Factors influencing health facility readiness to provide Emergency Obstetric and Neonatal Care in Dodoma region, Tanzania

Robert Philemon Tillya

United republic of Tanzania

53rd Master of Public Health/International Course in Health Development

19 September 2016 - 8 September, 2017

TITLE

A thesis submitted in partial fulfilment of the requirement for the degree of

Master of Public Health

by

Name Participant: Robert Philemon Tillya

Country Participant: United Republic of Tanzania

Declaration:

Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements.

The thesis **Factors influencing health facility readiness to provide Emergency Obstetric and Neonatal Care in Dodoma region, Tanzania**

is my own work.

Signature:…………………… …   ……………………

53rd Master of Public Health/International Course in Health Development (MPH/ICHD)

19 September 2016 - 8 September , 2017

KIT (Royal Tropical Institute)/ Vrije Universiteit Amsterdam

Amsterdam, The Netherlands

September 2017

Organised by:

KIT (Royal Tropical Institute) Health Unit

Amsterdam, The Netherlands

In co-operation with:

Vrije Universiteit Amsterdam/ Free University of Amsterdam (VU) Amsterdam, The Netherlan

Table of contents

Contents   Page

List of tables

	Contents	Page
	Table 1 Number of operating health facilities in Tanzania	
	Table 2 Health disparities between urban and rural population in Tanzania mainland	
	Table 3 Health status and coverage indicators - Dodoma	
	Table 4 Signal functions for Basic and Comprehensive Emergency Obstetric and Neonatal Care (BEmONC and CEmONC)	
	Table 5 The status of health facility readiness to provide EmONC in Tanzania 2014-15	
	Table 6 Health facilities involved in the survey	
	Table 7 Human resource available by levels of care.	
	Table 8 Availability of skills and services at health Centre and dispensary level	

List of figures

List of abbreviation

ADDO	Accredited Drug Dispensing Outlet
AIDS	Acquired Immunodeficiency Syndrome
AMO	Assistant Medical Officer
AMTSL	Active Management of Third Stage of Labour
ANC	Ante Natal Care
ARR	Annual Reduction Rate
ARV	Anti-Retro Virals
BEmONC	Basic Emergency Obstetric and Neonatal Care
CA	Clinical Assistant
CBHI	Community Based Health Insurance
CCHP	Council Comprehensive Health Plan
CEmONC	Comprehensive Emergency Obstetric and Neonatal Care
CHF	Community Health Fund
CHMT	Council Health Management Team
CHSB	Council Health Service Board
CO	Clinical Officer
CS	Caesarean Section
DHS	Demographic and Health Survey
D&C	Dilatation and Curettage
EmONC	Emergency Obstetric and Neonatal Care
FBO	Faith Base Organization
FP	Family Planning
GDP	Gross Domestic Product

GHE	Government Health Expenditure
GoT	Government of Tanzania
HC	Health Centre
HF	Health Facility
HFGC	Health Facility Governing Committee
HIC	High Income Country
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
IMPAC	Integrated Management of Pregnancy and Childbirth.
LGA	Local Government Authority
LTR	Lifetime Risk
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MNCH	Maternal Neonatal and Child Health
MO	Medical Officer
MOF	Ministry of Finance
MOL	Ministry of Labour
MoHCDGEC	Ministry of Health Community Development Gender Elderly And Children.
MSD	Medical Stores Department
MVA	Manual Vacuum Aspirator
NER	Net Enrolment Ratio
NGO	Non-Governmental Organization
NHIF	National Health Insurance Fund
OOP	Out of Pocket Payments
OPD	Out Patient Department

PHI	Public Health Insurance
RCH	Reproductive and Child Health
SARA	Service Availability and Readiness Assessment
SDG	Sustainable Development Goal
SSA	Sub Saharan Africa
STI	Sexually Transmitted
TBA	Traditional Birth Attendant
THE	Total Health Expenditure
UHC	Universal Health Coverage
UNICEF	Unite Nations
USAID	United States Agency for International Development
USD	United States Dollar
VU	Vrije Universiteit
WHO	World Health Organization

ACKNOWLEDGEMENT

Abstract

The pace towards reduction of maternal death in Tanzania has been very slow. This brought up the need to know: 1. the ability of health facilities to provide Emergency Obstetric and Neonatal Care (EmONC). 2. The health system factors influencing health facility response to obstetric emergencies.

A mixed method approach was conducted. Analysis of secondary quantitative data of Dodoma health facilities was done. Review of literature was done to explore the health system factors influencing health facility response to EmONC.

The health facilities in Dodoma had problems which affects the readiness to provide EmONC. Out of 143 dispensaries, 36% had no Clinical Officers nor did Clinical Assistants, 8% had no midwives. Only one out of 152 health facilities was using Magnesium sulphate while more than 97 of all dispensaries and Health Centres (HC) had stock of uterotonic. Less than half of dispensaries had neonatal ambu bag and suction apparatus. Only 1 out of 6 HCs, and 19% of dispensaries recorded the partogram correctly. None of the HFs had blood transfusion service. Only 1 HC performed Caesarean Section (CS). Only 4 out of 9 HCs had ambulance. Poor governance, shortage of staff and lack of continuing education were health system factors influencing provision of EmONC. Inadequate skilled health workers, lack of EmONC training, weak health committees with low government expenditure on health, also were system factors.

Majority of health facilities in Dodoma were not capable enough to provide EmONC. Governance, health workforce and finance problems influence the provision of EmONC.

Introduction

I am a Clinician with nine (9) years' experience in clinical practice and another nine (9) years employed in a research institute. In my post as research officer I have been working with district health teams, to introduce new technologies that aim at improving obstetric care. The research team conducted operational research aiming to contribute to the reduction of maternal mortality in rural settings.

Through this kind of work, I realized, there are so many women in the rural setting who end up with preventable obstetric complications. Lack of awareness, overworked health staff, inadequate supplies and poor infrastructure are the existing problems.

Maternal mortality is one of the major public health problems claiming lives of innocent women. Maternal death has social and economic consequences affecting families, society and the country. The maternal mortality ratio is a key health status indicator reflecting overall development. This study will provide information for improvement of health services as well as generating further research ideas.

Chapter 1

Background

1.1. Country profile

1.1.1. Geographical location

The United Republic of Tanzania borders Kenya and Uganda in the north, Rwanda, Burundi, the Democratic Republic of Congo to the west and Zambia to the south west, Mozambique and Malawi to the south and to the east the country borders the Indian Ocean. It covers 940,000 square kilometres, making it the largest country in east Africa. It is divided into 30 administrative regions: 25 regions in the mainland and 5 in Zanzibar. Regions are divided into districts, divisions, wards and villages (1).

1.1.2. Population

According to the 2012 Tanzania national census data, the total population for the Tanzania Mainland was 43,625,354 (21,239,313 male inhabitants 48.7%, 22,386,041 female inhabitants 51.3%) people out of which 30,924,116 (71%) people live in rural setting and 12,701,238 (29%) people live in urban setting (2). Women at child bearing age (15 – 49 years) constitute 47.3% of the total female population (3). The crude birth rate in 2012 was 42 births per 1000 while in 2002 and 2012 it was 14 births per 1000 people and 9.3 births per 1000 people respectively. Population growth rate in 2002 was 2.9% and in 2012 was 2.7% (4).

1.1.3. Socio-economic status

The agricultural sector provides 63% of all employment in the country (2). In 2015 it contributed to 29% of the Gross Domestic Product (GDP). The GDP per capita in 2014 was USD 1,044 while in 2015 it was USD 967. Although there might be other reasons for the decrease of the GDP, in the year 2015 the country had its general election which might have interfered with trade in the country. The GDP growth rate has been constantly increasing and in 2015 it was 7.0%. The inflation rate has been constantly decreasing, in 2013 it was 7.9% and in 2015 it was 5.6% (5).

In 2011/2012 the Total Health Expenditure (THE) as percentage of GDP was 7.3% while Out of Pocket Payments (OOP) as percentage of THE was 33.2%. The Government Health Expenditure (GHE) as percentage of THE was 36.3%

(6).The literacy level of the population age group 15 years and above is 78.1% (83% male inhabitants and 73% female inhabitants) (3).

1.1.4. National health policy

The government has the vision to have a healthy community, which will be able to contribute to individual development and the country. It aims to facilitate provision of quality health services which are proportional, affordable, equitable, sustainable and gender sensitive (7). Tanzania mainland has also mainstreamed maternal, new born and child survival into the national health policy. It emphasises that maternal, new born and child health services are exempted from cost sharing. (8).

1.1.5. National health system

According to the Ministry of Health (2015) (MoH), the health services structure is comprised of dispensaries which are the first level of health care and covers 87.5% of primary health care in the country. The second level is Health Centres (HC) covering 10.7% of all health facilities and it is the first referral level from the dispensary where patients are admitted and some provide Comprehensive Emergency Obstetric Care. The third level is the district hospital, which is the highest referral level of care at the district. The regional hospital is the highest referral level in the region. Tertiary (consultant) hospitals including the national hospital are the highest referral level in the country. All hospitals constitute 1.8% of all health facilities in the country(7). See table 1 below.

Table 1: Number of operating health facilities Tanzania 2017

Operating Health Facilities in Tanzania Mainland				
	Hospital	Health center	Dispensary	Total
Public	119	516	4826	5461
For Profit	36	81	573	690
Faith Based Organization(FBO)	104	145	623	872
Total	**259**	**742**	**6022**	**7023**
Operating Health Facilities in Dodoma region				
Public	5	31	288	324
For Profit	2	2	14	18
FBO	3	5	27	35
Total	**10**	**38**	**329**	**377**
Source: http://hfrportal.ehealth.go.tz/ (16/07/2017)				

The national hospital, consultant hospitals are supervised by the Ministry of Health while regional hospitals, district hospitals, health centres and dispensaries are supervised by the Local Government Authority (LGA)(7).

