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Challenges of Essential Medicines Availability in Refugee Camps in Gambella - Ethiopia: - *The Case of Jawi, Tierikidi and Nguyiel*

A Thesis Submitted to the Office of Graduate Studies, School of Commerce in partial fulfillment of the requirements of the Degree of Masters of Art in Logistics and supply Chain Management

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Challenges of Essential Medicine Availability in Refugee Camps in Gambella-Ethiopia: - *The Case of Jawi, Tierikidi and Nguyiel*

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APPROVED BY BOARD OF EXAMINERS

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DECLARATION

I, Diress Terefe hereby declare that the research entitled *"*Challenges of Essential Medicine Availability in Refugee Camps in Gambella- Ethiopia*: - The Case of Jawi,Tierkidi and Nguyiel"* is original and neither the whole work nor any part of it was, or has been submitted to this or any other university.

Diress Terefe(Candidate)

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

Tariku Jebena (PhD)

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Abstract

Access to essential medicines is a critical component of universal health coverage. However availability of essential medicines is poor in countries like Ethiopia. Therefore a descriptive cross sectional case study was employed to obtain data about availability challenges through document review, questionnaires and key informant interviews. Then data was cleaned and entered using SPSS version 20. The results were illustrated using tables and percentages. Drug availability was highest (100%) at Jawi while storage condition was the poorest at Nguyiel (17.6%) during the assessment period. Stock out rate was moderate at Tierkidi health center. In general the overall availability of essential drugs in refugee camps were affected by transportation, inventory control, human resource shortages and demand supply uncertainties.

Key words: - essential medicine, availability challenge, refugee camp and stock out

Acronyms/Abbreviations

AIDS-Acquired Immune deficiency Syndrome

ARRA- Administration of Refugee and Returnee Affairs

DSM- Drug Supply Management

EML- Essential Medication List

HCMIS- Health Commodities Management information System

HSDP- Health Sector Development Plan

IFRR-Internal Facility Report and Request

IPLS- Integrated Pharmaceutical Logistic System

NGO- Non Governmental organization

PFSA- Pharmaceutical Fund and Supply Agency

PHC- Primary Health Center

RDF-Revolving Drug Fund

RRF- Report and Requisition Form

SOP- Standard Operating Procedure

SPSS-Statistical Package for Social Scientists

STI- Sexually Transmitted Disease

UNFPA-United Nations Food Programme Agency

UNHCR- United Nation for Higher Commissioner for Refugee

WHO- World Health Organization

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CHAPTER ONE

Introduction

Ethiopia is a State Party to the *1951 Convention relating to the Status of Refugees* and its*1967 Protocol* (hereafter jointly referred to as the *1951 Convention*), as well as to the *1969 OAU Convention Governing the Specific Aspects of Refugee Problems in Africa*. Refugee protection is provided within a framework of national laws, notably the Refugee Proclamation of 2004, and the core international human rights treaties that have been ratified by Ethiopia.

Ethiopia is now the country with the second largest refugee population in Africa. Refugees are sheltered in 25 locations across 8 regions of the country. In light of the continued instability and political turmoil in the region, it is likely that Ethiopia will remain a major refugee receiving country (Adam. *et al, 2013).* Equitable access to safe and affordable medicines is crucial to the health and wellbeing of people, especially in developing countries. In spite of developments made in the areas of public health, medicines still remain the single most vital factor in the maintenance of health and the treatment of diseases in many parts of the world. Access to essential medicines is a key determinant of health outcomes in developing countries, where economic constraints lead to low affordability of essential medicines. Very definite estimates of this phenomenon are difficult to compile, but it is estimated that between 1.7 and 2 billion people worldwide have inadequate or no access to life-saving essential medicines.

Majority of these people live in developing countries, where after the presence of trained health professionals, medicines are the single most critical element in the maintenance of health and the successful treatment of disease and illness. Lack of essential medicines undermine the ability of healthcare professionals to respond appropriately to patient needs and this often erodes the confidence and trust patients and their families have in local health systems. The lack of access to life-saving and health-supporting medicines for an estimated two (2) billion poor people stands as a direct contradiction to the fundamental principle of health as a human right, as poverty and illness create a vicious cycle in the access of essential medicines (Leach et al., 2005). Therefore, one way to create access to essential medicines is to make sure they are always available to meet the primary health needs of the refugee population in this case.

1.1 Background of the study

Effort by nations to ensure availability of essential medicines to those who need the medicines is historical. In 1977, WHO issued its first model list of essential medicines as per the directives of the World Health Assembly which was held in 1975(Richard Laing.*et al, 2003*). WHO has defined essential medicines as those that satisfy the priority healthcare need of a population and therefore, they are required to be available in sufficient amount at all times (MSH and WHO, 1997). After the Alma ata declaration in 1978, member countries were urged to prepare national drug policy. WHO was tasked to help the countries to establish the policy, and in light of this it established a program called action program on essential drug (Richard Laing.*et al, 2003*).

Ethiopia has been one of the most important host countries for refugees in the world. It is often stated that, hosting refugees in Ethiopia, dated as far back as to the coming of follower of the prophet Muhammad. The country had experienced a large influx of refugees over the last two decades reaching the level of close to one million. This is mainly conditioned by the fact that the country is bordered by the most volatile and conflict ridden countries (Sudan, Somalia, Eritrea) in the region- Horn of Africa. It is currently accommodating close to 200,000 refugees10 in 11 camps. The refugee population served is the highest in Gambella as compared to other camps of the country. The area is far from Addis Ababa. The distance accompanied by the continued influx of refugees in the region requires frequent supply of medical supplies and drug. The refugee population stays temporarily to the entry border camps where medical service delivery is not as simple as that of a relatively stable refugee camps around the Gambella town. The study was conducted in this region. The number of refugee presented hereunder as of April data obtained from respective health team coordinators of the facilities except Pugnido and Okugo.

Data from Respective refugee camps at the time of the assessment of essential drug availability challenges in refugee camps located around Gambella town is described as follows. ARRA refugee population in April 2017 was hosting a total of 179,794 refugees in Jawi, Tierkidi and Nguyiel camps altogether. The largest refugees' population was 69,800 that resided at Tierkidi refugee camp followed by Jawi camp hosting 57,997 refugees. On the other hand the relatively

newer Nguyiel refugee camp harbors about 52,000 populations (ARRA camps data, 2017). All refugee population was originating from South Sudan.

1.2 Statement of the Problem

Access to essential medicines is part of the fundamental right to health, and effective health services cannot be achieved without equitable universal access to essential medicines (Quick, 2003). Essential medicines are indispensable elements in the continuance of health care provision (WHO, 2004) and helpful to reduce disease burden (Tetteh, 2008). It is estimated that by improving access to existing essential medicines, every year about 10 million lives could be saved (DFID, 2004). Still, lack of access to essential medicines is one of the most serious global public health problems. As much as 50% of the population in the poorest countries of Africa and Asia are denied reliable access to essential medicines. Poor availability, low affordability and high medicines prices are important barriers to access to essential medicines in many low- and middle-income countries (FMOH and WHO, 2005).

In Ethiopia, like in other low-income countries, poor access to essential medicines is a common public health problem. A national survey estimated that only 70% of key essential medicines were available in the public sector and the cost of treatment of common diseases was found to be unaffordable to the majority of the Ethiopian people. The government of Ethiopia recently reorganized the procurement and distribution of pharmaceuticals by forming a semi-autonomous institution called Pharmaceutical Fund and Supply Agency, to supply safe and affordable medicines to the public health sector on a sustainable basis (Ryan, 2009). As described by Dukes *et al*., 1997 drugs have a special importance and need to be available for the following reasons: Drugs save lives and improve health outcomes, drugs promote trust and participation in health services and essential drugs provide a direct low cost response for many diseases. Improving access to essential medicines is a complex challenge for all actors involved. Many different factors define the level of access, such as financing, prices, distribution systems, appropriate dispensing and use of essential medicines (WHO, 2010).

Medicine stock-outs are usually defined as occurring when a health facility temporarily does not have supplies of medicines it should have, according to national guidelines. Across low- and lower-middle income countries from 2007-2012, the average availability of selected essential medicines was 57% in public sector facilities and 65.1% in private facilities; these

statistics highlight the extent to which this is a problem in many developing countries (UN, 2012: 60-61).Major barriers to access in Africa include rising disease pandemics, the high prices of patent-protected drugs, poverty, infrastructure and political will (Heywood, 2002).A similar study about medicine availability in Ethiopia in public and private health facilities has been conducted (Daniel et al, 2011).

