%)	0 (0.00%)
Not Applicable	0(0%)	1 (11.1%)	6 (22.2%)

Regarding quantification practice of medical supplies as shown in the figure 6, Resupply quantity of medical supplies were determined by facility itself or pull method only in 1of hospital as well as in 55.5% and 44.4% of type A and type B HCs respectively. In addition 11.1% of type A and 33.3% of type B HCs reported that resupply quantity of medical supplies were determined by both facility itself and by higher level (push method). However this decision was made only by higher level in 44.4% of type A and 22.2% of type B HCs (figure 6).

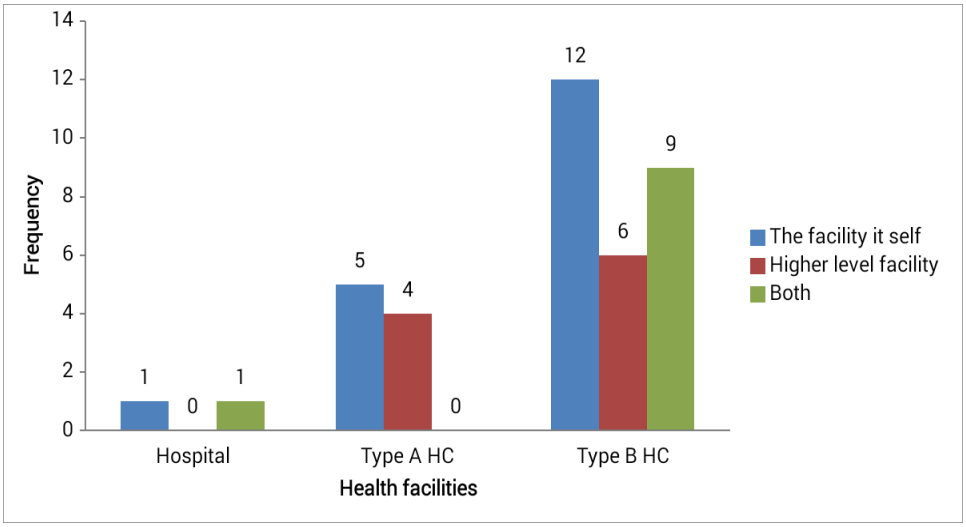

Figure 6: Frequency for Determination of resupply quantities of medical supplies and other pharmaceuticals in Jimma Zone Health Facilities, July 2016.

Regarding Quantification method consumption method were used in all hospitals and in 5(55.5%)

and 22(81.55%) of type A and type B HCs respectively (Figure 7).

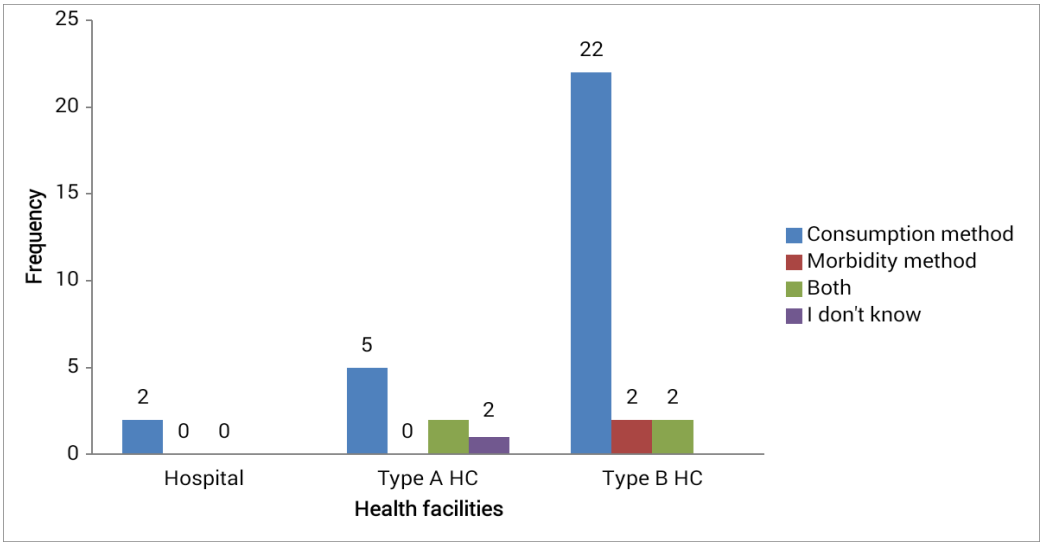

Figure 7: Quantification methods used to estimate quantity of medical supplies during a reporting period in Jimma Zone health facilities, July 2016.

Regarding availability of essential records used for consumption method among 29 health facilities (2 hospital, 5 type A and 22 type B HCs) Stock/Bib cards were available in 18(62.1%) facilities (100% Hospitals, 20% type A HCs, as well as in 15(68%) of type B HCs. Similarly availability of dispensing records was 50% in hospital 40% in type A as well as 59% in type B HCs (Figure 8).

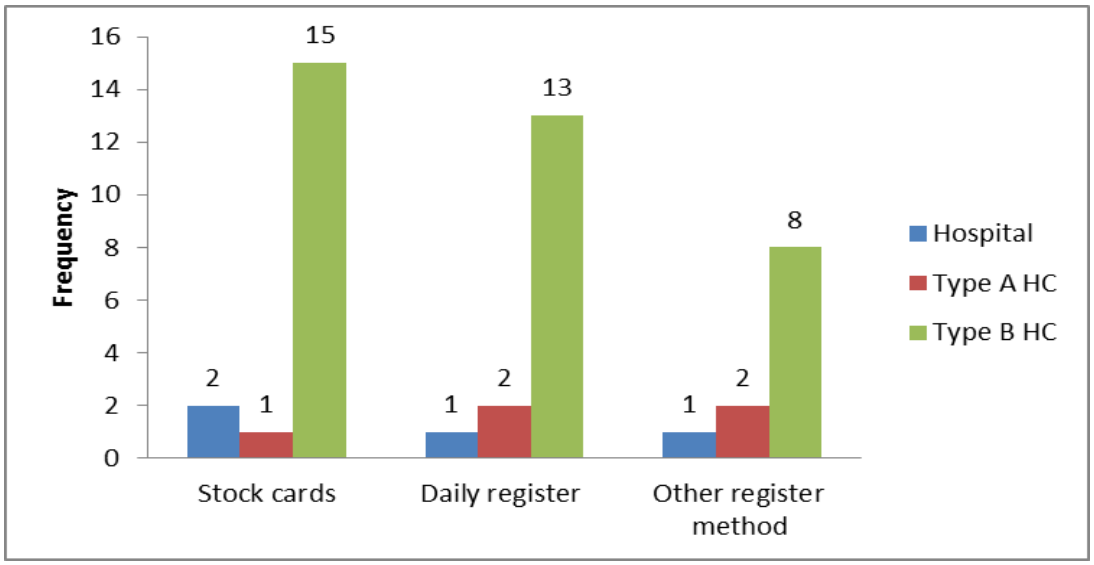

Figure 8: Availability of appropriate documents for consumption method, in health facilities which use only consumption method for quantification of medical supplies, Jimma Zone, July 2016.