1.1.6. Health status and service coverage

Tanzania did not attain the Millennium Development Goal 5 (MDG) target 5a of 75% reduction of maternal mortality by 2015. The 2015 Annual Reduction Rate (ARR) of Maternal Mortality Ratio (MMR) in Tanzania was 3.4% and has always been lower than the global ARR which is 5.5% (9). The MMR in 2015 was 556 deaths per 100,000 live births (4)

According to DHS 2015, the total fertility rate was 5.2 children, lower in urban (3.8) and high in rural setting (6.0). Women who were attended by skilled personnel in Ante Natal Care (ANC) were 98% while those who completed 4 ANC visits were 51%. Women who delivered at the Health Facility (HF) were 63.6% (urban 87% and 54.7% in rural) of which 64% were delivered by skilled personnel and only 34% received post-natal care(4).

The 2013 Service Availability and Readiness Assessment (SARA) report shows that overall availability of health facilities was 1.5 health facilities per 10,000 populations. Professional health worker's ratio was 7.1 per 10,000 populations (67% employed by the government, 14% employed by Faith Based

Organization (FBO) and 18% employed in private for profit sector). Overall, 69% of the health workforce is stationed in an urban setting while only 31% is in a rural setting (10). This shows more than half of all health workforces were placed where less than half of the whole population lives.

1.1.7. Health Inequities

In 2014/15, 85% of health facilities provided ANC, 76% provided normal delivery services. Only 4% provided Caesarean Section (CS) services (11). Generally, reports have shown health disparities in the coverage of health services between urban and rural settings(12). See table 2 below

Table 2 Health Disparities Between Urban and Rural Population in Tanzania Mainland		
Service	**% Urban**	**% Rural**
Skilled birth attendance	83	42
Postnatal follow up within 48 hours of delivery	52	30
Demand for family planning met	70	53
Breast feeding within an hour of birth	62	45
		Source: RMNCH Plan. 2014.

1.1.8. Dodoma region

Dodoma region is divided into seven administrative districts. In the 2012 national census data, the population was 2,083,588 people (48.8% Male inhabitants, 51.2% Female inhabitants) out of which 84.6% lives in rural areas.

Literacy level age group 15 years and above 2012 census, literacy was 67.5% (Male 73.5%, Female 62.0%). The Net Enrolment Ratio (NER) in primary school is 67.7% (64.7% male enrolment, 70.8% female enrolment). The NER is 90.2% in urban setting and 64.6% in rural setting. Percentage of people aged 15 years and above in Dodoma who are employed is 61.7% and the majority (71.8) is doing agricultural activities and farming was the main occupation for people in Dodoma (2)

Table 3 Health status and coverage indicators – Dodoma.		
Indicator	**2015/16**	**Source**
Health status		
Total fertility rate	5.2	DHS
Service coverage		
ANC from skilled health worker	98.2%	DHS
ANC 1 Visits	75.5%	HMIS
ANC at least 4 visits	35%	HMIS
Delivery at the HF	69.1%	DHS
Births attend by skilled personnel	69.3	DHS
Postpartum care within 48 hours	46%	DHS
Delivery by Caesarean Sections	5.6%	DHS

1.2. Emergency Obstetric and Neonatal Care

WHO recommends for every 500,000 population, to have at least 4 health facilities providing Basic Emergency Obstetric and Neonatal Care (BEmONC) and at least one HF providing Comprehensive Emergency Obstetric and Neonatal Care (CEmONC) (13). All hospitals, Health Centres (HC) and dispensaries are expected to conduct normal delivery services. Facilities providing normal delivery services are all expected to provide BEmONC services, and hospitals and HCs are all expected to provide CEmONC (10).

1.2.1. Signal functions for assessment of EmONC

A list of clearly defined EmONC signal functions is used for supervision and monitoring of health facilities showing the level and quality of care they provide (14). This list has been shown on Table 4 below.

Table 4 List of signal functions for basic and comprehensive Emergency Obstetric and Neonatal Care services.

BASIC SERVICES	COMPREHENSIVE SERVICES
1. Administer parenteral antibiotics	Perform 1 to 7 plus…
2. Administer parenteral uterotonic drug (i.e. Oxytocin)	8. Perform Caesarean Section
3. Administer parenteral anti-convulsion (i.e. Magnesium Sulphate) for eclampsia and pre-eclampsia	9.Perform blood transfusion
4. Manual removal of placenta	
5. Remove retained products (i.e. Manual Vacuum Aspiration (MVA) or Dilatation and Curettage – (D&C)	
6. Perform assisted delivery (vacuum extraction or forceps delivery)	
7. Perform basic neonatal resuscitation (e.g. using bag and mask)	
	WHO, 2009 (14)

1.2.2. HF delivery services readiness

The readiness of HF to provide delivery services and manage obstetric complications depends on the assessment of the availability of four domains. The domains include staff trained on BEmONC or CEmONC or Integrated Management of Pregnancy and Childbirth (IMPAC) service guidelines, basic equipment and medicines and supplies(11). See table 4 below

Table 5 The status of facility readiness to provide EmONC in Tanzania 2014-15

Percentage of health facilities providing normal delivery that have the following items			
	Hospital	**Health centre**	**Dispensary**
Injectable Uterotonic	97	88	76
Injectable Antibiotic	53	36	30
Injectable Magnesium sulphate	87	67	34
Injectable Diazepam	76	57	54
Guidelines on BEmONC or CEmONC	44	51	26
Staff trained on IMPAC, CEmONC or BEmONC	37	42	20
Emergency Transport	93	75	58
Suction apparatus (mucus extractor)	79	46	16
Vacuum Extractor	52	12	2
Vacuum aspirator (MVA or D&C kit)	40	24	3
Neonatal bag and mask	97	84	74
Partograph	96	80	52
Source: TSPA 2014-2016			

1.2.3. Maternal Mortality

Each year, 15% of all women worldwide get childbirth complications leading to life threatening or death if not properly treated (15). The medical causes of maternal death are grouped into direct and indirect causes. The major direct causes of complications which lead to maternal death are haemorrhage 27.1%, hypertensive disorders (14.0%), sepsis (10.7%) and abortion (7.9%). Indirect causes of maternal death include anaemia, malaria and heart diseases which contribute up to 20% of deaths (16)(17).

Chapter 2: Study Methodology

2.1. Problem statement

In 1990, 99% of global maternal deaths occurred in low income countries. (12). The MDGs were introduced with the vision to fight poverty. Its fifth goal (MDG 5) aimed to improve maternal health where its target 5A focused on reduction of MMR by 75% and target 5B focussed on achieving universal access to reproductive health by 2015 (13)(14). In 2015 the global MMR was reduced from 385 deaths per 100,000 live births to 216 deaths per 100,000 live births. This reduction was equivalent to 12 deaths per 100,000 live births in High Income Countries (HIC) and 546 deaths per 100,000 live births for sub Saharan Africa (SSA) (15).

In spite of good progress towards attainment of MDGs globally, in Tanzania the change has been very slow and does not correspond to the efforts by government and partners. Figure 1 below shows a trend in estimates of maternal death, MMR and Lifetime Risk of dying of maternal health problem (LTR) which shows similar characteristics. The estimated number of maternal death in 1990 was 11,000 women and in 2015 (25 years later) it was 8,200 women. This shows that Tanzania has a very long way to go and unless changes are done, the progress will still be disappointing.

Figure 1. Trends in estimates of Maternal death, MMR and LTR

Source: WHO, UNICEF, UNFPA, World Bank Group and UNPD (MMEIG) - November 2015
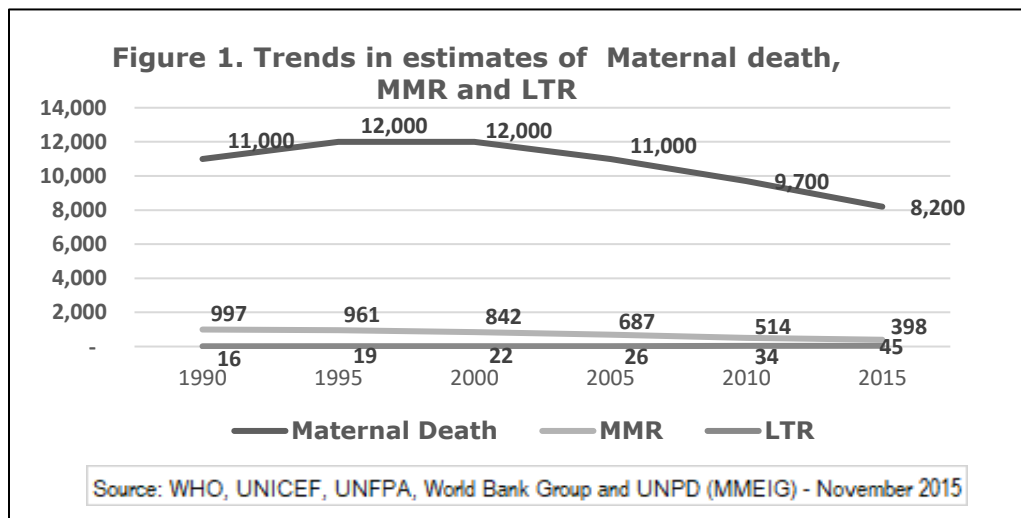
There has been inconsistency in some of HMIS data collected and reported, sometimes reports are not timely, incomplete and some are missing completely. Lack of skilled health personnel and inadequate supervision often

contributes to poor reporting (18). This brings up questions about the actual number of pregnant women dying of problems related to pregnancy and childbirth in the country and are not reported. What are the factors associated to their deaths?