In contrast to public health facilities established and providing services to the local population, refugee camp health centers and health post have a myriad of problems. One of the major problems includes access and availability of the essential drugs that are requested at often times but frequently stock out. As a result it is justified to repeat studies in a different context where humanitarian health care service is demanded much and a number of vulnerable refugee population live. Assessing the extent of stock out and investigating the underlying causes is the core of conducting this study and would remain throughout the entire study.

1.3 Objective of the Study

1.3.1 General objective

The general objective of the study is to assess the challenges of Essential Medicine Availability in the case of selected refugee camps in the Federal Democratic Republic of Ethiopia.

1.3.2 Specific objectives

The Specific Objectives of the Study are:

- To assess unavailability/stock out of the selected essential medicines in the refugee settings
- To assess the causes for stock out within the review period in the study

1.4 Research Questions

- What are the factors that affect the availability of essential medicines in selected refugee camps in Ethiopia?
- How does the extent of stock out of drugs in the refugee camps look like?

1.5 Significance of the Study

It would be helpful to provide an insight to local funding agencies, NGOs and UNHCR the expected assistance needed to solve the availability problems of refugees considered in the study.

1.6 Scope of the study

The study simply assesses the availability of essential medicines in refugee camps in Ethiopia in the Gambella region. Because of the financial problems and the time constraints only selected camps are included in the study. The study does not cover the procurement methods and forecasting method intended for the supply of medicines in the refugee camp health centers. The study area coverage is confined to the Gambella region.

1.7 Limitations of the study

This study did not attempt to assess the challenges that can exist in the supply of health services in refugee camps over the country as a whole. There was a financial problem to visit and collect data from all 10 refugee camps in Ethiopia. Only few data were collected from the health workers, health department managers and logistic officers of ARRA. Therefore it may not be possible to draw inference due to specific differences in refugee camps population. The study represents the situations of drug availability in Jawi, Tierkidi and Nguyiel refugee camp health facilities and could not give information on camps established close to the border of the country at the entry points.

1.8 Operational definition of terms

Health center: -It is an establishment which provides both preventive and curative services. It comprises five satellite health posts and is expected to serve for 25,000 people.

Health post: -One of the satellite facilities in the Primary Health Care Unit which serves for 5,000 people (1 per Kebele)

Medicines: - This term is used in this document to mean drugs and other pharmaceuticals.

Physical inventory: is a process of counting by hand the total number of units of each item in store/warehouse at any given time.

Primary health care: - refers to "essential health care" that is based on scientifically sound and socially acceptable methods and technology, which make universal health care accessible to all individuals and families in a community.

Tracer products: - in this document the term has been used to mean pharmaceutical products that are essential and must be available in all health facilities. The list of tracer products has been used as a guide in conducting this study.

Store: is a place where to keep or accumulate pharmaceuticals for future use

Stock out: unavailability of usable stocks in the store or a balance of zero on the bin card sat store.

Lead time: the gap between when an order is placed and when it is received.

1.9 Organization of the Study

Chapter 1-In chapter one, the author briefly present background information related to the subject of this research which is challenges of availability of essential medicines in refugee camps in Gambella, Ethiopia. Statements of the problem are given followed by research questions and the objective of the thesis. The chapter provides scope and limitation of the study. Then the significance of the study is followed to emphasize the importance of the thesis. Lastly, the author gives the definition and description of the terms used in pharmaceuticals.

Chapter 2-This chapter provides frame of references related to the subject studied which are used throughout this thesis. The concept derived from literature reviews frame the analysis of an empirical study which are presented and were helpful to devise the conceptual framework. Then the conceptual framework concerned with each identified challenge is presented.

Chapter 3 -In this chapter, the explanations of research strategy and research approaches used in this thesis are displayed. The method is mentioned and justified as to why the researcher had used by evaluating the appropriateness for this case study.

Chapter 4-In the fourth chapter the author presents the findings of the study then followed by interpretation and implications of the study.

Chapter 5- In this chapter, the author gives summary on the major findings followed by conclusion.

CHAPTER TWO

Literature Review

This part explores existing pertinent literatures about factors that affect essential medicine availability in refugee camps health centers. A number of factors have been associated with this in public and private health facilities. However, the nature of associations is not well documented by empirical researches in humanitarian supply of medicines.

2.1 Health problems in refugee camps

Host communities are often the first and primary responders, particularly in the initial phases of a refugee influx when national authorities or international actors have not yet arrived. Where social services and natural resources, already constrained, are put under additional pressure, this can engender frustration or hostility among the local community. Accordingly, UNHCR's programmes for the benefit of refugees, particularly in health and education, are often implemented to benefit and strengthen the capacities of host communities as well (MSH, 1997).

Despite these efforts, the impact of refugees' presence has not been systematically addressed, even by refugee programmes with remedial components, such as reforestation. In recent years, UNHCR has increasingly advocated for the inclusion of refugee-affected host communities in broader programming efforts that are sustainable and properly integrated into national or regional development strategies. The Office is also interested in efforts to better understand and reflect the contributions of host governments and host communities and to illustrate their experience and good practices.

There is no single model for setting up health services in a refugee settlement: this will depend on the specific context, disease patterns, possible outbreaks, the resources available and existing health facilities. However, the model selected should be based on the knowledge that 50% to 95% of the mortality in refugee situations is caused by only four communicable diseases: diarrheal diseases, acute respiratory infections, measles and malaria, with malnutrition often acting as an aggravating factor (MSF, 1997).

Acute respiratory tract infections and malaria remain the leading causes of morbidity in most of the camps. Despite disparities of infrastructures and services in protracted and newly established camps primary health services are available for refugees in all areas and run by ARRA and

health operational partner NGOs. Refugees and host community have access to health centers in either the refugee settlement or the host community. When medicines and health services are constrained, refugees inclined to traditional healers and buy medicines from alternate private sectors. UNHCR, ARRA and Partners coordinated effort is needed to renovate temporary health facilities in Dollo Ado, Gambela and Afar.

Prevalence of morbidity varies from camp to camp; acute respiratory tract infections, watery diarrhea and malaria remain the leading causes of morbidity in most camps. Despite disparities of infrastructures and services between protracted and newly established camps, primary health services are available to refugees in all areas, run by ARRA and/or health service partners (NGOs). Refugees and host communities have access to health centers in either the refugee settlement or the host community. When medicines and health services are constrained, refugees are inclined to use traditional healers and buy medicines from the private sector (JAM, 2014).

Major health problems presented are upper respiratory tract infections (20% of consultations), lower respiratory tract infections (10%), watery diarrhea (9%) and malaria (6%) (UNHCR 2016).

5.1.1 Top 10 Causes of Morbidity (EFY, 2005)

Rank	Diagnosis	Cases	%
1	Acute upper respiratory infections	2,128,657	7.5%
2	Malaria (confirmed with P. falciparum)	2,116,047	7.4%
3	Acute Febrile Illness (AFI)	2,084,211	7.3%
4	Pneumonia	1,776,470	6.2%
5	Diarrhea (non-bloody)	1,598,188	5.6%
6	Malaria (confirmed with species other than P. falciparum)	1,215,552	4.3%
7	Helminthiasis	1,214,512	4.3%
8	Trauma (injury, fracture etc.)	1,072,568	3.8%
9	Dyspepsia	1,010,092	3.6%
10	Urinary tract infection	944,984	3.3%
	Total of leading cause	15,161,281	53.3%
	Total all causes	28,435,456	100.0%

In contrast to these major health problems affecting the refugee camps visited was listed in their descending order as mentioned below: Top ten health problems identified at the time of the assessment

1. Malaria
2. Watery diarrhea
3. Upper respiratory Infections
6. Eye diseases
7. Intestinal parasites
8. Sexually Transmitted Infections

4. Lower respiratory Infections
5. Skin diseases
9. Injury
10. Urinary Tract infections

2.2 Concept of Essential Medicines

Refugees have typically suffered threats to their lives, separation from and loss of family members, separation from their homeland and loss of many of their cultural traditions. Many refugees have experienced highly traumatic events such as persecution or torture, physical and mental deprivation and human rights abuses. Many have experienced war or civil unrest, famine, poverty and displacement. These pre-migration experiences have a well-documented impact on the physical and emotional health of refugees (Paul, 2011). The source of revenue for humanitarian supply chain is government funding, charitable donations from individuals and corporation, and in-kind donations.