Regarding availability of essential records used for quantification of medical supplies like stock/bin cards were available in all hospitals as well as in 5(55.5%) of type A and in 18(59.2%) of type B HCs. Similarly availability of dispensing records was less than 55% in all health facilities (figure 14). In addition computerized inventory management system was started in one hospital and type A HC (Figure 9).

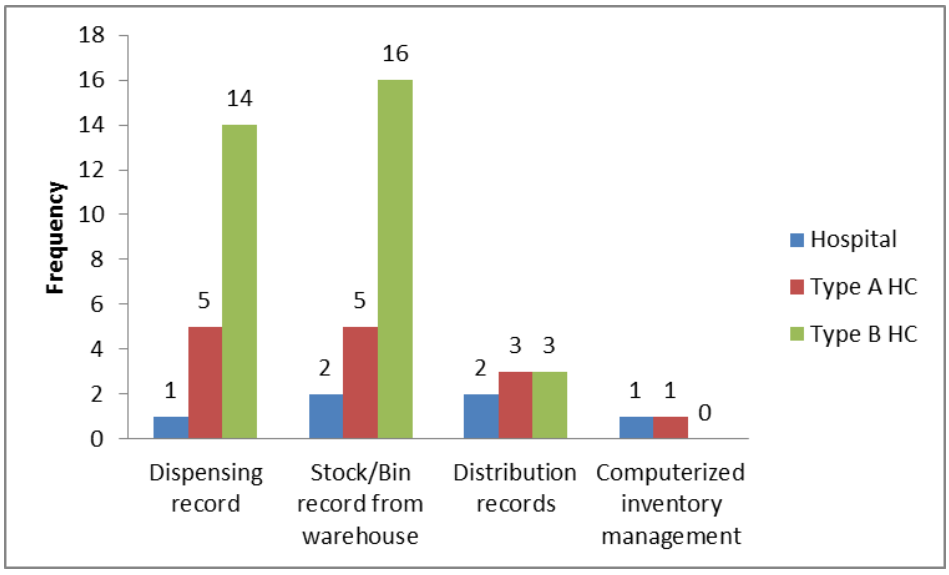

Figure 9: Distribution of health facilities who use types of logistics forms to manage health

products in the health facilities of Jimma Zone, July 2016.

Regarding availability of standard quantification tool all hospitals, 37.5% of type A and 65.2% of type B HCs were use country specific quantification tool which they called reporting and requisition form (RRF). However 28.6% of type A and 30.4% of type B HCs were used other less standard quantification tool and 32.1% of type A and 4.4% of type B HCs do not have quantification tool (Figure 13).

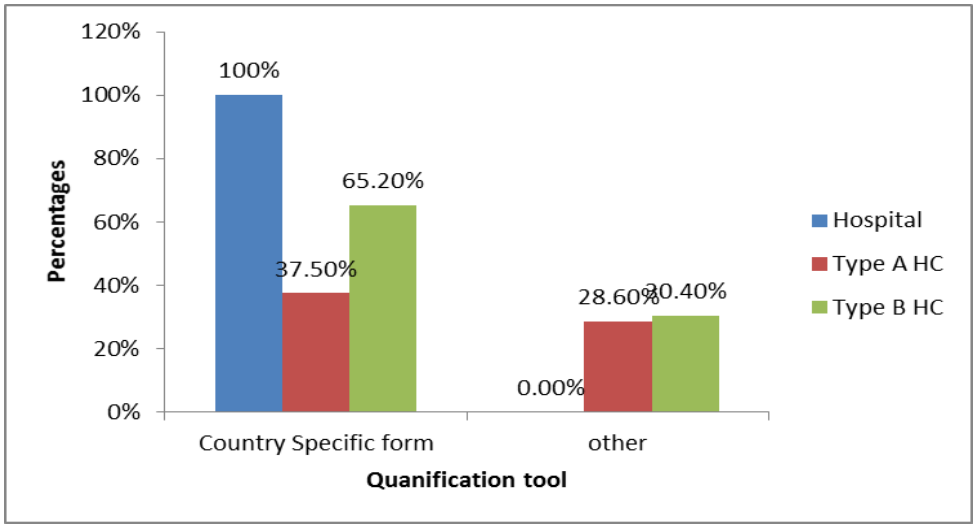

Figure 10: Availability of Quantification tool or LMIS forms used for reporting/ordering in the health facilities of Jimma Zone, July 2016.

Frequency of essential information like Stock on hand, Quantity used, Loss and adjustment, Maximum and minimum stock levels and Product information were 100% for those which use country specific, and in other word their country specific quantification tool contains all essential information which used for quantification of pharmaceutical products. However for those health facilities which use other less standard quantification tool frequency of information content was less than 50% (Table 5).

Table 5: Percentage of Information content of Quantification tool of health facilities of Jimma Zone, July 2016.

Types of information	Hospital	Type A HC	Type A HC	Total
Stock on hand	100	62.5	63.0	64.9
Quantity used	100	62.5	70.4	70.3
Loss and adjustment	100	62.5	66.7	67.6
Max and min stock levels	50	71.4	59.3	61.1
Specific product characteristics (number of units per pack size, unit cost, etc.)	50	75.0	81.5	78.4

Regarding lead time, the approximate time between an order initiated and received either from PFSA or when purchased from private suppliers according to the respondents was less than 1month for the larger portion 34(89.5%) of the health facilities (Figure 11).