The major cause of maternal death is hemorrhage, but other determinants which can contribute to high maternal mortality relates to health system (19). Health system failure, can lead to low coverage and inequity in Maternal, Neonatal and Child Health (MNCH) services. Figure 2 below, shows wealth and residence inequity in MNCH services (20). Low coverage of services in rural areas or lowest quintile may be a result of weak or unequal distribution of resources in the health system.

Figure 2. Coverage indicators showing Wealth and residence inequity in health service
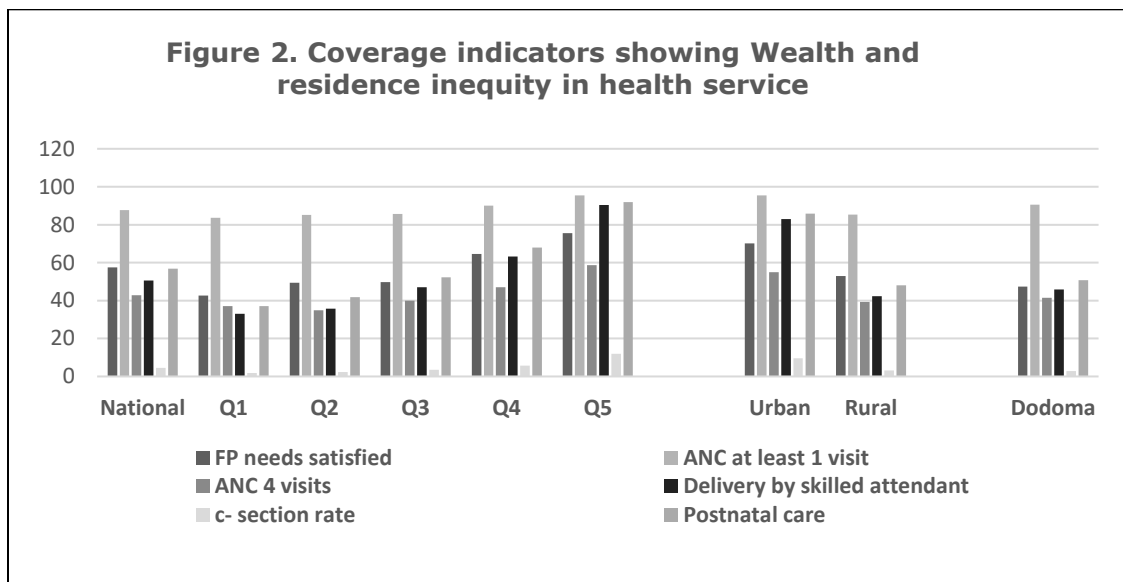
2.2. Justification of the study

An African woman plays a major role in the daily economic activities and takes care of the family. Maternal death has an impact on the economic development of individuals, family and the country. The husband can be affected psychologically and fail to take care of the family. Lack of care to the newborn and young children can lead to death of the newborn, malnutrition, drop out from school, child marriage /pregnancies and substance abuse. Funeral procedures can deplete the family savings, leading to financial crisis. It reduces the workforce, lowering GDP hence creating a poverty cycle (21)

Failure to attain MDG 5, the slow decrease in maternal mortality ratio, shows there are still operational gaps which need to be identified in order to know

the appropriate measures to be taken. Poor reporting of deaths from health facilities makes it difficult to estimate the burden of maternal mortality in the country and as a result compromises the planning and contributes to failure to improve health services. The need for assessing health system factors, which might be influencing the specific services, for women with obstetric emergency. This study will help to identify areas for improvement and provide important information to accelerate the attainment of SDG 3.1. It will also contribute to the fight against poverty.

The study will answer the following research questions:

i.   How capable are health facilities in Dodoma region to promptly respond to obstetric emergencies?
ii.   What are the health system factors influencing the responsiveness of health facilities to obstetric emergencies?

Dodoma region is chosen because firstly, its districts represent a typical rural Tanzanian setting. Secondly the government is now officially shifting from Dar es Salaam to Dodoma, this will attract migration and likely to affect the demand for services and overload the supply side. Knowing the status of EmONC services in Dodoma will be useful.

2.3. Objectives

2.3.1. General objective

To explore the factors influencing the readiness of health facilities in Dodoma to provide Emergency Obstetric and Neonatal Care, and provide evidence based recommendations to the districts and Ministry of Health.

2.3.2. Specific objectives

- To assess the current capacity of selected health facilities in Dodoma to provide Emergency Obstetric and Neonatal Care.
- To identify health system factors that contributes to health facility readiness to provide Emergency Obstetric and Neonatal Care in Dodoma.
- To critically analyse current policy, strategies and programs in order to identify gaps in the current responses.

- To review the interventions that have been successful on improving EmONC to make recommendations for interventions to improve the situation.

2.4. Methodology

2.4.1. Study design

A mixed method approach will be used to answer the research questions. Analysis of secondary quantitative data to assess the capacity of health facilities in Dodoma, to provide EmONC. The review of published literature to identify factors that contributes to HF readiness to provide EmONC. The desk review will be used to analyse policies, strategies and programs.

2.4.2. Data collection technique

2.4.2.1. Quantitative data

The data was collected in June 2016 for baseline assessment of the status of health facilities for implementation of new maternal health project. This assessment was conducted in selected health facilities of all types in Dodoma region. A structured questionnaire was administered by trained data collectors. After quality check, data entry and analysis was done in MS Excel.

2.4.2.2. The review of literature

Literature review was conducted to identify factors that explain the current ability of health facilities in Dodoma to provide emergency obstetric and neonatal care. The literature search included studies conducted in Dodoma and published in English within the past 10 years. Information obtained from studies written in Kiswahili, will be translated to English language. This information will be searched from database Google scholar, PubMed and VU library.

2.4.3. Analytical framework

Different models were reviewed to select the most suitable for this thesis.

The three delay model by Sareen Thaddeus and Debora Maine 1994.This framework is commonly used to analyse social factors associated with maternal deaths. The First delay: is the delay in making the decision to seek medical care. The second delay: Is the delay due to distance or seeking means of transportation to HFs. The third delay: Is the time lost after arrival to the health facility. It is very common; the client might be waiting for the provider, medicine and other supplies. Generally this system is useful because it includes the more important social factors which are associated with maternal death and service provision factor. However this framework cannot analyse other Components of the health system (22).

The analysis was done following the WHO 2007 Health System Framework which is comprised of six health systems functions. It clarifies what health system should have the capacity to do to achieve its goals including, but not limited to those which relate to maternal health. It also helps to identify priorities and provide means to identify gaps(23). This is possible because the functions are interlinked and with strong relationship. A change in one function affects other functions e.g. introducing insurance scheme to protect people from OOP expenditure, lead to increased health services utilization (24).

This framework is chosen because it is useful in highlighting the barriers which many women encounter when they seek service for their pregnancy, delivery or during obstetric emergency. It is a guide for the classification of factors influencing the coverage and quality of services the pregnant women receive across the continuum of care (19).

2.4.3.1. Health service delivery

This focuses on provision of effective health services which are safe, good quality of personal and non-personal health interventions to those who need it. Should determine where these services are provided and where they are needed with minimum waste of resources. It includes integrated services and delivery packages (23).

2.4.3.2. Health workforce

It involves people who perform the responsibilities whose main objectives are health protection, improvement and service provision. This includes managers, professionals and support staff and all can be either engaged to work in the public or private sector. There is strong relationship between the size of health workforce and health service coverage and outcome (23).

2.4.3.3. Health Information

It strengthens the process of timely production, analysis and dissemination and use of reliable health information. It ensures availability of information on health determinants, health systems performance and health status (24). This information is useful for decision making, planning, monitoring and evaluation of health services.

2.4.3.4.   Medical products, Vaccines and Technologies.

This function ensures the availability of safe, efficacious and cost-effective medical commodities, supplies and technologies. It also ensures the use of quality, scientifically acceptable and cost-effective products (24). This study will explore on how this Medical products and technologies influences the provision of EmONC services.

2.4.3.5.   Health care financing
This involves the collection of adequate revenue to ensure that people can get the health services they need. How they can be relieved from impoverishment resulting from paying for the services (24).

2.4.3.6.   Leadership and Governance
It ensures establishment of policy frameworks, partnership building and ensuring accountability. This also involves setting regulations, oversee the health system and incentives to influence the responsiveness (24).

Figure. 3 Health Systems Framework (WHO, 2007)
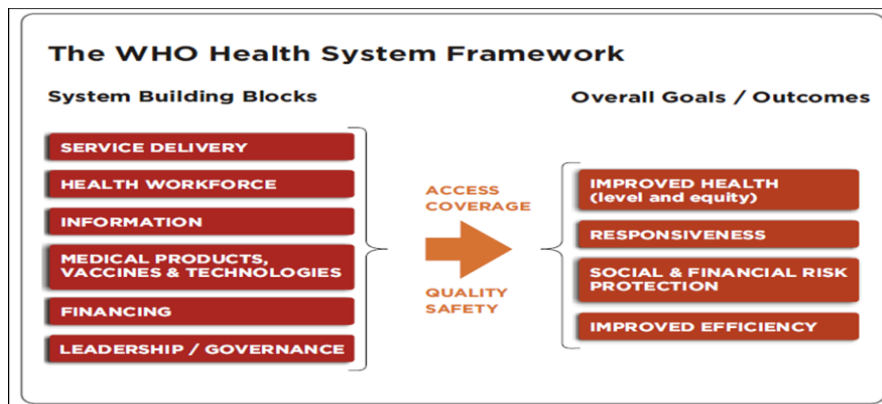
This health system framework was designed to be used to strengthen health systems. It is also useful for monitoring investments in health systems interventions hence an important tool for health systems research as well. It has been chosen because it has all the important health systems functions (25).