WHO defined essential medicines as indispensible and necessary for the health needs of the population. They should be available at all times, in the proper dosage forms, to all segments of the society. The essential medicines concept is a global concept that can be applied in any country, in the private and public sectors and at different levels of the health care system. It promotes equity and helps to set priorities for the health care system. The core of the concept is that the use of a limited number of carefully selected medicines based on agreed clinical guidelines leads to a better supply of medicines, to more rational prescribing and to lower costs. There is substantial evidence that the use of national lists of essential medicines has contributed to an improvement in the quality of care and to a considerable saving in medicine costs (WHO 2003). Essential medicines are those that satisfy the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness (WHO, 2002).

2.3 The Need for Essential Medicine Lists

The concept of essential medicines was pioneered by the World Health Organization (WHO) in 1977 with the introduction of the first essential medicines list (EML). The list has been revised every 2 years since then.

1. Essential medicine is those that satisfy the priority healthcare needs of the population. They are selected with due regard to public health relevance, evidence of efficacy and safety, and comparative cost-effectiveness.

2. Essential medicines are intended to be available within the context of functioning health systems at all times, in adequate amounts, in appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford. Although the WHO has defined the concept of EML and regularly publishes the updated lists, implementation of this concept is intended to be flexible and adaptable. The responsibility of determining exactly which medicines are regarded as essential is left to the discretion of the adopting nations based on their requirements.

The Model list of the WHO serves as a guide for the development of national and institutional EML. The concept of essential medicines has been accepted worldwide as a powerful tool to promote health equity and its impact is remarkable, as essential medicines are considered to be one of the most cost-effective elements in healthcare (WHO, 2007).

The essential medicines concept is a global concept that can be applied in any country. However, the decisions about exactly which medicines should be considered essential should be a national level responsibility (MSH, 2012). Ethiopia has recently published essential medicine lists for all levels of the health system (FMHACA,2014).The choice of such medicines depends on many factors such as the pattern of prevalent diseases; treatment facilities; training and experience of viable personnel; financial sources; and genetic, demographic and environmental factors (WHO, 2007).

2.4 Access to Essential Medicines

Millions of people worldwide still do not have access to essential medicines that are affordable and of good quality (WHO, 2004).Access to medicines means access to treatment. Improving access to quality treatment is currently the most important strategy to reduce disability and death from many diseases (Okoro.et.al, 2005). Generally, ensuring access to effective treatment is a high priority issue for international public health. Access to essential medicines is part of the human right to health. The poor lack access to medicines for many reasons, all of which must be addressed in a comprehensive manner. The most important is poverty, which means that neither the poor nor their governments can afford to purchase essential medicines or ensure their rational use in well-run health systems. Availability is one core issue at the centre of debates about medicine use in international health.

2.5 Challenges of medicine availability

2.5.1 Transportation

Transportation is a commonly identified barrier to care but is understudied in terms of the detail needed to address more direct health and transportation policy interventions (Fitzpatrick, et al, 2004).Transportation has been identified as a general barrier to health care in a number of broad based studies focusing on underserved populations. Okoro et al. analyzed data from the 2002 Behavioral Risk Factor Surveillance System and reported finding that 9% of older adults (65 and older) did not obtain needed medical care because of transportation problems, suggesting that they might be people living in rural areas, no longer drive, or depend on others or public transportation. Ahmed et al. surveyed the non-elderly urban poor in door-to-door surveys and determined that 30% of respondents had a transportation barrier to health care with those living in poverty disproportionately affected. Rittner and Kirk found that public transportation barriers have adverse effects on the populations that depend most on them for health services access, namely the poor and older persons. The study described bus service to clinics as inconsistent, and bus stops were of poor quality and perceived to be unsafe.

2.5.2 Human resource

Ethiopia suffers from an acute shortage of health workers at every level, and rural areas, in which 85% of the population lives have been particularly chronically under-served. In working out the best approach to tackle health workforce issues, the Ministry of Health calculated that 60-80% of the country's annual mortality rate is due to preventable communicable diseases such as malaria, pneumonia and TB. HIV and AIDS are also growing concerns. They therefore chose to begin by focusing on community level provision, initiating the Health Extension Programme in 2004. This is outlined in the current Health Sector Development Plan (2005-10), which focuses on both human resource development and the construction and rehabilitation of facilities. Reports in studies conducted in Kenya say lack of pharmacy personnel inequalities in medicine availability (Brown et al., 2014). On the other hand a similar study conducted in Ethiopia suggests inadequate number of pharmacy personnel compromises availability (Hussien et al, 2015).

The total number of available human resources for health and availability during HSDP II and 2nd year of HSDP III

Human Resources	HSDP II (2002/03-04/05)		2nd year of HSDP III (2006/07)	
	Total number	Ratio to population	Total number	Ratio to population
All physicians	2,453	1:29,777	1,806	1:42,706
Specialists	1,067	1:68,457	974	1:79,055
GPs	1,386	1:52,70	832	1:92,548
HOs	776	1:94,128	792	1:97,222
Nurses BSc, and Diploma	17,300	1:4,222	18,146	1:4,250
Midwifes (seniors)	1,509	1:48,405	1,012	1:76,086
Pharmacists	191	1:382,427	178	1:432,584
Pharmacy tech.	1,428	1:51,151	1,023	1:75,286
Environmental health workers	1,312	1:55,673	1,109	1:69,546
Lab technicians and technologists	2,837	1:25,747	1,816	1:42,400
Health extension workers (HEWs)			24,571*	1:3,134

Source: FMoH, HSDP III (2005) and Health and Health Related Indicators (2006/07)

* The HEWs figure is cumulative; at this stage 82% of the planned targets of training have been successfully attained.

2.5.3 Participation of Stakeholders

The supply network is huge and complicated with numerous players (donors, NGOs, government, military, and suppliers), and it is hard to coordinate all of them along with all the items that need to be delivered .Disasters place extraordinary stress on the logistics of responding organizations. Coordination can reduce and manage the stress. The systematic use of policy instruments to deliver humanitarian assistance in a cohesive and effective manner. Such instruments include: strategic planning, gathering data and managing information, mobilizing resources and assuring accountability, orchestrating a functional division of labor in the field; negotiating and maintaining a serviceable framework with host political authorities; and providing leadership (Minear, 2002).

Coordination must fight against humanitarian organizations' strategies for survival. These organizations operate in a market. They must all generate and sustain resources in order to survive. Fund raising strategies depend on skills such as the marketing of suffering, enhancing

image, buying donor fashions, competing for credit and visibility, and selectively avoiding coordination mechanisms (Walkup, 2001). These activities guarantee survival. Coordination is usually seen in a positive light. Each situation faced by organizations working in relief options is unique. The ever-changing shape of natural disasters and man-made conflicts continuously presents new challenges. Coordination issues often arise. Many authors argue that coordination is important due to possible gains in program effectiveness, although there is no consensus on what is meant by effectiveness (Minear, 2002). Responses must be coordinated, both among NGOs and in regard to the broader emergency (Okasaki, 2003). Advantages can be found in pooling information and resources and in forming alliances that allow each organization to contribute its core competence.

2.5.4 Inventory Control

Inventory Management systems or forms are necessary to gather information such as consumption data to identify successes and efficiency constraints (Transaid, 2013a). Data collection consists of information about actual consumption, demand, stock levels, adjustments and losses and is necessary for resupply planning. Entirely paper-based approaches such as in Gambella refugees health centers especially Tierkidi and Jawi are straightforward and do not require expensive software implementation. However, such systems are unable to calculate up-to-date consumption data. Full electronic information flow approaches have high initial costs due to customized software and hardware at the health centers, necessary internet connectivity and reliable energy sources, but can significantly improve information availability and quality, and allow visibility of real-time demand data from health centers. In general the information system used needs to balance requirements and available resources (USAID, 2011a). HCMIS was installed and was ready for deployment at the Jawi health center. However there are examples for good practice such as a family folder system, which is used in Ethiopia on health center level and helps to keep record of statuses and the medicine received by patients. This information helps to forecast demands for vaccines or family planning products and makes it more predictable (John Snow, 2012).However in Nguyiel health center the store is not enough to hold adequate medicines and was unsuitable for record keeping and there were no any document useful for reporting and helpful for keeping track of the consumption data.