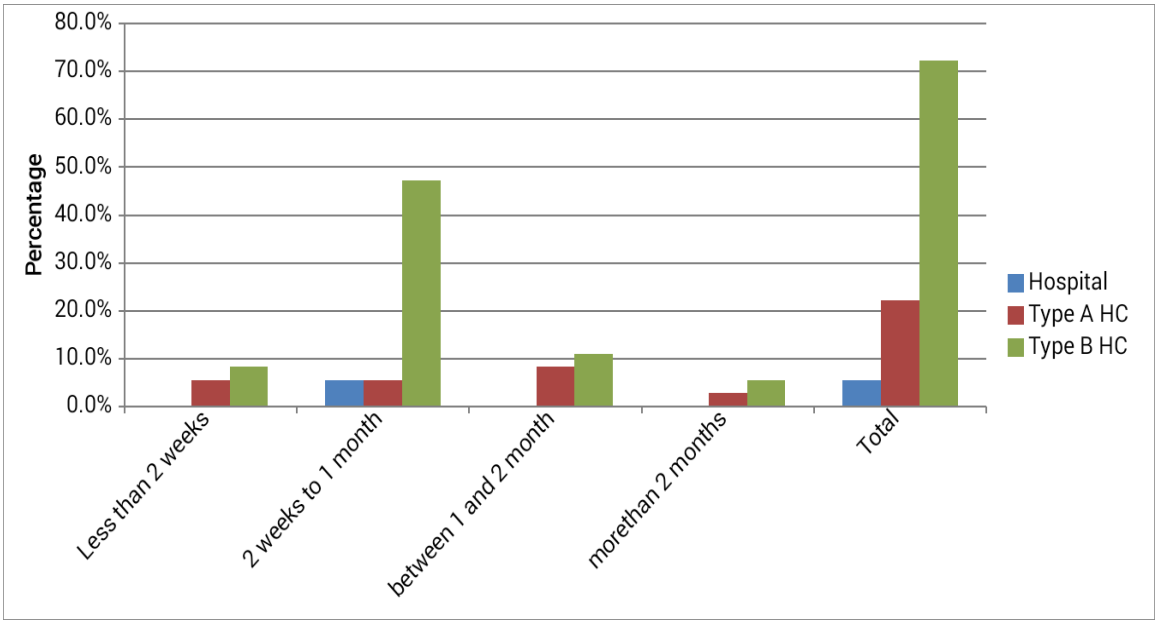

Figure11: Lead time it takes between ordering and receiving products by health facility type in Jimma Zone, July 2016.

Most health facilities 40% reported receiving supervision within the last month before day of visit and around 25% of facilities received within three months. However, around 15 percent of health facilities in type B HCs never received any supervisory visit for more than six months ago (figure 12).

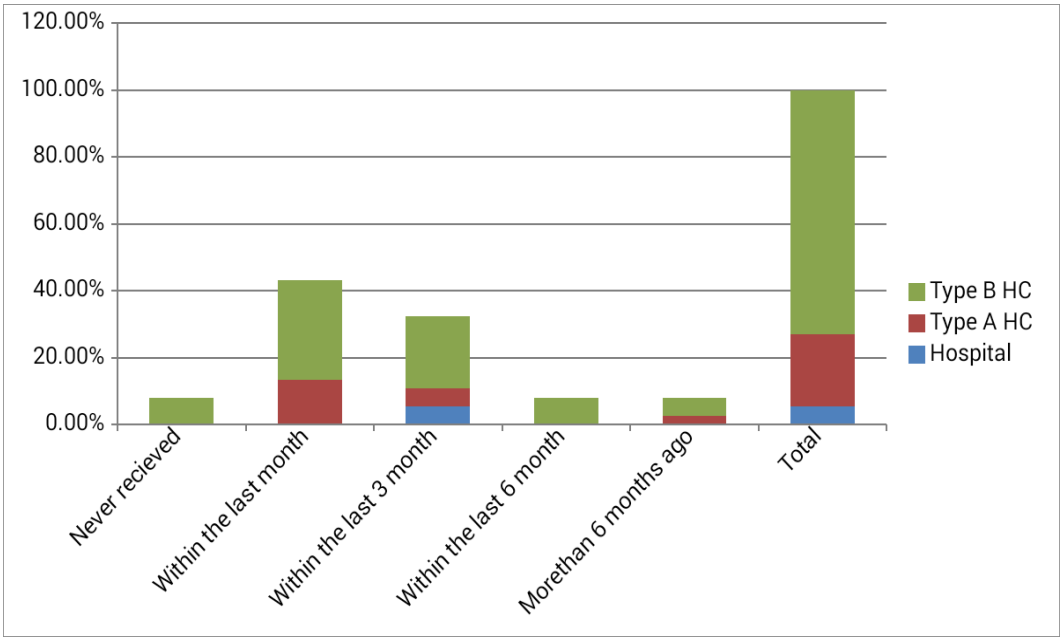

Figure12: Percentage of facilities receiving supervision visit by facility type, in Jimma zone, July 2016.

5.3. Availability of the commonly used medical supplies

Availability of 23 selected common medical supplies on the day of visit (Point availability) and percentage and frequency of stock out of such medical supplies during the past six month before day of visit was assessed in these public health facilities. As a result Point availability of these 23 common medical supplies was 64.97% and these public health facilities were stocked out for 15.6% of medical supplies at least one times during the last one month and stocked out for 21.9%, 18.8% and 3.1% at least one times, two and three times respectively during the last two month.

When it was assessed for each level of health facilities percentage availability was 84.77%, 58.28% and51.87% in hospitals, type A and type B HCs respectively. In addition when it was assessed for products category percentage availability was 45.8%, 58.9%, 23.65%, 97.25%, and 96.1% for Suturing agents, Injection supplies, Tubes, Supplies for surgical dressing and protective supplies respectively. Similarly when average availability by product was assessed out of 23 selected common medical supplies average availability of 9 products was below 50% and average availability of 5 products were within 51% to 65%. And average availability was below 15% in type A HCs and below 10% in type B HCs for products like Catheter Foley Silicon zed Latex 5-15 ml balloon sterile three ways size 14 Ch., Endotracheal tube sterile CH 8, sterile CH 8, Nasogastric tube adult size Ch. 16 and Nasogastric tube sterile Ch. 12 (Table 6).

Table 6: Point availability of 23 common medical supplies (n=23) at 38 public health facilities Jimma Zone, July 2016.