2.4.4. Characteristics.

2.4.4.1. Strengths

1. Easily understood and analysed by policy makers and other stakeholders
2. Clear health system concept and stipulates various components of the system
3. Provides framework which can be conveyed to the general public (26)

2.4.4.2. Weaknesses

1. According to Sandra et al, 2014, the framework cannot completely appraise specific interventions on the health system (27).
2. Though useful for health systems research, it is limited in collecting information about the community.

Chapter 3. Study Findings

3.1. Overview

The results are presented following the six health system functions. This is in order to show the interrelationship of different parts of the health system and how they influence the health service and its outcome. For a good flow and logical interpretation, the findings are sequenced as follows: Governance, health workforce, medical products vaccines and technologies, financing, health information and service delivery.

The survey results are combined with literature review findings in service provision, medical products vaccination and technology and health workforce. Findings for governance, financing and health information will only be based on literature review because this was not covered by the survey. These results portray the situation of HFs in Dodoma region. However, the HFs are not in isolation, they operate within the national health system, therefore the information from the review of literature will give possible factors influencing the ability of HFs in Dodoma to provide EmONC.

Literature review was done from published literature from Tanzania including Dodoma region and the rest of Tanzania. Grey literature from the MoHSW and other institutions. Information about other countries was also considered to provide evidence of useful interventions relevant to the Tanzanian context.

The quantitative assessment was done in 143 dispensaries and 9 HCs; a total of 152 health facilities were included. The facilities were selected based on the criteria that Hospitals and two upgraded HCs providing CEmONC were not included in this baseline survey because they were involved in a different category of the intended project. The study targeted health facilities receiving medicine and supplies from the Medical Stores Department (MSD). In this case only public HFs and one Faith Based Organization (FBO) dispensary were involved. From table 6 below, all public HFs were surveyed in district 1, 2, and 3. Few HFs from districts 4 and 5 were involved because the baseline assessment was intended for the project which was limited to the selected health facilities.

Table 6 Health facilities involved in the survey

District	Dispensary		Health centre	Total
	Government	FBO	Government	
District 1	44	1	5	50
District 2	49	0	0	49
District 3	35	0	4	39
District 4	11	0	0	11
District 5	3	0	0	3
Total	142	1	9	152

Each section starts with a short introduction on the state of the particular function in the local health system; this is followed by presenting the findings (and an analysis) to show how the provision of EmONC in Dodoma is either positively or negatively influenced by the state of the particular function

3.2. Governance

Governance is a fundamental function of the entire health system. It oversees all other functions, ensures coordination, accountability and transparency for effective delivery of service (28). Tanzania decentralized the health service delivery responsibilities to district councils and communities, to ensure their full involvement in the whole process of planning, budgeting, implementation and monitoring of services. Figure 4 below shows organization structure which has been put in place to ensure a good governance of the health system at the local government (29).

The Prime Minister's Office, the Regional Administration and Local Government (PMO-RALG) and MoHSW. At regional level the Regional Health Secretariat oversee and supervise all health services in the region, Council Health Service Board (CHSB) at the district council. The Council Health Management Team (CHMT) are professionals providing technical assistance and supportive supervision to the health facilities at the district. Ward health committees at the Ward level and Village Health committee at the dispensary level.

Figure 4 Organization structure and decision making bodies in Tanzania. (Source: *Tanzania Primary Care Systems Profile)).*
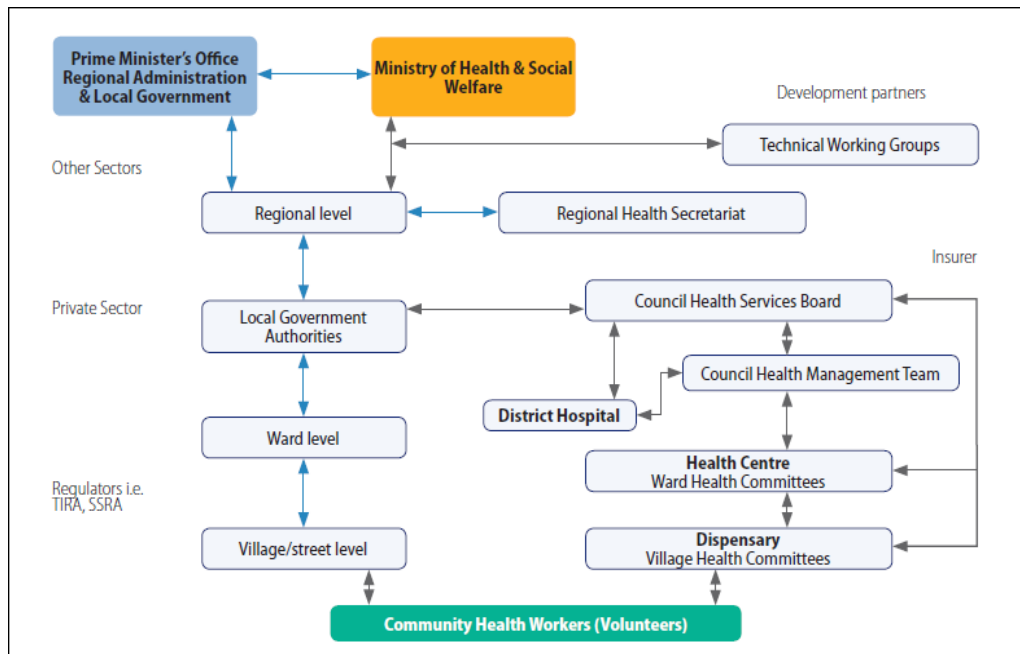
3.2.1. Functions of the councils and committees

- **Council Health Service Boards (CHSB)**:
  - To be involved in planning and budgeting
  - Play a role and oversee the implementation, Monitoring and Evaluation of health services.

- **Health Facility Governing Committees (HFGC)**
  - Planning and budgeting for HF
  - Mobilize community to join CHF
  - Ensuring availability of medicines and equipment at the HF
  - Reporting the health provider's needs to the district council discuss with dispensary management team and other stakeholders to ensure services are delivered at a good quality (30)

3.2.2. How Governance influences EmONC

Health Boards and committees representing communities determine the kind of services provided by HF. This will depend on how capable these boards and committees do their responsibilities. The provision of EmONC will depend on what has been planned in the Council Comprehensive Health Plan (CCHP) e.g. how much funds are allocated for buying drugs and supplies, having an ambulance etc. A study by Kilewo (2015) in Manyoni found there was poor

communication and information sharing between CHMT and HFGC, a lack of managerial capacity among HFGC members and lack of financial resources (31). These weaknesses within and between the committees, indirectly affects the performance of HFs to provide EmONC.

Similar governance problems seem to affect many districts. Another study conducted in 14 councils by Kessy in 2008, to review the functions of the CHSB, and to assess understanding of the board members on the issues related to planning and budgeting, to assess power relations within the council and its influence to the health service provision and progress on the use of CHF. Kessy (2008) found that the boards were poorly designed, lacking professional support, lack of participation and involvement of the community. It was also found that some boards had no knowledge on planning, budgeting or evaluation and sensitizing the community. Interaction between the boards and other committees at the district was poor and this was also due to the lack of guidelines directing on how to work together. In some districts, the District Medical Officer had very high discretionary powers; this undermined the decision making of the board (29). Another Study conducted in Ulanga district 2011, to assess the functions of Health Facility Governing Committee, found that the committees were not conducting meetings, had limited access to the community to discuss issues on health, had no transport allowance to attend meetings at the council (30). According to their responsibilities, these challenges make the boards and committees fail to fulfil their responsibilities and result in poor service due to poor planning. As this study was conducted to selected districts in all health zones in the country, the constraints might be affecting other areas including districts in Dodoma.

Governance determines success or failure of many interventions in the health system. A qualitative study by Mkoka (2014) in Kongwa district, Dodoma region aimed at exploring factors, influencing uptake of introduction of EmONC services to health facilities and CHMT experience on implementing this intervention and governance issues. This study explored reasons for some districts in the country to perform well while others are not. Findings revealed that HFs which performed well had increased HF deliveries, increased number of ambulances and even built CEmONC HF, more health workers were trained on BEmONC and CEmONC. The success was due to good leadership skills of the CHMT and partnership between the team and political leaders, community and Traditional Birth Attendants (TBAs). Reasons for bad performance of some HFs were governance related which included delays in disbursement of funds from central government, shortage of skilled staff, lack of accountability, lack

of incentives to health workers, high workload to staff and lack of guidelines (32). The above findings shows how governance influences the quality of service provided by HFs. Good governance ensures availability of necessary resources like adequate funds, health workforce, and essential medicines like uterotonic, magnesium sulphate and ambulances for EmONC.

3.3. Health Workforce

This section starts with a short overview of the global and Tanzania health workforce situation. Factors influencing availability and distribution are then explained following sub titles: Training and development, human resource management, recruitment and retention. All along, these health system factors are linked with Dodoma survey findings to show how they influence the health facilities readiness to provide EmONC.