2.5.5 Uncertainty in Demand and Supply

Another important capability is the ability to cope with uncertainty. Demand uncertainty is relatively quickly resolved as the humanitarian supply chain is activated. The first assessment provides a baseline of needs that evolves as the relief operation unfold. The customers in a disaster supply chain include the population at the affected area, as well as intermediate customers at local or global storage facilities. Their needs change significantly according to disaster types and the phases in the disaster timeline. Dependency of demand in disasters on these hard to measure factors and its high uncertainty are the main differences from the demand in regular supply chains. Unlike logisticians in the private sector, humanitarian workers are always faced with the unknown: when, where, what, how much, where from and how many times; in short, the basic parameters needed for an efficient supply chain setup are highly uncertain (Van Wassenhove, 2006).

COMPARISON OF BUSINESS AND HUMANITARIAN SCM

Topic	Business SCM	Humanitarian SCM
Main objective	Maximize profit	Save lives and help beneficiaries
Demand pattern	Fairly stable	I Irregular
Supply pattern	Mostly predictable	Unsolicited donations and in-kind donation
Flow type	Commercial products	Resources like vehicles, shelters, Food and drugs
Lead time	Mostly predetermined	Approximately zero lead time
Inventory control	Safety stocks	Challenging inventory control
Delivery network structure	Location of warehouses, DCs	As hoc distribution facilities

Source: -Ertem et al. (2010)

Disaster demand forecasting is also difficult due to the lack of historical data. Even though there do exist some databases from the past experiences prepared by both NGOs and governments, they are occasionally inadequate because of inconsistent and/or insufficient data collection and reporting problems. Additionally, disasters are unique even if they occur in the exact same location, since other factors such as population structure or economic conditions could have changed since the previous occurrence. Hence, historical data is not always very useful for predicting future demand. Improved information on real demand would also facilitate market sensitivity. Quick estimates of needs calculated when a disaster strikes often incorporate errors. There are wastage rates of up to 30% in aid delivery in some post-crisis situations (Pettit and Beresford, 2009). However, if real demand was known (or at least reliably estimated) and measured, these errors could be reduced or eliminated, leading to more efficient operations and potentially decreasing suffering.

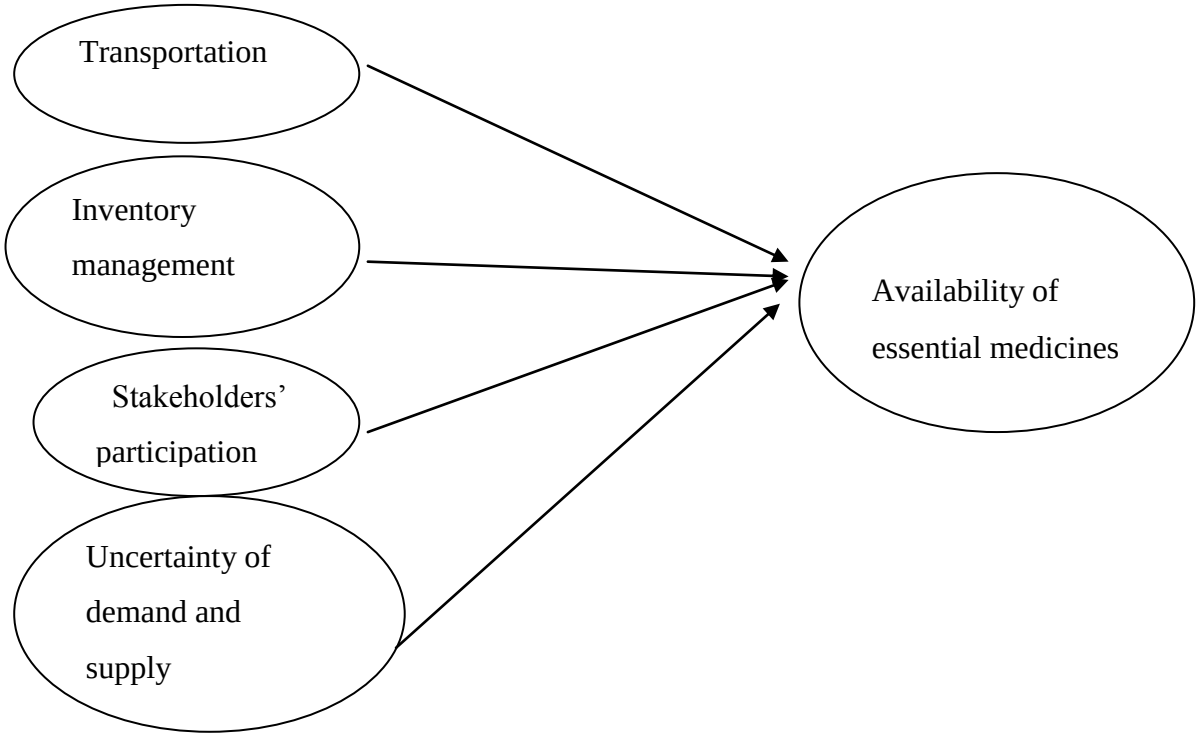
Literature gap

Studies did not recognize the differences in refugee camp settings in one country with that of another country. The challenges for drug access and availability in sub Saharan countries is somehow documented as if it has the same source of problem and without recognizing contextual differences. Therefore this study was intended to find out the causes for stock out of essential drugs in the area where resource is very limited and political turmoil is predominant.

2.6 Conceptual framework

The basis of this conceptual frame work is the work shop by WHO (2006) that outlines the difficulties of medical supplies of African countries that the main challenges being selection and quantification for unknown demand, consumption data, inadequate storage facilities and temperature control systems and a lack of quality assurance procedures. For accurate supply of medicines inventory management system is described as one challenge on medicine availability (Transaid, 2013a). On the other hand stake holders' coordination in resource limited countries and transport infrastructure factors are important for drug availability (Okoro.et al, 2002 and Minear, 2002). In Ethiopia the available health human resources described as a major determinant for drug availability (FMOH, 2005).

The focus of the study is to assess the availability challenges of essential medicine in selected refugee camps in Ethiopia. Not all challenges could be considered in this study. In this regard only four independent variables were investigated against the dependent variable as a result of previous researches. The independent variables comprised of factors such as; transportation, human resource, participation of stakeholders and demand and supply factors. The independent variables will be investigated with finding their effect on availability of essential medicines. According to this frame work many independent variables have a huge effect on the results of medicine availability in health centers in the refugee camp settings included in the study.



Independent variables Dependent variable

Figure: 1 Cause and effect relationship of independent and dependent variables

CHAPTER THREE

Research Methodology

3.1. Introduction

Implications to drug availability in the Gambella refugee camps administered by AARA with financial support provided by UNHCR was assessed against the WHO methodology developed. Some tracer drugs that are frequently used in the refugee camp setting based on the disease prevalence situation in the area were derived from the National Essential Medicine List (NEML). These drugs are required to meet the health needs of the refugee and the hosting population that would obtain primary health care service. In the assessment process the availability of antibiotics, drugs for pain management, anti- malaria drugs, Oral rehydration salt and MCH drugs were studied intensively.

The average days out of stock were calculated from bin cards and the Lead Time needed to replenish stock was also found out from the RRF reports for programmed drugs and requisitions for RDF drugs and that of the receiving notes for drugs/Model 19. According to WHO and the National Drug Policy of Ethiopia the availability of drugs listed in generic name and the selection criteria was on the basis of current disease burden to the area under consideration from WHO reports (WHO, 2014).

3.2 Study Area

The Gambella regional state has a population of 259,000 based on the latest CSA estimate obtained in the year July 2008. In this region there is a continuous influx of refugee from the South Sudan. The number of refugee in the area is close to 290, 000. Three health centers and one health post had been established to render primary health care services both to the inhabitants/host community and the refugee population. Because of the distance from the Gambella town and financial problems Pugnido camp heath centers was not included in the study.

Jawi refugee camp which is about 25km away from Gambella town administers 57,548 refugees. In order to give primary health service ARRA has built 1 health center and 1 health post within the camp compound. Whereas the Tierkidi and Nguyiel camps are scattered about 8kms away from each other and 42kms and 50kms away from Gambella town respectively. Tierkidi camp has 1 health center but the health center in Nguyiel was one in number that was confined in tents.