Type of Items	Specific Name of the Items	Hospital	Type A HC	Type B HC	Total
		N (%)	N (%)	N (%)	
Suturing agents	Catgut chromic gauge 3.0(3/0) 75cm on 25 mm ½ circle Round Bodied Needle	2 (100%)	8(88.9%)	22(81.5%)	32 (86.2%)
	Catgut chromic gauge 4.0(0) 75cm on 30mm ½ circle round Bodied Needle	2 (100%)	7(77.8%)	11(40.7%)	20 (52.6%)
	Catgut chromic gauge 5.0(1) 75cm on 48mm ½ circle round Bodied Heavy needle	1(50%)	2 (22.2%)	3(11.1%)	6 (15.7%)
	Catgut chromic gauge 6.0(2) 75cm on 35mm ½ circle round Bodied needle	1(50%)	3 (37.5%)	5(18.5%)	9 (23.6%)
	Mersilk Braided Black Gauge 4.0(1), 75cm on 30 mm ½ circle round bodied needle.	1(50%)	7(77.78%)	20(74%)	28(73.7%)
	Mersilk Braided Black Gauge 6.0 (3),75cm on 38 mm 1/2 Circle round bodied Needle	2(100%)	3 (33.3%)	5(18.5%)	10 (26.3%)
Injection supplies	Disposable syringe,3 parts, 3ml lure fitting to 18G Needle	2(100%)	8(88.9%)	25 (93%)	35 (92.1%)
	Cannula Intravenous Set Sterile Polythene with introducer needle and injection Valve external Diam. 0.7mm Length 19mm 24G	2(100%)	8(88.9%)	12(44.4%)	22(57.9%)
	Cannula Intravenous Set Sterile Polythene with introducer needle and injection Valve external Diam. 0.9mm Length 25mm 22G	2(100%)	6(66.7%)	15(55.6%)	23 (60.5%)
	Cannula Intravenous Set Sterile Polythene with introducer needle and injection Valve external Diam. 1.1mm Length 32mm 20G	2(100%)	5(55.56%)	17(63%)	24 (63.1%)
	Scalp Vein Set Winged infusion set 19mm simonized cannula with 30cm extension tube sterile size 23 G	2(100%)	5(62.5%)	1 (3.7%)	8 (21%)
Tubes	Catheter Foley silicon zed latex 30-50ml balloon sterile three ways size 16 Ch.	2 (100%)	6 (66.7%)	14(51.8%)	22 (62.9%)
	Catheter Foley Silicon zed Latex 5-15 ml balloon Sterile three ways size 14 Ch.	1 (50%)	1 (11.1%)	0 (0.0%)	2 (5.3%)
	Nasogastric tube adult size Ch. 16	2 (100%)	1 (11.1%)	9(33.3%)	13 (34.2%)
	Nasogastric tube sterile Ch. 12	1 (50%)	0 (0.0%)	7 (25.9%)	8 (21%)
	Endotracheal tube, sterile CH 8	1 (50%)	1 (11.1%)	0 (0.0%)	2 (5.3%)
	Endotracheal tube, sterile CH 4	2 (100%)	2 (22.2%)	1 (3.7%)	5 (13.2%)
Supplies for Surgical Dressing	Roll bandage 100% cotton, dimension 19x15, size	2 (100%)	9 (100%)	26 (96%)	37 (97.4%)
	Gauze surgical size 90cmx100cm, ply type	2 (100%)	9 (100%)	27(100%)	38(100%)
	Cotton roll 100mg	2 (100%)	9 (100%)	24 (89%)	35 (92.1%)
	Adhesive plaster	2 (100%)	9 (100%)	27(100%)	38(100%)
Protective supplies	Examination glove non sterile	2 (100%)	9 (100%)	24 (89%)	35 (92.1%)
	Surgical glove sterile latex no 7	2 (100%)	9 (100%)	27(100%)	38(100%)
	Average Availability	**84.77%**	**58.28%**	**51.87%**	**64.97%**

5.4. Challenges of Selection and Quantification for Basic Medical Supplies in Public Health Facilities

Majority of the respondents (85%) agreed that lack of accountability among professionals was one of a great challenge that affect selection and quantification of medical supplies in their health facility.

*"*When respondents were asked what are the specific challenges related to lack of accountability among professionals in their facility they respond that:-

"Not enforce establishment of DTC and not participate in selecting essential list of medical supplies for their facilities (pharmacy head), Not maintaining stock card, bin card, transaction and consumption record for medical supplies and other pharmaceutical in store room and dispensary unit (pharmacy personnel in store room and pharmacy dispensary and other non-pharmacy professional in dispensing unit), Not filling and maintaining the prescription registration book in dispensing unit, Not completing facility combined RRF as per their schedule and submit to PFSA and RHB (pharmacy personnel in store room), Not following timely reporting and data quality of RRF and other records, and unable to procure commodity not available in PFSA (pharmacy head)."

Most respondent greater than (80%) perceived that lack of budget was not a problem in their facility because of implementation of health care financing and additional budget of 180, 000 Ethiopian Birr from Oromia health bureau. However "*limited accessibility to locally mobilized drug funds, bureaucratic public procurement process for accessing locally mobilized drug funds were some challenges to use budget of health care financing".*

Greater than half of the respondents (65%) also agreed that "*Lack of appropriate professionals especially pharmacist and lack of accountability among professionals was a critical challenge that affect managing, selection and quantification of medical supplies in their health facility".* Similarly most respondent 95% agreed *Capacity building activities especially training on selection, and quantification of medical supplies was a critical factor that affects practice of selection and quantification of medical supplies in their health facility.* Another barrier mentioned by some of the respondents was that "*there was turnover among pharmacy staff where the trained and experienced store keepers were replaced by another staff that was new to*

storekeeping".

Almost half of the respondents (55%) agreed that *lack of management support was one of the challenges that affect selection and quantification of medical supplies in their health facility,* but this problem was mostly observed in type B HCs when compared to type A HCs and hospitals. In addition some respondent (20%) agreed that "*lack supervision was also problem of their facility".* When respondents were asked what are the specific challenges related to management support in their facility, they respond that "*un able to force establishment of DTC and follow its functionality, selecting essential list of medical supplies for their facilities, preparing job description for professionals especially for pharmacist, not allocating appropriate human resource and giving and capacity building (training) activities, and un able to give supervision monitor in sustained manner".*

Around 70% of the respondent agreed that "*out of stock of some medical supplies was a challenge in their facility"* but according those respondent, "*problems that related to expiry and over stock of medical supplies was not a problem in their health facility".*

Greater than half of the respondent (60%) perceived that "*having only one supplier was a challenge related to practice of those products because public procurement policy was not flexible to select other private suppliers. In addition unreliability of getting medical supplies needed for health facility or denial of supply of needed medical supplies, Long delay in supply of drug and medical supplies and Supply of expired and unmatched drugs and medical supplies were some challenges related to PFSA".*

Recommendation to improve the existing practice of those products

To improve the process selection and quantification practice of medical supplies respondents forwarded couples of recommendations as summarized below.

"PFSA should enhance its capacity on supplying drugs and its service delivery, Unreliability of getting medical supplies needed for health facility or denial of supply of needed medical supplies, Long delay in supply of drug and medical supplies, Supply of expired and unmatched drugs and medical supplies. Priority should be given to HCs with high patient flow in resupplying, and PFSA should be networked with all HCs by information and communication technologies

Adequate budget should be allocated, under budgeting and limited accessibility to locally

mobilized drug funds, insufficient funds from central government to meet local drug demand, bureaucratic process for accessing locally mobilized drug funds should be improved from government part.

Revolving fund in which the health facilities use the income generated from the sale of drugs should be created without imposing limitation in the number of cycles that can be made, and should provide a permit to purchase from private suppliers immediately if it doesn't have the drugs.