3.3.1. Global health workforce situation

Human Resource for Health (HRH), is an important pillar to the function of any health care system. For better performance, it requires an optimum number of trained and qualified health workers, adequately distributed and in line with the countries health policies and systems (33).

In 2013, the global health workforce was 43 million and the need based shortage of around 17.4 million. Out of this shortage, round 2.6 million were doctors, 9 million were nurses and midwives. Although the largest need based shortage is in South-East Asia (6.9 million) the worst challenges are in Africa with a shortage of 4.2 million needs for health workers. It is expected by 2030 that the estimated global need based shortage of health workforce will be 14.5 million which is a decline of only 17% from 2013 estimates (34).

3.3.2. Health workforce profile in Tanzania

Table 7 below show that in 2014 the health workforce deficit was 56.4% while in the health training institution it was 34.8%. This means that the available health workforce in the health system is less than half of the required number. This shortage of skilled staff makes the health facilities incapable of providing essential services like EmONC which require some technical skills.

Table 7 Human Resource for Health: Available by level of care				
Level of care	Required	Available	Deficit	Percentage shortage
Health service delivery	145,454	63,447	82,007	56.4%
Health training Institution	4,325	2,820	1,505	34.8%
Total	149,779	66,267	83,512	
				Source: HRHSP 2014-2019

3.3.2.1. Factors influencing health workforce availability

Different factors are associated with availability of human resource for health in the country.

- **Training and development**

In spite of an increase in health workers training institutions in the country, a number of factors have been associated with reduced quality and quantity of the product.

A qualitative study by Siril et al (2013) which involved five graduate level training institutions in the country found, there was an inadequate teaching staff to many of the institutions involved. This was associated with an increase in the number of public and private institutions without prior preparations to increase the number of the teaching staff. This is critical due to the fact that, until recently, Tanzania had only one nurse tutor training institution at advanced diploma level (Personal communication). The shortage of tutors leads to production of incompetent health workers and this has a negative impact in the provision of EmONC. Siril et al also found that most institutions had a low students admission capacity in spite of having a number of qualifying applicants. Many reasons have been associated with this which includes, limited sponsorship to students which also affects the capacity of institutions to raise enough funds to run the programs. Thirdly, limited infrastructure for students accommodation, teaching halls and hospital for practice (35).

- **Human resource management**

Human resource management has an influence to the performance of both health workers and HFs in general. The HF readiness to provide EmONC will depend on the nature and style of managing the health workers. Although the survey conducted in Dodoma did not involve a management variable, the study by Marjolein et al (2009) found that, Continuing Education (CE) to health workers, improves their knowledge, skills and performance. She added that, CE will be effective, especially if it involves local problem solving and get adequate and timely supportive supervision (36). The survey in Dodoma shows that only 3 out of 9 HCs and 25 out of 143 dispensaries had at least one health worker trained on BEmONC. Effective CE could increase the number of health workers with BEmONC skills and make HFs ready to manage obstetric emergencies.

Motivation to health workers increases the commitment to their responsibilities and increases the performance of HFs. In their study, Marjolein et al (2009) also found that, payment of incentives increases motivation of health workers, job satisfaction, clients' satisfaction and HF performance. Examples show there was an increase in deliveries in Cambodia while in Uganda and Nigeria there was a decrease in informal payments from the clients. Although the survey did not collect this information, we learned from these examples that, we can increase the HF's readiness to provide EmONC if we also include incentives in human resource management in Dodoma context.

- **Recruitment**

Problems associated with health workforce challenges in Tanzania are together with those which affect recruitment of staff. Four different ministries are involved with HRH decision making. This creates difficulties in coordination. Releasing permits for districts, to employ cadres which are not required and allowing applicants to choose the places they prefer to work, resulted in deprivation of rural and hard to reach settings of skilled health workers, because they are less selected. Sometimes not all those who are employed arrive to the work station and not all who report, remain at work (37). Limited budget for employment, limits the number of health workers employed. This has resulted in a low number of employed health workers compared to what the district requested (35).

The consequences of the above limitations for employment are reflected on the survey results from Dodoma (at the end of this section) which shows; eight per cent of all dispensaries had no skilled nurse, only 18% of dispensaries had the required minimum number of skilled nurses and 36% of dispensaries had no CO or CA. Three rural dispensaries had no skilled personnel. Inadequate skilled health workers compromise the ability of rural HFs to provide EmONC promptly.

- **Retention**

In spite of the above recruitment problem, the country is also facing the problem of health workers retention. It is not clear how big this problem is countrywide. However, the study done by GIZ (2011) found that, 53% of district health workers have plans to leave their work (37). This means more than half of skilled health personnel are not motivated to work. Lack of motivation of staff affects the quality of services especially responding to emergencies.

A study by Shemdoe et al (2016) in 43 districts found that, recruitment and retention problems were more in rural districts (56%) than in urban setting (33%). It also found that highly skilled staff, like medical doctors, laboratory technicians etc. were more difficult to retain in rural setting than urban. However, this problem affects the whole country though unequally. Inability to cope with the environment, including poor communication, transport problems, lack of safe water and electricity etc. were among the reasons for leaving. The study also found the reasons for some health workers to remain at their respective work stations were: some already established their families at the area, spiritual commitment and find themselves obliged to help the community, others felt trapped by not being qualified enough to quit or protecting their pension and hopping that things might change in the future (38).Therefore, even if the health workers stay in rural settings like the districts in Dodoma, some of them are due to reasons other than commitment to work there. Deciding to stay just because one is not competent enough to quit, is a selective trend for less qualified workers remain rural setting. Figure 5 below, shows the findings from Dodoma to show health workforce situation.

Availability of skilled health workers – HF assessment in Dodoma

Fig 5 Availability of skilled healthworkers to helath facilities
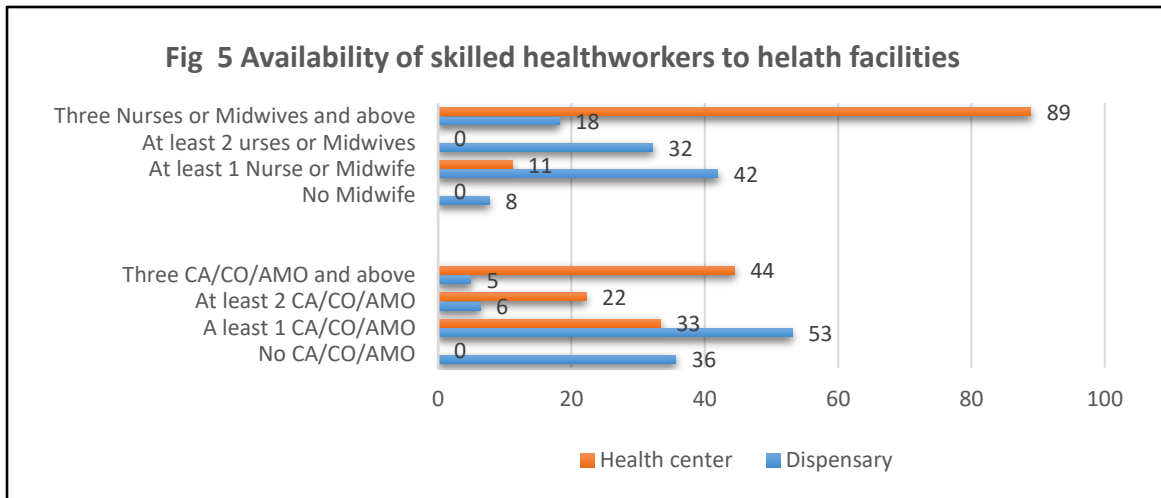
There were fewer HFs without midwives as compared to HFs without CO or CA. The recommended number of Nurses, Registered nurses and Nurse Midwifes at dispensary level is at a minimum of 3 and maximum of 5. Figure 5 above, shows 8% of dispensaries did not have any skilled nurse cadre, 42% had only one Nurse or Nurse Midwife which is below the minimum required number, 32% had two Nurses or Nurse Midwives and 18% had three or more midwives. This means that only 18% of 143 HFs had a required (Minimum) number of Nurses or Nurse Midwives. Although only 8% of dispensaries had no skilled nurses, still the majority of them have a minimum number of skilled nurses. For busy HFs, there is high chance of high work load to staff which will affect the quality and readiness to provide EmONC.

Out of 143 dispensaries, 36% had no CA/CO/AMO, 53% had at least one CA/CO/AMO which is a minimum required number of a Clinical Officer (CO) or Clinical Assistant (CA) at dispensary level. The findings also show very few (6%) and 5% of dispensaries had at least 2 and 3 clinicians respectively. This is the maximum number of CO or CA needed at this level.

The required number of Assistant Nursing Officers at HC level is at minimum of 1 and maximum 2 and for Nurses is minimum of 9 and maximum of 13 health workers. All HCs had at least one midwife and 8 out 9 HCs had 3 or more midwives. This shows that at least every shift can have at least one skilled health worker.

The HC is supposed to have at least 1 Medical Officer (MO), 1 Assistant Medical Officer (AMO) and a minimum of 1 or maximum of 2 CO. The results have

shown 3 out of 9 HCs had one CO which is the minimum number of CO needed but there were no MO or AMO as required. It was also found that 4 out 9 HCs had three or more CO and there were no MO or AMO as required.

Health centres are designed to receive patients with conditions which could not be handled at dispensary level and some to provide CS. Shortage of skilled staff at this level reduces its readiness to provide EmONC and can lead to an increase in maternal and or neonatal death. It can also lead to financial crisis for clients for they have to mobilise resources for referral which could be avoided if the HF was competent enough.