3.3 Research Approach

The study mainly focuses on assessment of the challenges in availability of essential medicines in Gambella refugee camps using descriptive methods of research which is conveniently aligned with the objectives of the study. Since the research is a case study it requires understanding complex real life events. Control of events by the investigator is difficult. Therefore a mixed research approach was followed. That is both qualitative and quantitative methods were used.

To do so different tools such as in depth interviews, questionnaires and observation check list were prepared. Additional documents like RRF, IFRR, and bin cards were used to collect relevant data for final analysis.

3.4 Study Design

The study is descriptive in an effort to generate pertinent information what is known about factors affecting availability of essential medicine in refugee camp health centers in the region. It was guided by conceptual frame work presented above. Due to the nature of information that the study seeks, qualitative and quantitative methods was employed. Quantitative method is used to collect data on numerical variables. This will be made possible by using structured questionnaires. For in depth data on various areas of investigation, key informant interviews were undertaken with supply chain staff with expert knowledge about supply chain experiences in the head office of ARRA and the pertinent the health service department. A cross sectional study was used to assess the challenges in the availability of essential medicines in the health center and stock status of the selected drugs was reviewed from January 1, 2016 -December 30, 2016 from bin cards where appropriate. The participants in the study were health workers that had access to drugs and medical directors or health team leaders working in the refugee camps administered only by ARRA in Gambella region. The principal investigator had to move and collect data 25 kilo meters, 42 kilo meters and 50 kilo meters away from Gambella town at Jawi, Tierkidi and Nguyiel camps respectively.

3.5 Unit of Analysis

In this study the unit of analysis is the presence or absence of the essential drugs in their basic units such as tablets, capsules, bottle, vial/ampoule and sachets that were selected for the purpose of the study in the Jawi, Tierkidi and Nguyiel refugee camps.

3.6 Population of the study

A total of six pharmacy technicians, three medical directors and other six health workers involved in DSM in the three refugee camp health centers and one health post. Two logistics coordinators and two health department heads also included in Addis Ababa was included in the study. The total number of population participated in the study were 18.

Table 1:- sample size and tools

Departments	Population size	Sample Size	Tools
Pharmacy Technician	5	5	Questionnaire
Other health workers	6	6	Interviews
Medical directors	3	3	Questionnaire
Logistics coordinators	2	2	Interview
Medical service heads	2	2	Interview

3.7 Sampling Design

The study is on the assessment challenges in the availability of essential medicines in the selected refugee camps in Gambella region. As the study is purposive in that health workers who had adequate knowledge and practice in drug management directly and indirectly involved. The data were collected from six pharmacy technicians and three medical directors of the Jawi, Tierkidi and Nguyiel health centers situated in the refugee camps.

3.8 Data Collection

In respect to the information needed both qualitative and quantitative data collection method had been embraced in the study. For quantitative data collection a questionnaire was developed reflecting the independent variables and the dependent variable that had been assumed to account for medicine availability. Then the questionnaire was administered to pharmacy staff with

guidance provided by the conductor. Medical directors of the respective health centers in the refugee were interviewed.

The conductor had the opportunity to take photographs and some videos of the premises of the dispensary and the storage areas. The self administered questionnaires were collected for 3 days of the visit. In addition to this, review of the relevant documents that are supportive to suggest whether there were stock out and useful to determine the average lead times was done appropriately. The documents include: - bin cards, RRF, GRN and Request vouchers/IFRR in medical stores in each facility. The review period was from January 1, 2016 -December 30, 2016.

At the head office of ARRA level, experts of logistics and the medical staff and store head interviewed to explore of various aspects of the study. An interview guide was developed and used in line with the objective of the study. However, secondary data were obtained both from official reports of UNHCR/ARRA and document reviews.

Primary data collection were undertaken to meet the objective of the study in the data collection period. Primary data includes assessment of availability of medicines, storage, inventory management and stock-outs on each health centers in the refugee camps. For assessing availability and stock-outs of essential medicines at the facility, the 'Facility Level Medicine Availability and Stock-out Tool' were used. The tool had been used to collect data on drug availability on the day of the assessments, medicine stock-out position for the previous twelve months from the date of the assessment and the duration of stock-outs (USAID DELIVER, 2005).A list of medicines to be assessed had been selected after reviewing the National List of Essential medicines (NLEM) and medicines provided under National Health Programs and the disease prevalence in the region.

3.8.1 Study variables

The study variables are transport, inventory control, participation of stakeholders and uncertainty in demand and supply. The variables were measured by undertaking the following qualitative and quantitative data described below. The study intended to collect data to provide information for:-

- Average percentage of time that products were out if stock in health facilities in the period of assessment (January 1, 2016 -December 30, 2016).
- Average percentage of products in stock on the day of visit.

- Percent of accurate stock keeping records in health facilities
- Method used to estimate pharmaceutical needs.
- Proportion of health workers with good pharmaceutical knowledge
- Percentage of health facilities with the acceptable general pharmaceutical storage condition.

3.8.2 Data collection procedure

All data were collected by the principal investigator. Data on days out of stock were collected by review of store ledger and/or bin cards and day out of stock was counted from when a stock record was recorded zero to when the stock record showed the stock was in. Data on availability on the day of visit was collected based on physical count of the products in the store and at the dispensing area. Data on accuracy of stock of stock record was collected by review of store ledger and/or bin card and adjusting for recent issues and receipts that were within seven days to the day of visit and comparing with the physical counts. Data on pharmaceutical logistics knowledge of the health workers was collected by first obtaining consent of the health workers and then giving them a self administered questionnaire which after filling they were returned to the principal investigator. Data on storage condition was collected though observing the general storage condition in the facilities' store area and marking against the specific storage criterion on the check list.

3.9 Data Collection Instrument

In this case study data were collected through review of records, check lists and self administered questionnaire and few key informant interviews in the administration office in Addis Ababa head quarter. Tools used in the record review were:

1. List of tracer products (annex 1). This list was used to guide the review and it had twelve items. The list was prepared based on the Ethiopian essential medicines list and it included all items that the list deemed them essential to be available in all Primary Health Care Units (PHCUs), the lowest level of healthcare provision system in Ethiopia.

2. Inventory data collection form (annex 2). This collected data on name of a product, unit of count of the product, record count, recent receipts and issues, adjusted total record count and physical count. This tool was used to compare stock balance reading of a stock keeping record and actual stock available on the shelf (physical count) on the day of visit.

3. Stock out data collection form (annex 3). This tool has twelve months of a year arranged in columns and was used to record number of days in each month that a product was out of stock in a particular facility. The tool provided for computation of the total number of days that a product was out of stock in a year.

A tool that was used in observation data collection was the facility storage condition observation checklist (annex 4). The tool was adopted from that developed by the DELIVER project (John snow Inc/DELIVER, 2005). It was used to collect data on the general pharmaceutical storage condition in the health facilities. Self administered questionnaire was used to collect data on pharmaceutical logistics knowledge of health workers involved in pharmaceutical management. Apart from questions to inquire on demographic features of the workers, there were seven questions to assess the knowledge

Due to the nature and characteristics of the independent variables it was impossible to measure quantitatively. The researcher preferred to measure the quantity of each drug present both in their basic units and percent of stock outs, accuracy of stock records and storage condition which indirectly enabled him to describe at what extent each variable affected the output that is availability of essential drugs.

3.10 Data Analysis Methods

Before embarking on analysis, the data collected was cleaned for completeness and consistency. After this a variable definition file, template for data entry was developed in Statistical Package for Social Sciences (SPSS) version 20 in which data was entered.

After data entry and cleaning, analysis was undertaken to generate summaries of various variables in terms of descriptive statistics, tables and percentages.

Data collected were checked for completeness daily after field visit. Data collected using questionnaire were then entered into computer software SPSS. Data cleaning was done by running frequency tables and then analyzed. Data collected using forms and checklists were entered into excel sheet. The excel sheet was used to make the required calculation. Availability of pharmaceuticals was assessed based on average percentage of time that products were out of stock for the whole year of 2016 and percentage of products in stock on the day of assessment. Calculations for these two indicators were based on the formulas developed by the Management Sciences for health (MSH, 1995 and John Snow, Inc. /DELIVER, 2005).