Communication between HCs should be improved

Continues training should be given on the LMIS, Adequate awareness should be created on staff that works in dispensary units other than the pharmacy, until they internalize the system.

HCs should own the LMIS, the LMIS should be computerized".

Association between selection and forecasting practice, and health facilities related indicators

Descriptive Statics

From the total of 38 assessed health facilities 18(47.4%) fulfilled at least eight criteria's and considered as acceptable level of Selection and forecasting systems performance and 20(53.6%) considered as inacceptable.

The management ownership level of the facilities measured on various aspects found that 17(44.7%) with good and 21(55.3%) with poor management ownership. All the 16(94.1%) health facilities with good management support performed acceptable level of selection and forecasting system performance for medical supplies and from the poor management ownership health facilities only 1 performed acceptable level of performance. In other word there was significant relationship between good management support and performance of selection and quantification practice of medical supplies.

With regards to product availability 10(26.3%) these health facilities in the study areas had percentage of product availability >65% and from these 68(80%) performed acceptable and 2(20%) performed unacceptable performance of selection and forecasting practice of medical supplies. This relationship indicates that there was association between product availability and performance of selection and quantification practice of medical supplies.

Regarding health service volume the study covered 2(5.3%) high volume both are hospitals and performed acceptable level. However from 36 low volumes health centers 16(44.4%) performed acceptable level of selection and forecasting performance practice and 20(55.6%) performed un acceptable. On the other hand this may indicate that there was no relationship between health service volumes and performance of selection and quantification practice of medical supplies (Table 7).

Table 7: Relationship between health institutions related factors and performance of selection and quantification system

Characteristics		**No**	**%**	Performance of Selection and Quantification Practice			
				Acceptable		**Unacceptable**	
				No	**%**	**No**	**%**
Functional DTC	Yes	15	39.5	12	80	3	20
	NO	23	60.5	6	26.1	17	73.9
Management ownership (support)	Good	17	44.7	16	94.1	1	5.9
	Poor	21	55.3	1	4.8	19	95.2
Availability Budget	Yes	33	86.9	18	54.5	15	45.5
	No	5	13.1	0	0	5	100
Product Availability >65%	Yes	10	26.3	8	80	2	20
	No	28	73.7	12	42.9	17	57.1
Availability Consumption Records (both dispensing and Bin card)	Yes	18	44.4	12	66.7	5	33.3
	No	20	52.6	6	30	15	70
Type of Health Facility	Hospital	2	5.3	2	100	0	0
	Type A HC	9	23.7	4	44.4	5	55.6
	Type B HC	27	71	12	44.4	15	55.6
Service Level Volume	High	2	5.3	2	100	0	0
	Low	36	94.7	16	44.4	20	55.6

To test relationship (whether appositive or negative) between these characteristics and selection and quantification practice of medical supplies, Pearson's Chi-Square Test and Fisher's Exact Test was used. Accordingly for functional DTC and management ownership (1st, 2nd and 3rd columns of table 9 below) Pearson's Chi-Square Test was used and for the rest fisher's exact test was used.

The result of (χ^2= 10.86, **P**=0.001), (χ^2 = 10.45, P=0.001) and (χ^2 = 6.65, **P**=0.01) on table 8 below for functional DTC, management ownership and Availability Consumption Records respectively indicate that there was significant association between them and performance of selection and quantification practice of medical supplies because at 0.05 level of significance p-value of 0.001 and 0.01 was less than 0.05. Similarly P-value of 0.048 and p-value of 0.027 for availability of budget and Product percentage availability >65% respectively indicate that there was a positive association between them and performance of selection and quantification practice of medical supplies. On the other hand P-value of 0.218 for service level volume indicate that no association between service level volume and performance of selection and quantification

practice of medical supplies because at 0.05 level of significance p- value of 0.218 was greater than 0.05.

Table: 8 Chi-Square Test of Association at 5% of significance

Indicators	**Pearson's Chi-Square Test**			**Fisher's Exact Test**	**Comment**
	Value	df	Asymp. Sig (two sided)	Exact Sig (two sided)	
Functional DTC	10.858 a	1	0.001	0.002	No cell count<5
Management ownership (support)	10.450	1	0.001	0.003	No cell count<5
Availability Consumption Records	6.653	1	0.010	0.021	No cell count<5
Availability Budget	5.182 a	1	0.023	0.048	2 cell count (50%) have <5
Product percentage availability >65%	5.797a	1	0.016	0.027	1 cell count (25%) have <5
Service Level Volume	2.346a	1	0.126	0.218	2 cell count (50%) have <5

6. Discussion

Regarding selection practice, this study documented that almost all of health facilities 30(68.4%) Selection of medical supplies was not made by DTC and only 21% of health facility approved facility specific list of medical supplies by DTC. Moreover this study also revealed that non functionality or weakness of DTC was a barrier for good selection practice. According to the standard, DTC representing different service units of the health facilities and shall be involved in the selection of medicines (FMHACA, 2011a).

Likewise selection was not evidence based due to non availability of essential documents and references which are necessary for selection of medical supplies. In addition consideration of general criteria's for selection of medical supplies like specific characteristics of individual medical supplies; disease pattern and availability of products in national list were not considered in more than 50% these health facilities. Furthermore none of health facilities fully consider all factors (specific characteristics) during selection and description of suturing agents, and injection supplies.

The result of this study finding was somewhat improved when compared with other related study conducted in Oromia region since 2016 which stated that out of assessed health facilities only 33.55 % of Hospitals and 17.1% of HCs have functional DTC. Similarly it was comparative with a study done in Tanzania which states that from 27 surveyed health facilities only 38% of them had EDL out of which only 52% of facilities procured medicines within the EDL (MOHSW, 2008).

However less than achievement of hospitals in Ethiopia when compared with other study conducted on Operational Status and Effectiveness of Drug and Therapeutics Committees (DTCs) at Public Hospitals in Ethiopia which stated that from supervised hospitals around 63% of them established DTCs, had an action plan and (52%) updating the drug list. Likewise this study finding was not encouraged when relate to study finding of on Assessment of Pharmaceutical Logistics System in Health Centers of Addis Ababa, Ethiopia, August, 2014 that almost all of the HCs had their own EDL, and in most HCs selection of drugs was made by DTC and all of them using pattern of prevalent disease as a criterion which is in line with the standard.

According to WHO essential drug concept, and working guideline for establishment of DTC in Ethiopia each country and each health facility should have their own list of essential drugs and

product selection and formulation of facility specific list of essential medicine may be the responsibility of DTC. However noncompliance of these restricted selection factors by these health facilities may lead to frequently spent out of limited available funds on ineffective, unnecessary, or even irrelevant to the basic needs of the local population (3).