3.4. Medical products vaccines and technologies

This part is intended to show how system factors can influence the availability of essential medicine and supplies for EmONC to health facilities in Dodoma. Information is presented following five subsections as follows: brief introduction on access to essential medicine, national medicine supply system, supply chain management, integrated delivery of medical products and supplies, survey results on availability of essential medicine and equipment for EmONC in Dodoma HFs. However the survey results will be referred to throughout this section.

3.4.1. Access to Essential Medicine

Health systems are supposed to work in such a way that people can equally access all kinds of essential medicines, medical product, vaccines and different technologies. These services should be safe and with good quality, efficacious, cost effective and scientifically acceptable (24). This means they should be readily available to all levels and affordable by everyone who deserves. As the right to health is a fundamental human right, access to medicine or medical products and technology is a derivative of human rights.

3.4.2. National medicine supply system

The public medicine and supplies in Tanzania are procured, stored and distributed by an autonomous department of the ministry of health, the Medical Stores Department (MSD). However other partners order and store medicines and supplies for vertical programmes through MSD, MoHSW and UNICEF. Sixty one per cent of all essential medicines and supplies are stored by MSD, 29% by partners and 10% are stored in the health facilities. This makes MSD the main handler of public medicine and supplies in the country. Although other partners procure medicines independently, 88% collaborates with the MoHSW during the process (39). This ensures safety and quality of

products procured and protects people from ineffective or counterfeit medicines and supplies.

To expand the availability of quality and affordable Essential Medicine and Supplies, Accredited Drug Dispensing Outlet (ADDO) system was established. This strengthened public private partnership in drug dispensing in the country. In 2014, Management Science for Health (MSH) conducted an evaluation to assess availability, affordability and quality of essential drug dispensing in rural and semi urban. Results found improved quality of dispensing services, increased availability of essential medicines and improved the regulatory system (40). Similarly, another study by Kaale et al (2016), conducted in 12 districts, to assess the quality of drugs, sold in (ADDOs). It was found that 90% of medicines sold in ADDO met the quality standard, except Egometrine, a critical drug for delivering effective EmONC (41). This shows that while there is an improving trend in terms of availability of essential medicine, problems remain – both generally and in relation to supplies for effective provision of EmONC.

3.4.3. Supply chain Management

To ensure rational use of safe medicine with high quality and efficacy. Different methods are used for the supply of medicines and other products to governmental or non- governmental health services. These includes Central Medical Stores (CMS), Autonomous Supply Agency, Direct Delivery System, Primary or Prime Vendor System and Primary Private Supply (42). Figure 6 below show the supply chain functions depending on public or private role in financing. It shows the flow (chain) of commodities from manufacturer (International) level down to the community. This is summarised on figure 6 below.

Figure 6 Supply Chain with payment mechanism
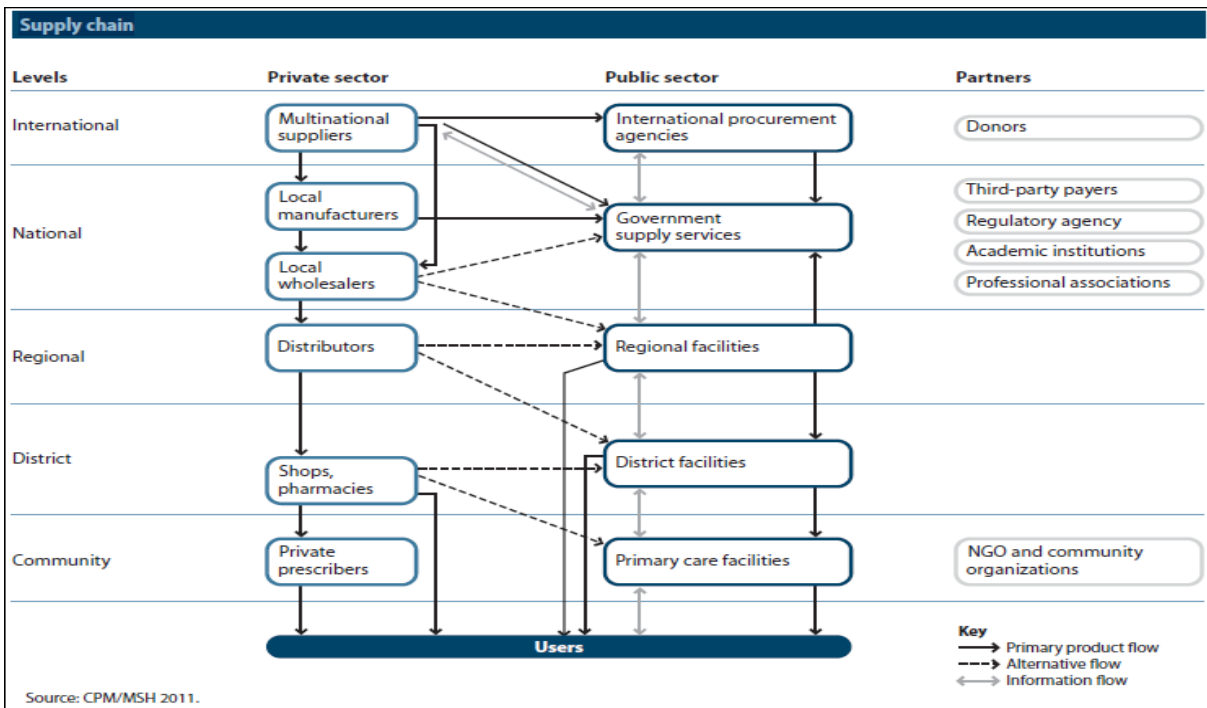
3.4.4. Integrated delivery of medical products and supplies

According to the Ministry of Health, Tanzania is using ILS to report and order various categories of supplies including essential medicines for EmONC. HFs use same procedures and same tools to report the consumption, the stock and amount to order. The categories included are: Essential medicines, contraceptives and Condoms, STI medicines, Lab supplies, dental supplies, and radiology supplies, medical supplies, Vaccines HIV Tests and ARVs. All these are grouped into 3 classes as follows.

Funding:

Four main sources of funds are financing medicine and supplies in HFs: Community Health Fund (CHF), Health Insurance, User fee and Donor fund. Every HF has its own account, where MSD withdraws the payments and the Government tops up periodically.

The evaluation done by Mikkelsen et al in (2009), in one district, five years after the introduction of using Integrated Logistic System (ILS), revealed a significant improvements in medicines and supplies accountability. There were still a number of unaccounted medicines following stock taking in health facilities Mikkelsen also found poor design and governance of the pull system

26

which show lack of reconciliation between. They also found that the system required complex calculations which health worker has to calculate manually. (43). These challenges, play a very big role on stockouts of essential supplies which includes emergency medicines

However the evaluation report show there was a massive improvement in reporting rate and reduction of medicine and supplies stock outs with more than 18,000 health workers from all levels trained on medicine and supply management issues. (44). As we saw from the previous sections, continuing education improves the performance, and it corresponds to what USAID did. Here we can conclude that, for an effective supply chain, orientation and training to health workers is mandatory.

Figure 7 Availability of medicine and equipment in HFs in Dodoma

Figure 7 Availability of Medicines and equipments

	% Dispensary (143)	% HC (n=9)
Functioning Ambu bag neonates	49	56
Suction Machine Available	48	56
Uterotonics available	97	100
Magnesium sulphate available	1	0

Percentages (0 to 120)
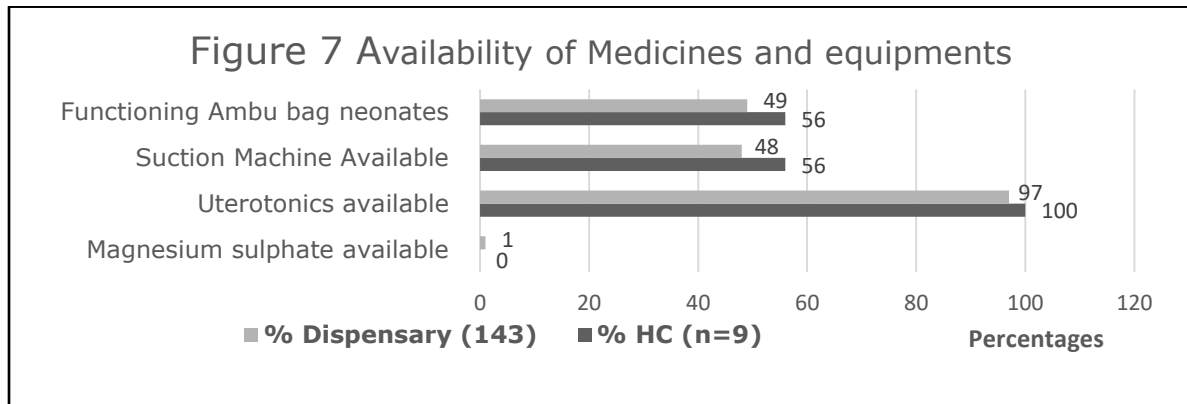
All HCs had uterotonic medicine but none had Magnesium sulphate although the study did not assess for the availability of other short acting anticonvulsants. For dispensary level, 97% had Uterotonic but only 1% of then had Magnesium sulphate. Training on how to administer this medication is part of the EmONC training and according to this study finding, very few health workers were trained on BEmONC. This might be the reason that health workers did not order Magnesium sulphate for they don't know how to administer or manage its complications. The most common direct cause of maternal death is haemorrhage and Uterotonic is the medicine of choice, there is a high possibility for women experiencing acute haemorrhage to survive. Magnesium Sulphate stocks out compromises the HF ability to manage Eclampsia as an emergency.