Average percentage of time out of stock of the trace products: The first step was to obtain facility specific average percentage of time out of stock of the tracer products, using the following formulas;

$$\text{Average \% product stock out} = \frac{\text{Total number of stock out days for all tracer products}}{365 \times \text{Total number of tracer products in the study}} \times 100$$

Percent of accurate stock keeping records in health facilities: first, facility specific percent of stock keeping records corresponding with physical counts was obtained as follows;

$$\text{\% of stock records corresponding physical count} = \frac{\text{No.of stock records with no discrepancy}}{\text{Total number of records examined}} \times 100$$

General pharmaceutical storage condition: facilities were categorized based on total scores they obtained in the storage condition checklist. Those scored 90%-100% were categorized as excellent, 70%-89% acceptable and bellow 70% as unacceptable group. Finally, the study results have been presented using tables and where applicable statements have been used.

3.11 Ethical Clearance

Ethical approval was asked from Addis Ababa University, School of commerce Research Ethics Committee. However, only letter of cooperation was given. Permission was obtained from the Director of Administration for Refugee and Returnee Affairs to conduct the study at all PHC on the selected region. Participants were introduced about the purpose of the study and informed consent had been gained. Questionnaires were anonymous and therefore the identity of participants was not revealed. Anonymity and confidentiality were thus consistently maintained.

Refugee camp entrance permission was given after ARRA head quarter had faxed the relevant documents to the western part of the country where Gambella regional coordinator was found. Then the researcher was able to get gate pass to the refugee camps studied with guidance provided by health team leaders.

CHAPTER FOUR

Data Analysis and Discussion

4.1 Data Analysis

This part of the study provides a summary of the results obtained from the survey conducted in health facilities located in the refugee camps of the Gambella region namely Jawi refugee camp, Tierkidi refugee camp and Nguyiel refugee camp. The study was conducted from April 24 to 28, 2017 by the principal investigator. To help explain the research questions about the extent of stock out in the studied facilities in the area the following quantitative data was calculated. As a result of the fact that qualitative data had been used to analyze for the challenges of drug availability the factors is described as it was.

A. Medicine availability in Health Facilities in the refugee camps

With up to a third of the world's population with limited access to essential medicines, it is clear that by 2015 many countries will not be able to achieve their health related Millennium Development Goals (MDGs) (WHO, 2011). Of the eight MDGs, four explicitly discusses the availability of medicines at the primary care or service delivery point level (UN, 2014). It is pertinent because without access to and appropriate use of quality medicines, health systems would lose their ability to meet healthcare needs (UN, 2012).

In this study, availability was assessed based on; stock out duration during the twelve months of the year 2016 and availability on the day of assessment. The survey collected data on both stock on hand, stock outs on the day of visit and stock outs during the twelve months period of the year 2016. The physical count of the tracer drugs in the Tierkidi HC, Jawi HC and Nguyiel at the time of visit of the facilities is shown below in the table.

Table: 2 Stock on hand of tracer drugs in respective refugee camps at the time of assessment

Drugs	Unit of measure	Jawi HC	Tierkidi HC	Nguyiel HC
Paracetamol 500mg	Tablet	180,000	2,000	0
Albendazole 400mg	Tablet	5,000	2,000	0
ORS	Sachet	14,000	19,000	200
Amoxacillin 250mg	Capsule	14,000	46,000	10,000
Chloroquine 150mg	Tablet	13,000	1,000	0
Iron sulphate 325mg	Tablet	80,000	16,000	0
Cotrimoxazole 240mg/5ml	Bottle	650	0	0
Metronidazole 250mg	Capsule	50,000	500	0
Ampicillin 500mg inj	Vial	1,800	300	0
Doxycycline 100mg	Capsule	7,000	5,300	10,000
Arthmeter/Lumfantrine 120mg/20mg	Tablet	28,800	7,560	100
Magnesuim sulphate 50% w/v inj	Ampoule	300	150	0

Stock out within the twelve months period of the year 2016 was expressed as the average percentage of time that products were out of stock in a particular facility. The study has found that all facilities (100%) visited had experienced stock out of a number of tracer products within the twelve months period of the year 2016.

Availability of products on the day of assessment was expressed as the percentage of tracer products available on the day of assessment in a particular facility. The study has found that all facilities (100%) visited had stock out of a number of tracer products on the day of assessment.

Table: - 3 Drug available during assessment, average stock out percentage and storage condition the four health facilities

Health facility	Average stock out percentage (%)	Storage condition in percentage (%)	Drug available during assessment (%)
Jawi health center	10.5	47	100
Tierkidi health center	8.8	71.8	91.7
Nguyie lhealth center	14.4	17.6	33.3
Jawi Health post	8.5	42.4	85

From the table shown above the highest average stock out percentage was found in Nguyiel Refugee camp HC which was 14.4%, the least was at Jawi health post (8.5%).

B. Accuracy of logistics data for inventory management

The study assessed the quality of record keeping system in public health facilities in the refugee camps administered only by ARRA with support provided by UNHCR. Percentage of stock keeping records was reviewed. A stock record was considered accurate if after adjusting for recent issues and receipts (within 7 days) the record balanced with the physical count of the stock on the day of visit. Results showed that, the Tierkidi refugee camp store was doing the best in the area of record keeping, compared to other facilities, as all of the stock records (100%) that were reviewed were accurate and made up to date when compared to the physical count obtained the survey day. By contrast stock record keeping and the overall arrangement of the store in the refugee camps assessed in Nguyiel camp is the poorest. However the records in the Jawi refugee health center were 50% completed at the time of visit.

C. Methods to quantify/estimate medicine requirements

In health facilities that have been studied all store men reported RRF to determine quantity of drugs needed to satisfy health needs from previous consumption data. No morbidity data was used although responses from interviews in all refugee camps suggested that there was a variation in drug use at different seasons of the year.

Table: - 4 the number of health workers in the refugee camps

Profession	Tierkidi HC	Jawi HC	Nguyiel HC
Pharmacy technician	2	2	1
Mid wives	8	12	5
Clinical nurses	12	11	4
Bsc nurses	3	2	3
Health officers	2	5	3
Medical doctors	1	1	0
Environmental health	1	2	1
Laboratory technician	2	0	0
Nitration	1	0	0

Awareness of how to handle and report drug consumption and request drugs from storage areas of the facilities was inquired and presented among health workers who directly had access to drugs. Then the results of IPLS knowledge was assessed and tabulated as follows:

Table: - 5 Knowledge of IPLS among health workers in refugee camps

Level of knowledge	Frequency	Percentage
Good	10	52.6
Average	5	26.3
Poor	4	21.1

As it is demonstrated in the table above majority of the health workers had good level of knowledge (52%). This comes because of knowledge transfer made through on job training given to those who had duty and responsibility to handle drugs. To mention MCH/ family planning coordinators and clinical nurses received training. Lack of adequate training in medicines quantification was cited as one of the reasons affecting availability. This is probably because staff members were not able to predict how much medicines were needed which might have led to drug shortages. The finding is similar to what was found in a study undertaken in Malawi.

4.2 Discussion

4.2.1 Transportation

One of the main barriers to challenges of availability of tracer drugs to health centers of Nguyiel camp was described as vehicle shortage and poor road infrastructure. As health workers explained infrequent delivery of drugs were dominant practice because of the distance from central ware houses and rigid delivery schedule in every quarter delayed drug access to this facility. They further emphasized that there were a weak communication link between transport coordinators at the head quarter. Likewise the same problem was mentioned at Tierkidi and Jawi health centers though the case is not as severe as the Nguyiel health center which is distant as compared to those facilities. Researches emphasized vehicle shortage and poor road infrastructure set back delivery of supplies to refugee camps (Transaid, 2013).

Interview was made to provide evidence whether the logistics department at the center of ARRA had a designed transport route to the Gambella region. They said anything except that each facility could get any medication whether the facilities were on the same route or not. The logistician said, "*There is no vehicle reserved only for the purpose of transporting medical supplies to refugee camps. If we need a vehicle we will be given prior to other activities. Privileges are always maintained in this case. However due to report delays we experience shortage of essential drugs in some refugee camps.*" When the logistician asked to explain how the distribution of pharmaceuticals occurred with different refugee camps he said that consolidating medical supplies to the same regional camps were done if receipt of request had occurred in the same period. Despite all this the three camps explained that there was shortage of vehicles dedicated for medical supplies. "*Sometimes this gap was filled by regional camp vehicles".* They explained.