Similarly if such selection factors are not considered according to level of health facilities and type of service provided it was difficult to avail specific suturing gents, injection supplies and others which match specific anatomic positions of the patient, specific age of individual patients and type of medication administered. This further leads to either of unreliable referral of patients, use of products which doesn't match to specific anatomic positions and age of the patient which further Cause complication like muscle atrophy, sterile abscess, pain, nerve injury and loss of life (Hunter, 2008 , Ogston-Tuck, 2014a).

Regarding Quantification Practice this study also documented that, Resupply quantity of medical supplies were determined by facility itself or pull method in only 50% of health facilities of Jimma zone. Similarly, even though most health facilities 76.3% were used consumption method of quantification, essential records used for Consumption method like Stock/Bib cards were not available in 60% of HC with worsen in type A HC and dispensing records were not available in 50% of these health facilities. Furthermore 32.5% of them doesn't use standard country specific quantification tool (reporting and requisition form for RDF supplies and diagnostic reagent RRF 7 for Hospital and RRF 8 for HCs) to determine the resupply quantity.

The result of this finding was not satisfactory when compared with related study conducted in Addis Ababa which found that, 50% hospitals and 54% of health centers were currently using stock/bin cards to track all HIV/AIDS and TB laboratory commodities in their main pharmacy store. Likewise according to other study conducted in Oromia region since 2016, among assessed facilities 66% of hospitals and 61% health centers were using stock/bin cards for essential medicines in pharmacy store, which were better and higher than our finding in case of hospitals and lower than in case of health centers.

Similarly the result of this finding was not satisfactory when compared with study finding on national survey of IPLS in health facilities of Ethiopia which states more than 90 percent of facilities determine resupply quantity by them self and prepared and submitted their reports

every two months by using standard country specific quantification tool (RRF).

On the other hand the result of this study finding was somewhat comparative when relate to study finding of on Assessment of Pharmaceutical Logistics System in Health Centers of Addis Ababa, Ethiopia, August, 2014 which revealed that resupply quantity was determined by consumption method by all 24 (100%) of the HCs while 4(16.7%) of them used morbidity method as well. Majority 18(75%) of them determined the resupply quantity using a standard formula; the rest 6(25%) determined it by guess.

According to standard operating procedure (SOP) manual of IPLS in health facility of Ethiopia all health facilities were expected to quantify their annual requirement and to submit to the nearby PFSA hub, and they were responsible for determining resupply quantity of medical supplies they need based on their past consumption method and service level by using both LMIS data to determine rate of consumption and HMIS data for types of service they provide.

Similarly according to (WHO, USAID Deliver) quantification and selection, absolutely needs essential data items: stock keeping records like stock card or Bin card and dispensing registers. Ideally, for some products like medical supplies for which their selection based on type of services provided, both the consumption and the morbidity method can be used.

When there are poor stock records, quantification will be made based on inaccurate data, which leads to stock-outs and/or overstock and loss of resource. When this happens in a country like Ethiopia, where there is shortage of adequate financing for essential medicines, the consequences can be dire (APTS in Addis).

Availability of common medical supplies were assessed using different approaches such as average availability on the day of visit, products that are reported to often stock out, frequency and duration of stock outs for last six months prior to the day of visit. Accordingly Point percentage availability of 23 selected common medical supplies in 38 public health facilities was 64.97% which was 84.77% in hospitals, 58.28% type A and 51.87% in type B HCs. Conversely they were stock out for 21.9%, 18.8% and 3.1% at least one times, two and three times respectively during the last two month regarding to frequency of stock out (Figure 20).

This study finding was not in line with one study conducted in health centers of rural Ethiopia

which indicate that the availability based of essential drugs at facility level was 91% based on a list of selected drugs and 84% based on prescriptions filled and one in six patients was forced to purchase drugs in the private sector, where drugs are roughly twice as expensive. However the of result this study finding was improved when compared with an assessment findings on availability Medical Supplies in 54 Hospitals of Tanzania Mainland, show that a majority, (94%), of hospitals reported being out of stock of one or more essential medical supplies. For medical supplies the specific items commonly out-of-stock were gloves (in 83% of the hospitals), sutures (48%), Gauze (39%) for a period exceeding 4 weeks.

Out of stocked for these essential supplies which used for various examinations and surgical procedures are due to cumulative effect of poor selection and quantification. Lack of such supplies can compromise the quality of care and influence morbidity and mortality rates. Often unavailability of essential medical supplies such as sutures can lead to unnecessary referrals to higher-level facilities at the cost of time to the patient and increased patient burdens at the higher facilities. Also, unavailability of medical supplies has been reported as one of the delays causing increased maternal deaths (Sikika, 2011a).

Finally result of association part reveled that there were significant association between performance of selection and quantification practice of medical supplies and management ownership functional DTC, availability consumption records and availability of products. On the other hand there is no association between service volume level and performance of selection and quantification practice of medical supplies (Table 9).

The result of this finding was in line with studies in South Africa and Kenya showed low availability of essential drugs were greatly interrelated with the poor inventory management system, difficulties in getting accurate records, lack of management follow up, allocation of inappropriate type of professionals (Management sciences for health, 2006).

Similarly according to one studies in Indonesia hospital the work poor inventory control system in hospitals had no relation with high work load and service volume of the health facility (Godeliver A.B et.al, 2012).

6. Strengths and Limitations of the study

This study combined both quantitative and qualitative method to supplement the findings each other. Moreover, this study is the first to study the selection and quantification of medical supplies in study area

The limitations include lack of similar studies especially in Ethiopia related to made difficult for comparing and contrast results.

The findings of this study were from only primary health tiers perspective (district hospitals and HCs) and did not include other secondary and tertiary health tiers of Ethiopia.

7. Conclusion and Recommendations

7.1 Conclusion

It can be concluded from this study that Selection practice of medical supplies was almost not exist, majority of these health facilities doesn't have functional DTC, and selection was not performed by DTC and doesn't approved facility specific list of medical supplies by DTC, and consideration of individual characteristics of medical supplies as selection factors was not given attention. In addition essential LMIS records used for quantification of health commodities like Stock/Bib cards and dispensing records were not available in majority (>55%) of these health facilities hence quantification and determination of re supply quantity was not evidence based and done by guess. Furthermore such poor practice (irrational selection and forecasting) were one of the courses of low availability of these essential medical supplies in these health facilities.

7.2 Recommendations

Based on the finding of this study the following recommendations can be drawn

DTC in HCs should be strengthening by each health facilities and all medical supplies shall be selected by DTC.

Consumption data for medical supplies should available and at all times and should be regularly updated and forecasting shall be done based on actual consumption data.

Both consumption and morbidity method of quantification should be considered during forecasting quantity of medical supplies.

Management ownership (support) of each health facilities should improve.