For neonatal resuscitation equipment, functioning Ambu bag and suction equipment were available to 56% of HCs while 48% of dispensaries had any kind of functioning suction apparatus (machine) while 49% had functioning Ambu bag for neonates. Every HF providing normal delivery services should be capable of ensuring safety of the new-born too.

3.5. Health financing

This section explains briefly about health financing in Tanzania. It is has two subsections, preceded by a short introduction.

In 2001, Tanzania, with other African countries met an agreement for every country to allocate 15% of the annual government budget for the improvement of health sector (45). Countries differ in allocating funds for health and there has been growing inequities in health care provision and outcome between and within the countries (46). Inequities in health care provision also leads to inequities in providing EmONC

3.5.1. Sources of funds

The main sources of health financing in Tanzania are from tax revenue, out of pocket payments (OOP), funds from development partners, grants and funds from vertical projects which usually is out of the main budget for health. Figure 8 below shows different forms of insurance schemes have been introduced. The Community Health Fund (CHF) voluntary insurance scheme, is operating under the local government in mainly rural setting. National Health Insurance Fund (NHIF) is a mandatory insurance scheme for civil servants which is under the Ministry of Health and Social Welfare (MoHSW) (47).

Figure 8. The structure of Health financing in Tanzania.

(Source: Tanzania Health Financing Strategy (2016–2020)
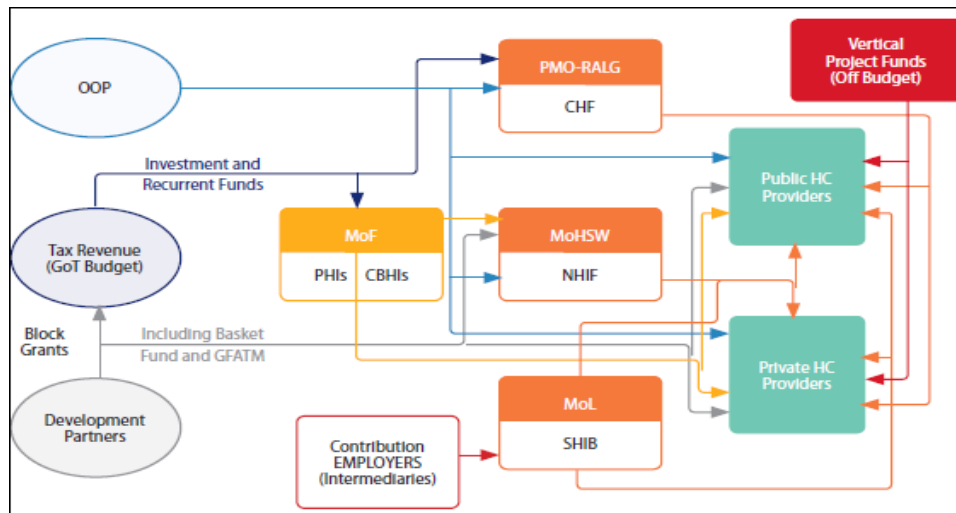
3.5.2. Expenditure on health

According to International Monetary Fund (IMF), Tanzania is one of 31 countries with a total government revenue below 20% of the GDP. In 2014, the government spent USD 20 per person on health, which is below the amount recommended of USD 86 (48). From the global health expenditure database, the OOPP on health was 33%, which is above the recommended limit of 20%. This means that there is a high possibility that people are more likely to become poorer due to relying on their own pocket on health.

Following the decrease in Government fund allocation on health, there has been an increase in out of pocket expenditure. The CHF premium collected is matched by 100% funds from the government which means that richer districts get more funds for health than the poor districts (49). All these inequities in health spending lead to inequities in accessing quality health care and this leads to a different health outcome.

Reintroduction of CHF to districts faces some challenges and as a result the intended objectives are not met. Among the reasons for rejections or dropouts of members, are governance issues, in some of the districts. Kalolo et al (2016), on a study conducted in Dodoma found that people were more likely to join the scheme if they can use the card across the region and existence of CHF structure close to the community. People were more likely to reject the scheme because of lack of accountability among the CHF workers and unavailability close to the community (48). This means that insuring good governance is crucial in ensuring maximum financial protection to the

community. Little spending on health limit the availability of essential commodities including medicine and supplies for EmONC. It mostly affect the lowest level of health system. This may lower the quality of the services and deprive the poor the right to health and lead to preventable deaths.

3.6. Information

In this section we want to know how health information and information system influences the service including EmONC. It starts with short introduction the findings from literature and conclusion at the end.

Health systems rely on different kinds of health information to plan, implement, evaluate and making different important choices. For good interpretation of outcomes and making rational decisions, which will result in intended performance, systems need accurate and reliable information (50). Low income countries are lacking enough reliable information. Due to poor performance of the health information system, with high demand of accurate information, there has been much pressure from managers, donors and other stakeholders. This has led to fragmentation of the system and it affects the quality of the data collected (18). Unreliable information may lead to poor provision of EmONC services.

Tanzania has been experiencing different challenges concerning collection, processing, storage and even utilization of health management information. The Health Management Information System (HMIS) follows the structure of the health service delivery. The information is collected through two channels: Population based data which includes surveys, Vital registration and census. The second channel is: Health Service Based data which includes health and disease records, service records and administrative records (18).

Like other departments in the health system in Tanzania, the health information system is facing some challenges which has resulted in poor quality of some of the information collected. Three studies conducted in Tanzania, identified problems related to human resource as one of problems affecting the system. One study which conducted an in-depth exploratory hospital based assessment, found that limited access to training as a major problem to health workers involved in HMIS. In this case they had low skills on data management and they found poor recording with duplication of data (51). Nyamtema et al (2010)conducted a cross sectional survey to hospital and found that, 81% of the respondents had never been trained on HMIS, 54% did not know who is responsible with HMIS data and more than 25% of the data collecting tools were not correctly recorded. Labour and delivery

registers were among the incorrectly recorded HMIS tool, which shows delivery data were not correct. Similar results were observed by Msuya et al (2010) in the study, which was conducted in information departments of four different ministries (52) (53). Health workers should have adequate skills on HMIS so that they can collect accurate information, which will be useful to them as well. Lack of drugs, inadequate supplies, shortage of skilled health workers or few HFs, can be the result of inadequate or poor information system. All this lead to inability of HFs to provide EmONC.

Problems related to governance, were also identified, Wilms et al (2014) found there was a tendency of not using the HMIS data on hospital planning, poor managerial skills, the indicator on hospital plan not matching with information collected at the same hospital. This means that it is more likely the planning does not reflect the hospital needs. Another study also found there was no informed decision making on issues at the hospital (51). A study by (2013) Kabadi et al also found that lack of adequate funds and delays in disbursement from the central office was another problem which caused many things to stop. There was a very low vital registration which means that important information was not properly collected and this directly affected the national statistics. When the mobile reporting system was introduced there was a marked improvement in registration. This proved that training and technology can improve the health information system (54).

 Health information is a cross cutting resource in health system. In spite of that, the above findings have shown different challenges which can influence the quality of information. Governance, finance, health workforce and technology are among the factors.

3.7. Service delivery
This section starts with a brief introduction followed by Dodoma survey findings followed by examples from other parts of Tanzania.

In the Tanzanian health system, the catchment area for a dispensary is 10,000 people, HC is 50,000 people and 500,000 or above. Current reports show that 90% of the population resides within 5 Kilometres from the HF. However due to the increase in population, with slow change in the number and size of infrastructure, leads to overcrowding of some HF, inadequacy of essential drugs and supplies and shortage of human resources (55). This can affect the ability of HFs including HFs from Dodoma to readily provide EmONC, which can result in maternal morbidity or mortality in Dodoma.
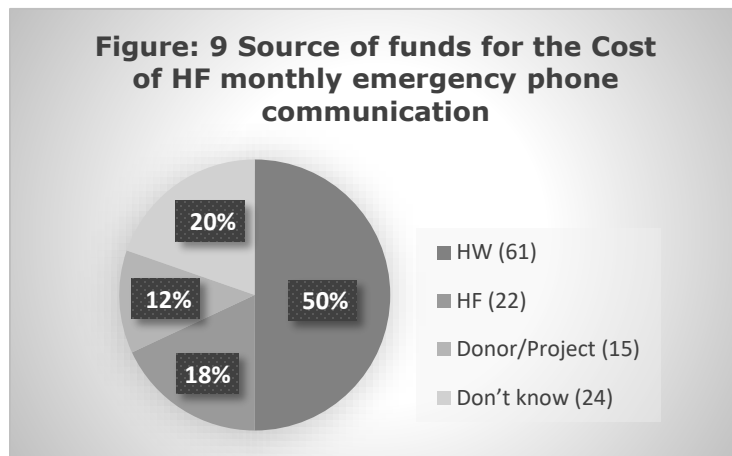
Table 8 Availability of skills and services at HC and Dispensary

Variable	Health center		
	n	**Actual**	**%**
At least 1 HW trained on BEmONC (n = 9)	9	3	33
Blood transfusion (n = 9)	9	0	0
Use of Partographs (n = 9)	9	6	11
Partographs recorded correctly (n = 6)	6	1	67
Manual removal of placenta (n = 8)	8	7	88
Perform Caesarean Section (n = 9)	9	1	11
Emergency transport (n = 7)	7	4	57
Any type of functioning Telephone (n = 9)	9	6	67
	Dispensary		
At least 1 HW trained on BEmONC (n = 143)	143	25	17
Use of Partographs (n = 134)	134	86	64
Partographs recorded correctly (n = 86)	86	16	19
Manual removal of placenta (n = 139)	139	42	30
Emergency transport (n = 143)	143	1	1
Any type of functioning Telephone (n = 143)	143	116	81

Table 8 above, shows that out of 9 HCs, only 3 had at least one health worker trained on BEmONC and there were no health workers trained on CEmONC. At dispensary level, only 17% had at least one health worker trained on BEmONC. Training on BEmONC or CEmONC imparts health workers with technical skills to confidently provide emergency care to women and this has an impact on reduction of maternal morbidity and mortality. Only one HC was prepared to perform the Caesarean Section but survey results show no health worker was trained on CEmONC and no Blood transfusion infrastructure. This concludes that, out of 9 HCs, none was providing the Caesarean section service.