Table 6:- Distances of facilities from Gambella town

Facility name	Facility type	Location
Jawi Refugee camp	Health center	25kms
Jawi Refugee camp	Health post	25kms
Tierkidi Refugee camp	Health center	42kms
Nguyiel Refugee camp	Health center	50kms

4.2.2 Participation of stakeholders

Interviews in the Central ARRA showed that the principal partner for ensuring availability of drugs is UNHCR. "*Emergency procurement of drugs and medical supplies is made available from PFSA regional and Addis Ababa hubs. Other major participants who work intimately with us when we are run out of stock of essential medicines are: Humedia, UNFPA and International Medical Corps*."When the medical doctor was asked to further explain what were undergoing to ensure a relatively higher availability includes:-

- "*We intend to accrue local procurement to reduce the stock out of very essential drugs resulting from long waiting time due to delivery delay from international purchase by UNHCR*."
- "*Now that this does not meet the needs immediately we plan to increase local procurement either from PFSA or equivalent suppliers as high as fifty percent of the whole procurement*."Beside this he emphasized the implementation of HCMIS would be mandatory and would facilitate information sharing and would also enable to forecast demands. "*Immediate reports can be generated*." He said.

4.2.3 Human resource

The number of health workers who managed drugs in the dispensing units of the health facilities was not adequate. Head nurses, mid wives and pharmacy technician filled and reported drug consumption data to store men every two weeks before resupply of drugs was made. However the number of individuals participated in this activity was insufficient. A single pharmacy technician was forced to work and dispense drugs for approximately 200-250 patients every day in Jawi and Tierkidi health centers. This is few in number as compared to the WHO recommended number of health workers and similar facilities in Ethiopia (FMOH, 2006). Beside this they had to report, arrange and monitor their assistant/ interpreter elected from the refugee

community to facilitate means of communication between the patient and the counselor. These health workers said that they would not have enough time to record and report drug consumption that would be helpful to generate important information on consumption and morbidity data.

Contrary to this the Nguyiel health center had only one pharmacy technician and one interpreter who were supposed to serve 250 patients every day and executed other activities of drug management. None of the health workers in the health center had gained IPLS training but pharmacy technicians in Jawi health center said that they had given on job training to health workers who were working as mid wives coordinator, clinical nurse heads and laboratory technician. At the time of the assessment in Tierkidi health center the delegated store man said that he had not gained about drug management he simply used reporting document without understanding why he was doing that. A study conducted by Daniel et.al showed the main causes of non-availability are shortage of human resources and slow supply processes. Estimation of drug needs was usually based on past consumption and rarely on morbidity pattern. It was done on a regular basis by store man of each health facility. Drug orders were submitted every three months. The average lead time from submission of orders to receipt of medical products was four weeks on average.

4.2.4 Inventory control

Stock record keeping practices in the three different refugee camp health centers differ quite significantly. In Jawi health center 65% of stock records were accurate. However, Tierkidi health center had the superior records keeping (85 %). And all bin cards were up to date at the time of survey in Tierkidi. But Nguyiel health center had no stock records available. Studies suggested that drug availability is affected by accurate stock record keeping (MSH and WHO, 1997). They did not know what amount and which drugs to request because of no proper stock record keeping practice available at the facilities.

4.2.5 Uncertainty

The most challenging obstacle in humanitarian logistics is uncertainty. Usually, there will be no indication as to when a disaster will strike, how many people will be affected, what infrastructure will be left intact, which suppliers will donate, or what other obstacles may arise. Uncertainty can stem from many elements relating to the mission, the organization itself, or nature of the

demand. For example, uncertainty may arise from inherent characteristics such as what and how much material is demanded, product traits, process fluctuations, and supply problems (Van der Vorst and Beulens, 2002:424). Van der Vorst and Beulens also recognize how supply chain configuration and control structures, long forecast horizons, decision complexity, poor information reliability, and agency culture may create uncertainty (2002:424-426).

Forecasting methods used to determine the amount of drugs that had to be supplied in every quarter was through extrapolation of consumption data available from immediate previous quarter RRF reports. As the data demonstrate Tierkidi and Jawi refugee health Centers used RRF and monthly reports directly to the head quarter ware houses in Addis Ababa. On the other hand Jawi health post filled and reported IFRR that the quantity to be supplied was determined by the pharmacy technician in Jawi refugee health center working as store man.

However no document had been used to estimate the need of drugs for future use in Nguyiel refugee health center. All drugs provided so far were by the grants made through the auspicious of donors and nearby health facilities like Itang health center, MSF-Holland and Jawi health center. The relevant documents for recording and reporting were absent. RRF, IFRR and bin cards were not present at the time of the visit. Due to the seasonal variations and the frequent relocation of refugee population continue the drugs needed are expected to rise following rainy season. Rain and congested style of living in tents in this refugee may aggravate epidemics, malaria and intestinal parasite infections. As a result forecasting must consider the high demand of drugs needed due to uncertainties and seasonal variations. Therefore integrating previous consumption data with morbidity data would help to estimate at times when adequate consumption data is inaccessible.

The morbidity-based technique should also be used periodically to counter-check the rationality of past consumption, by comparing actual consumption with the estimated need to treat common diseases based on standard treatment protocols and epidemiological data. This combination of consumption and morbidity methods is also useful in programmes with a high seasonal variation in consumption of certain medicines such as antibiotics or anti malarial (UNHCR, 2011).

Store men interviewed on how to deal with this seasonal variations of demand and supply of essential medicines say the root causes of stock out should be wipe out. They said that the following causes should have been removed.

Summary of the findings

Based on the research question: -1 **what are the challenges of drug availability in the refugee camps?** The results are summarized and presented as follows:

Table: - 7 Reasons for stock out in Refugee camps administered by ARRA

Name of refugee camps	Causes of stock outs
Tierkidi refugee health center	Delay due to lack of transport Seasonal demand and supply variations Communication problems between the facility and head quarter
Jawi refugee health center	Non scheduled request due to work load Lack of adequate number of transport vehicles to deliver products needed Humanitarian resource insufficient at the head quarter
Nguyiel health center	Lack of transport service No relationship with regional health bureau and PFSA Poor facility infrastructure No training obtained to facilitate supply of drugs/ IPLS

Research question 2:- **How does the extent of stock out in refugee camps look like?**

Results showed that the average stock out duration of essential medicines in Tierkidi health center (8.8%), Jawi health center (10.5%) and Nguyiel health center (14.4%) is less as compared to similar studies 23.89% conducted in Uganda in public health facilities. Average availability of essential medicines in primary health care units of south Wello zone was 85.5%. At the time of survey conducted 100% tracer drugs considered was present in Jawi health center, Cotrimoxazole 240mg/5ml which is a main treatment option for acute respiratory tract infection in primary health care was not found. 66.7% of tracer drugs did not exist in Nguyiel health center. Anti malarial drugs were relatively available at all times in all the refugee camps health centers. Bin card records showed that accurately. However drugs used for maternal health for the treatment of anemia was absent in the newly established refugee camp namely Nguyiel.

CHAPTER FIVE

Conclusions, Recommendations and Future Direction

5.1 Conclusions

The overall availability of tracer drugs in refugee camps at Gambella region is rated highest except the refugee camp at Nguyiel. Stock out is not as high as other in public health centers. Staff coordination (both local and expatriate) is essential, although complex and frequently overlooked. This responsibility should be assigned to one person; logically the person in charge of human resources, who should have had previous training, should be briefed for the specific situation and should receive appropriate guidelines. The principles for coordination are similar to most public health projects but they must, of course, be adapted to the emergency situation and the specific refugee context. One of the crucial points in regard to drug availability is to find local personnel with DSM training. In situations where qualified health staffs are scarce, alternative solutions must be found for responding to health needs.

The necessary facilities must be installed rapidly in order to respond to the basic needs of the refugees and allow services to be organized. Additional transport vehicles reserved for drug supply must be arranged in the future. Due to seasonal variations in demand and supply the refugee camps must have adequate number of health workers specialized in supply of drugs. As a result up-to-date information with regard to inventory management must be provided to the central ware house in Addis Ababa.

5.2 Recommendations

- Redundancy in record keeping in refugee camp health centers should be avoided to improve the time required for performing other activities. IFRR and Request Issue Voucher are used for the same purpose.
- Sharing experience between health workers of the three camps would possibly eliminate or reduce unnecessary activities and foster health care service and may improve drug availability.
- Implementing an integrated facility information sharing may alter shortage pattern of drug supplies among the camp health centers. Hence it will result in marked progress in the availability of tracer drugs reserved for primary health care service.