Specific characteristics of individual medical supplies should be considered as selection factors during selection of medical supplies.

Table:-9 Health facility assessment tool for selection and quantification of medical supplies

Facility Services and Infrastructure	
Facility Identification	
Name of the facility_____	
Facility location	
City/town: _____ Region_____ District _____	
Facility Type	
Code of the facility • District Hospitals 1 • Health center 2 Operating Authority 1=MOH, 2=NGO	SDP Facility Type • High volume Health Center Type A • Medium volume Health Center Type
Facility characteristics:	
Tarmac to the facility? (0=no; 1=yes Operational electricity on day of visit? (0=no; 1=yes) Operational water in the building on the day of visit? (0=no; 1=yes)	Tarmac _____ Electricity _____ Water_____ External Communication (Operational telephone or radio)_____

Information about Interview			
Date: _____	Date	Month	Year
Interviewer/s:_____	-------	---------	--------

Introduction

Introduce all team members and ask facility representatives to introduce themselves.

Explain the objectives of this survey:

Good day. My name is _____. I am student of Jimma University pharmaceutical supply chain management (MSc) program. I am conducting a survey of selection and quantification practice of medical supply. I am looking at the availability of selected commodities and information about how you select, quantify those products. I am visiting selected health facilities throughout the Jimma Zone; this facility was selected to be in the survey. The objectives of the survey are to collect current information on Selection and quantification practice.

No	Questions	Code Classifications	Comment
01	Can we continue?	Yes No	
02	Name and title and of person interviewed for this section		
03.	Number of years and months you have worked at this facility?	Years: _____ Months:	
04.	**Information about human power** write the number of health professions if available and write zero if not available		
	- General Practitioners (GP) ___ Health Officer __ Nurse __	- Druggist ____ Pharmacist ___ - Midwifes__ Other (Specify) ____	
05	Who is the principal person responsible for managing medical supplies at this facility?	○ Health Officer ○ Druggist ○ Pharmacist ○ Nurse ○ Other (Specify)	

First, ask the following questions of the in-charge or acting facility manager. After asking questions for selection, quantification and Availability of common Medical Supplies parts visit the storeroom, or storage area where the health products managed.

1- Selection of Medical Supplies		
1	Who was responsible to select medical supplies for this facilities	
	○ Pharmacist ○ Nurses ○ HO	○ DTC ○ Medical team
2	Does your facility have DTC?	
	○ Yes, but not functional ○ Yes, and functional	○ No
3	If your answer of number 2 is yes, and functional, select and thick to the following alternative regarding DTC of your facility, More than one alternative is possible, If the answer is yes please check availability of the written document like minutes of all DTC meeting	
	○ Are member of DTC multi-disciplinary ○ Does health facility management support DTC	Does minutes of all DTC meeting recorded and filled (check for availability of minutes)
4	Does your facility consider general criteria for selection of pharmaceuticals and medical supplies? More than one alternative is possible	
	○ Specific characteristics of individual medical supplies ○ Disease pattern of your local	○ Availability of the product in national medicine list for each level of health facilities

facility ○ Level of your facility ○ Availability of trained human power	○ I don't know ○ Not applicable
5	Do your facility have the following documents, and reference, If the answer is yes please check availability of the written document of standard list and reference
Standard list of medical supply for this Facility?	Yes_____ No_____
List the procedures (medical, surgical, etc.) that are performed in your facility.	Yes_____ No_____
National list of essential medicine for hospital or health center	Yes_____ No_____
Standard Treatment Guideline (STG)	Yes_____ No_____
National Drug Formulary	Yes_____ No_____
6	Which factors you considered in choosing the suturing agent for your facility and or your department? More than one alternative is possible
○ Nature of the Suture (absorbent/ nonabsorbent) ○ Gauge in EP standard and in bracket ○ Length of thread	○ Length of needle ○ Shape and curvature of needle tip ○ I don't know ○ Not applicable
7	Does description of surgical sutures of this facility contain the following information (check from bin card, list of medical supply or other documents?)
○ Name and nature of the Suture, ○ Gauge in EP standard and in bracket USP standard ○ Length of thread in cm,	○ Length of needle in mm, ○ Shape and curvature of needle tip ○ I don't know - Not applicable

8	What type of characteristics you consider during Selection of injection supplies (IV cannula and surgical Needles) for your facility and or your department? More than one alternative is possible	
	○ Size of needle (Gauge) ○ Needle length ○ External diameter ○ Bevel type	○ The size and age of the patient ○ The type and viscosity of the medication ○ I don't know ○ Not applicable
9	Does description of injection supplies (IV cannula and surgical Needles) of this facility contain the following information (check from bin card, list of medical supply or other documents?)	
	○ Name of the cannula ○ Gauge (size)	○ Length of needle ○ External diameter
10	Which factors you considered in choosing selecting surgical gloves for your facility or department?	
	○ Size of gloves ○ Hand size of professionals ○ Allergy of some professionals ○ Material from which it was produced (Latex or non-latex synthetic polymers)	○ Lubricants ○ I don't know ○ Not applicable
11	Which factors you considered in choosing dressing supplies for your facility or department?	
	○ The wounds characteristics and stage of healing i.e.(necrotic, slough, infected, granulated) ○ Economic factors	○ Clinical effectiveness ○ I don't know ○ Not applicable

2 - Quantification of Medical Supplies		
1	Who determines this facility's resupply quantities? (Circle all that apply.)	
	○ The facility itself ○ Higher-level facility	○ Other
2	How are the facility's resupply quantities determined?	
	○ Quantification tool ○ Formula (specify)	○ Don't know ○ Other means
3	What type Quantification methods do you use to estimate quantity of medical supplies during reporting period (check for availability)	

	○ Consumption method ○ Morbidity method ○ I don't know	o Not applicable o Other specify
4	If your answers to question o 1 is consumption method do you have these data	
	○ Dispensing record ○ Stock record from warehouse	○ Distribution records (Invoice from warehouse like Receiving voucher /Issuing voucher) ○ Computerized inventory management
5	If your answers to question no 1 is morbidity method do you have these data	
	○ List of medical supplies ○ Record of specific health problems	o STG o Morbidity data of each health problems (treatment episode)
6	Do you use and fill out the following logistics forms to manage health products?	
	A. stock cards	Yes_____ No_____
	B. Daily register	Yes_____ No_____
	C. other	Yes_____ No_____
7	What quantification tool or LMIS forms do you use for reporting/ordering?	
	A. country specific form	Yes_____ No_____
	B. Other	Yes_____ No_____
8	Does quantification tool or LMIS reports include the following?	
	A. Stock on hand	Yes_____ No_____
	B. Quantity used	Yes_____ No_____
	C. Loss and adjustment	Yes_____ No_____
	D. Maximum and minimum stock levels	Yes_____ No_____
	E. Product information or specific product characteristics (number of units per pack size, unit cost, and others)	Yes_____ No_____
	F. Supplier lead time(s)	Yes_____ No_____
9	How often are these LMIS reports sent to the higher level? (Thick all that applies.)	
○ Monthly ○ Quarterly		○ Semi-annually ○ Annually ○ Other
10	When was the last time you sent an order/report for products at this facility?	
○ Never ○ Within the last month 2 months ago		○ 3 months ago ○ More than 3 months ago
11	How did you learn to complete the forms/records used at this facility?	

	(Circle all that apply.)	
	○ Never learned ○ During a logistics workshop	○ On-the-job training ○ On-the-job (self-learning) ○ Other (specify)
12	On average, approximately how long does it take between ordering and receiving products?	
	○ Less than 2 weeks ○ 2 weeks to 1 month	○ Between 1 and 2 months ○ More than 2 months
13	When did you receive your last supervision visit that included drug management (e.g., stock cards checked, reports checked, expired stock removed, supplies checked)?	
	○ Never received ○ Within the last month ○ Within the last 3 months	○ Within the last 6 months ○ More than 6 months ago ○ Other (specify)
14	Is there sufficient budget in your facility for procurement of all forecasted quantities pharmaceutical products	
	Yes	No
15	What was your felling about commitment of management support your facility regarding medical supplies or other pharmaceutical supply chain management	
	Good	Poor

4- <u>Availability of Commonly Used Medical Supplies on day of visit</u>

Note: For any product that experienced a stock out in the last six months (including the day of the visit), please note reasons (by product).

4.1- Record whether or not the product is available at this facility on day of visit, answer Y for yes or N if no.

4.2- Check if the bin card is available, answer Y for yes or N for no.

4.3- Check if the bin card has been updated within the last 30 days, answer Y for yes or N for no. Note: If the bin card was last updated with the balance of 0 and the facility has not received any resupply, consider the bin card up-to-date.

4.4- Record the balance on the bin card.

4.5- Record if the facility has had any stock out of the product during the day of visit, answer Y for yes or N for no. If products are available outside the storeroom there is no stock out. Visually verify that usable products are in stock.

4.6- Record how many times the product stocked out during the 6 month period before on day of visit according to bin cards, if available.

4.7- Record the total number of days the product was stocked out during the 6 month period before on day of visit, only

Availability of Commonly Used Medical Supplies on day of visit			
Type of Items	**Specific Name of the Items**	**Availability**	
		Yes	**No**
Suturing agents	Catgut chromic gauge 3.0(3/0) 75cm on 25 mm ½ circle Round Bodied Needle		
	Catgut chromic gauge 4.0(0) 75cm on 30mm ½ circle round Bodied Needle		
	Catgut chromic gauge 5.0(1) 75cm on 48mm ½ circle round Bodied Heavy needle		
	Catgut chromic gauge 6.0(2) 75cm on 35mm ½ circle round Bodied needle		
	Mersilk Braided Black Gauge 4.0(1), 75cm on 30 mm ½ circle round bodied needle.		
	Mersilk Braided Black Gauge 6.0 (3),75cm on 38 mm 1/2 Circle round bodied Needle		
Injection supplies	Disposable syringe,3 parts, 5ml lure fitting to 18G Needle		
	Cannula Intravenous Set Sterile Polythene with introducer needle and injection Valve external Diam. 0.7mm Length 19mm 24G		
	Cannula Intravenous Set Sterile Polythene with introducer needle and injection Valve external Diam. 0.9mm Length 25mm 22G		
	Cannula Intravenous Set Sterile Polythene with introducer needle and injection Valve external Diam. 1.1mm Length 32mm 20G		
	Scalp Vein Set Winged infusion set 19mm ionized cannula with 30cm extension tube sterile size 23 G		
Protective supplies	Examination glove-latex disposable Non sterile		
	Surgical glove sterile-latex No. 7		
Tubes	Catheter Foley silicon zed latex 30-50ml balloon sterile three ways size 16 Ch.		
	Catheter Foley silicon zed latex 30-50ml balloon sterile two ways size 14 Ch.		
	Nasogastric tube, sterile adult size 16 CH		
	Nasogastric tube, sterile size 12 CH		
	Endotracheal tube, sterile CH 8		
	Endotracheal tube, sterile CH 4		
Supplies for Surgical Dressing	Roll bandage 100% cotton, dimension 19x15, size		
	Gauze surgical size 90cmx100cm, ply type		
	Cotton roll 100mg		
	Adhesive plaster		

5- Challenges Associated to Selection and Quantification of Basic Medical Supplies in Public Health Facilities

5.1- Do you face any challenges in Selection and Quantification of Medical Supplies?

5.2- Probe: Lack of management support, Budget, Lack of Supervision, lack of accountability among professionals and management support staffs

5.3- Do you face any notable problems associated to those products?

Probe: damage, expiry, overstocking, out of stock, theft, etc.

5.4- How do you select your supplier and how do you evaluate them

Probe: specification, cost, reliability, capacity, etc.

5.5- How do you see the products selected and its availability in your facility

Probe: quality, relevancy, utilization, professional's ability to use it.

6. Do you have any capacity building activities related to those products

Probe: training on how to utilize, on selection, quantification etc.

7. What is your recommendation to improve the existing practice of those products

Probe: staff training on selection, quantification, budget allocation, e

Table: 10 Assessment tools scoring sheet for product selection and forecasting systems performance of medical supplies

Assessment Tool Scoring Sheet		**Score**	**Maxi. Score**
1. Is there a national list of essential medicine or Ethiopian essential list of medical instrument	Yes No		1
2. Does all medical supplies in the health facility included in Ethiopian essential list of medical instrument	Yes No		1
3. Does the health facility consider local disease during selection of medical supplies (No=1, Yes=0)	Yes No		1
4. Does the health facility has list of the procedures (medical, surgical, etc.) that are performed in that facility and consider it during selection of medical supplies (No=1, Yes=0)	Yes No		1
5. Does determination of resupply quantity determined by the health facility it self	Yes No		1
6. Does the health facility determine quantity forecasted by considering the past consumption like dispensed-to-user data, distribution/issues data, stock on hand at all levels?	Yes No		1
7. Does the facility have dispensing record?	Yes No		1
8. Does the facility have stock record card or bin card?	Yes No		1
9. Does the facility use country specific quantification tool or RRF?	Yes No		1
10. Does the facility use have active HMIS data (service statics)?	Yes No		1
11. Does the health facility consider service statics data during selection and forecasting?	Yes No		1
Total			11
Score for the section			100%
Score for the section = total score/maximum total score × 100			

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