- Training of clinical nurses on DSM may basically minimize the gap in pharmacy technician man power shortages. It is necessary to organize training courses among health workers about essential drugs and standard treatment in the region.
- Better coordination of stake holders is needed to provide health service promptly. They must work in an integrated manner as the supports did not consider availing essential drugs. However most NGOs merely gave drugs that were not important for the area. Expertise of the refugee camps with regard to drug supply management was very limited. Therefore partners should work hard to solve the existing lack of trainings among the different health workers.
- The region is very hot almost at all times of the year. Storage conditions of the drugs were not appropriate especially in Nguyiel refugee camp where there was no temperature regulator. Installation of temperature regulators must be placed to maintain curability of drugs and/or reduce morbidity.
- ARRA must think to build a pharmaceutical storage area/ reservoir and dispensing unit that is convenient to give the service. The current premise is not good and there is no any storage area dedicated for this purpose. To achieve the health needs of both the host population and the refugee population either establishing another health center or broadening the existing service is important as the refugee population remain increasing at alarming rate.

5.3 Future Direction

This study focused on some challenges for essential drugs in refugee settings. Several other factors probably affect drug availability elsewhere in the country. In addition to this different refugee camps may have a totally different challenge and health problem and therefore further researches may give an insight to drug supply to humanitarian activities or see the challenges in a broader context.

Researchers are very limited in this area and the extent of the challenges is somehow neglected though Ethiopia is referred in different literatures as a home for many refugee populations. Scholars must consider conducting similar studies to recognize and affirm the hospitality without which providing hostages is not sufficient.

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Annexes

Annex: 1 LIST OF TRACER DRUGS

Ser.No.	Name of the drug	Strength	Dosage form
1	Paracetamol	500mg	Tablet
2	Cotrimoxazole	240mg/5ml	Suspension
3	Arthemeter/Lumfantrine	120mg/20mg	Dispersible tablet
4	Metronidazole	250mg	Capsule
5	Doxycycline	100mg	Capsule
6	Amoxicillin	250mg	Capsule
7	Albendazole	400mg	Tablet
8	Oral rehydration Salt/ORS	----------	Powder
9	Ampicillin	500mg	Injection/powder
10	Iron sulphate	325mg	Tablet
11	Magnesium sulphate	50% w/v	Injection/solution
12	Chloroquinesulphate	150mg	Tablet

Annex: - 2 INVENTORY DATA COLLECTION FORM

Date……..Facility name……Facility Type…….

District……..Data Collector……..

Ser.No.	Name of the Drug	Counting Unit	Bin card balance	Physical Count	Comments
1	Paracetamol 500mg	tablet			
2	Albendazole 400mg	tablet			
3	ORS	sack			
4	Amoxicillin 250mg	capsule			
5	Chloroquine 250mg	tablet			
6	Iron sulphate 325mg	Tablet			
7	Cotrimoxazole 240mg/5ml suspension	bottle			
8	Metronidazole 250mg	capsule			
9	Ampicillin 500mg injection	Vial			
10	Doxycycline 100mg	capsule			
11	Arthmeter/Lumfantrine 120mg/20mg	Disp. tablet			
12	Magnesium sulphate 50%w/v	ampoule			

Annex: - 3 STOCK OUT DATA COLLECTION FORM

Date.....Facility Name..... Facility type.....

District..... Data Collector.....

Drug Name	2016 calendar year												Total stock Out days
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	

Annex: - 4 FACILITY STORAGE CONDITION OBSERVATION CHECK LIST

Date.....Facility Name..... Facility type.....

District..... Data Collector.....

S/n	Description	Score	Comments
1	Products ready to distribution/dispensing are arranged so that identification labels and expiry dates and/or manufacturing dates are visible.		
2	Products are stored and organized in a manner that facilitate first-to-expire, first-out (FEFO), counting and general management		
3	Cartons and products are in good condition, not crushed due to mishandling. If cartons are open, determine if products are wet or cracked due to heat/radiation (fluorescent lights in the case of condoms/gloves) and cartons are put right-side up		
4	The facility separate damaged and/or expired products from usable products and removes them from inventory		
5	Products are protected from direct sunlight at all times of the day and during all seasons.		
6	Cartons and products are protected from water and humidity during all seasons		
7	Insects and rodents. (Check the storage area for traces of rodents [droppings or insects].)		
8	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.		

9	Products are stored at the appropriate temperature during all seasons according to product temperature specifications		
10	Roof is always maintained in good condition to avoid sunlight and water penetration at all times.		
11	Storeroom is maintained in good condition (clean, all trash removed, shelves are sturdy, boxes are organized).		
12	The current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).		
13	Products are stacked at least 10 cm (4 inches) off the floor		
14	Products are stacked at least 30 cm (1 foot) away from the walls and other stacks.		
15	Products are stacked no more than 2.5 meters (8 feet) high.		
16	Fire safety equipment is available and accessible (any item identified as been used to promote fire safety should be considered).		
17	Products are stored separately from insecticides and chemicals.		

NB: To qualify as “yes,” all products and cartons must meet the criteria for each item

QUESTIONNIARE and INTERVIEWS

I. Interview for Health Service Department

1. How do you define Essential Medicines on the context of your ARRA and the challenges for the distribution to the refugee camps?

2. What are the major challenges and opportunities of pharmaceutical supply chain in Ethiopia in humanitarian context?

3. How do you evaluate the total integration, collaboration and coordination different partners of pharmaceutical products?

4. What are the challenges not to meet the requirements of respective camp health centers with regard to drug supply?

5. Who are your stakeholders?

6. How do you evaluate the supply capacity of your suppliers?

7. What is the average lead time?

8. What efforts made by ARRA to increase the availability of medical products?

II. Interview for the Logistic Department of ARRA

1. Does ARRA have a fleet management? Is your organization has a designed a net work of transportation route?
2. What are the distribution lead time required to deliver medicines to the health centers? Does your department have a plan to improve delivery schedule? How?

Dear respondents,

This questionnaire will serve to assess the essential drug availability challenges in refugee camps in the selected areas of Gambella region solely for academic purpose. You have been selected to participate in the study because I believe you will provide the information that will be needed for study. Thank you for your time and cooperation.

For more information: direetere@gmail.com or use 0913203090/0924305546

General information

Please complete the following questions below:

i)Job title/position……..

ii) Number of years you have served this organization……..

iii) Maximum level of education you have acquired so far. Mark(X) in the box.

Diploma ☐ Degree ☐ Masters degree ☐

I. Facility specific questionnaires

1. Are all essential drugs available now?
    a. Which products stock out most frequently?
    b. How long does the stock out normally last?
    c. What causes these stock outs?
    d. In your opinions at what level of the supply chain do most stock outs occur?
2. Is the drug supply improving, the same or getting worse?
3. How is the level of drug supply in general?
4. How did the stock outs affect program services and performance?
5. Do the facility have SOP manual for handling drugs?

Dear respondents,

This questionnaire will serve to assess the essential drug availability challenges in refugee camps in the selected areas of Gambella region solely for academic purpose. You have been selected to participate in the study because I believe you will provide the information that will be needed for study. Thank you for your time and cooperation.

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Diploma ☐ Degree ☐ Masters degree ☐

II. pharmacy personnel

Have you gained training to improve your ability to determine the demand of the drugs in your facility?

Is SOP manual available for storage medicines at the facility? Yes ☐ ☐

1. Reporting document/ forms Yes ☐ No ☐

If yes. What is it?

a) List of drugs

b) Previous consumption data

c) RRF

d) Others specify

2. Who decide the resupply amount and type of drugs to the facility?

a) Pharmacy technician

b) Medical director

c) Central ware house at Addis Ababa

d) Others specify

3. How do you receive medical products coming to the facility from central ware house located at Addis Ababa? Do you use documents?

4. How often you receive medical products from ARRA ware house at Addis Ababa?

a) Monthly

b) Quarterly

c) Annually

d) Others specify

5. Do you have adequate storage space at your facility if products come as requested?

a) Yes

b) No

6. How do you evaluate storage condition, temperature and moisture?

a) Appropriate
b) Inappropriate

7. What tracer drugs considered in the study is available at the moment? List down.

8. What is the source of stock out in the health center you are working in?

9. If any for how long does stock out of each drug persist?