Only one HC had a functioning emergency transport (Ambulance). With geographical distance and nature of the emergency availability of ambulance has a big contribution in life saving. This service can work better if telephone communication service is available. From the table above, 6 out of 9 HCs and 81% of dispensaries had at least one functional telephone. The average cost per phone per month was Tsh. 7,185 and 50% of the health facilities, health workers paid from their own pocket no refundable. This becomes like a

negative incentive to the health workers which might affect their motivation to work. Also, when the health workers have no money they will not be able to call for transport, or ordering drugs for emergency or second opinion.

When the woman experiences an obstetric complication, her life and of her unborn baby are all at risk of dying or experiencing a permanent sequelae. Studies have shown that, shortening the time the woman spends during the referral, has a significant impact on the survival of the new born. Relying on own pocket for communication might demoralise the health workers and affect their performance. Training on EmONC with the availability of a communication network of both telephone and emergency transport improves the quality of service provided. A study conducted in Burundi in 2013, revealed that, the intervention made a great change to the service provision. The referral time was reduced with a very high number of emergency phone calls. There was an increase in women delivered by Caesarean Section, which means with transport, women can arrive at the referral Health facility on time (56).

Figure: 9 Source of funds for the Cost of HF monthly emergency phone communication

- HW (61) — 50%
- HF (22) — 18%
- Donor/Project (15) — 12%
- Don't know (24) — 20%

The use of a Partograph was very low on all levels. Only one HC was correctly using Partograph to monitor women in labour. At dispensary level 64% were using Partograph but only 19% were using it correctly. Monitoring the progress of labour is important because it guides the health worker to interpret the condition of the mother and the unborn baby and make appropriate decisions and actions. The reasons for not using Partograph given by health workers from 87 HFs, were the lack of skills on how to use the Partograph which was reported by 63% of HFs, health workers from 8% of HFs reported that patients come already in the second stage so they don't see the need to

use Partograph and the last was reflection given by health workers that some of them were not serious on the importance of monitoring labour using Partograph as a tool.

The use of Partograph to monitor the condition of the woman, unborn baby and the progress of labour itself is very important and prevents morbidity and mortality. The study, conducted in two national rehabilitation centres, for women with Fistula, to explore their bathing experience, which resulted in their problems, found quality related causes of fistula. After arrival to the HF, many women who come from all over the country, reported a lack of supportive care, neglect and complaints which were interpreted by the researchers that is a poor assessment of labour. This study recommended the use of Partograph as a tool to improve the quality of care (57).

Results also show that 7 out of 9 HCs and 42 out of 139 dispensaries reported performing the Manual Removal of the Placenta. A retained placenta may lead to excessive bleeding which leads to death. Results show very few health facilities that can provide this service which might compromise the safety of the woman with this condition. This can be associated with the lack of skills as we have seen above. The study conducted in Tanzania 2009, to assess the skills of health workers, to perform Active Management of Third Stage of Labour (AMTSL), found that there is a very low knowledge and practice among health workers to perform AMTSL (58).

A qualitative study, conducted in Dodoma and Dar es Salaam, which involved Nurse Midwives and women, who experienced complications during labour and delivery, both highlighted reasons for poor quality of service. It was found that an inadequate number of nurse midwives, inadequate health facilities, lack of drugs, equipment and supplies, blood transfusion services and a lack of emergency transport were the major causes. Health workers also reported the lack of supportive supervision and all these affected their motivation to work. The statement below represented what health workers were facing when they perform their duties (55).

"There is critical shortage of staff, for example in our dispensary, we are only two, a clinical officer and I, and we have delivery services. Therefore, sometimes we are forced to stay overnight to help women in labour. Beside I am also supposed to take care of all other units in the dispensary such as injection, antenatal care, children, and dressings. It is not easy" (Nurse Midwife from Mboli village, Mpwapwa Dodoma) (55)*.*

The findings in this section show that, problems affecting health workforce are also linked to other functions of the health system. Provision of EmONC in Dodoma can also be affected.

CHAPTER 4. Evidence on policies, strategies or programs to improve EmONC services

The information in this section is presented following the sequence of health system functions used in chapter 3. This section brings in evidence of policies, strategies or programs which can be applied to improve EmONC service in Dodoma and the rest of the country.

4.1. Governance

4.1.1. Clinical governance to improve EmONC

Clinical governance is the theory used to improve health care provision through good management and accountability. This strategy was introduced in Indonesia to improve quality of maternal and new-born care. Peer to peer monitoring among health workers was one of the main approach.

Indonesia has high coverage of deliveries by skilled health workers, but it still with high maternal and neonatal mortality. This situation is similar to Tanzania including Dodoma. An intervention: Expanding Maternal and Neonatal Survival (EMAS) was introduce in Indonesia for five years. The main intervention was: documentation and reviews of deaths and women survived critical conditions, use of performance standards to assess HFs readiness to provide EmONC and quarterly reporting. Service statistics were collected and used to assess coverage of MNCH interventions. It was found that, there was increase in clinical governance practice, increased maternal death reviews from 48% to 85%. Health facility readiness to provide EmONC was increased. The standards on provision of Magnesium sulphate for treatment of eclampsia and uterotonic also increased (59).

4.2. Health workforce

4.2.1. Provider education

Reports have shown a success on provision of pre and in service EmONC training through a continuum of activities, which ensures that the provider learns through an evidence based EmONC intervention, performs critical lifesaving skills and transfer it to the clinical area. This is accompanied with adequate guidelines and sustainable regular supportive supervision. This system has been successful in Afghanistan, Ghana, India, Malawi, Nigeria and Tanzania. Scaling up this program may be a sustainable and cost-effective way of producing EmONC competent health workers (60).

4.3. Medical products, vaccines and technologies

Increase availability of Magnesium sulphate

The use of Magnesium sulphate has been a challenge to some countries, including Tanzania. To ensure availability and use of the medicine Nigeria conducted series of training and advocacy to MoH for a policy. Local curriculum was also prepared for continuous training of health workers. Later the government of Nigeria authorised community health workers to administer the initial dose. In India, continuous training and supportive supervision increased the utilization. In Nepal, apart from training, the availability of guidelines on how to administer magnesium sulphate. This increased competence to health workers (61). This means that training, supervision and supply of magnesium sulphate will increase the utilization and improve EmONC services.

4.4. Health financing

CBHI targeting major MNCH challenges

Experience from Rwanda, following the use of Community Based Health Insurance (CBHI), has shown: there was an increase service coverage including Maternal, Neonatal and Child (MNCH) services, timely emergency obstetric referrals, adequate essential EmONC and medicines. Although the scheme is similar to other countries, the coverage to important (MNCH) services has made a very big difference. The premium is charged by wealth, it covers 90% of ambulance services during referrals, and it can be used outside the catchment area in emergency / referral bases. This is one of the interventions which contributed to Rwanda reaching the target (62)(63).

4.5. Information

Introducing new technology to improve HMIS

Tanzania has been mainly using paper based tools for collecting health information. Inadequate human resource to work on HMIS left all health workers to get involved on entire responsibility of collecting and managing the information. This has lead to errors and managers fail to rely on the information for planning. This means due to poor management of health information system has made health workers to lose trust and rely on other sources.

Mutale et al (2013) presented findings on the comparison of different interventions involving five countries, Zambia, Rwanda, Ghana, Tanzania and Mozambique. These countries were grouped on two partnerships where Zambia and Rwanda used an electronic base information system. This system was using simple electronic technology which was used in remote areas using

solar. This provided quick and accurate access of information from community, HFs, district headquarters and higher. This system can be used where there is shortage of staff, can be run and produce simple reliable reports which can be used in all levels of care and management. Another advantage of this intervention is increased possibility to linking HIS and decision making which will improve other functions of health system (64). If Tanzania adapt this system will improve health service provision especially in rural areas like many districts in Dodoma.

4.6. Service delivery

4.6.1. Improving emergency transport

Emergency transport is very important to ensure pregnant women with complications to arrive at the appropriate level of care on time. Inadequate emergency transport and HFs conducting CS, raise the need to have a reliable emergency transport. Rwanda improved emergency transport by introducing community health insurance to cover the costs. This means, the health system is able to provide easily accessible and uninterrupted emergency transport (63). This is different from Tanzania where the costs are provided by the DMO office. Through my long time experience, this system sometimes has fuel problems, maintenance of the car etc. The use of insurance will improve this service and increase the readiness to provide EmONC.

4.6.2. Improving readiness to provide EmONC

To ensure HFs readiness to provide EmONC, all health systems functions have to be effective. In order to reduce maternal death in Sofala province, the. Republic of Mozambique implemented a five year project. This project aimed at improving health system by strengthening rural hospitals and HCs. The capacity to effective response to obstetric emergencies was improved. This included improvement of infrastructure and human resource development. Emergency communication and transport were also improved. Management activities were strengthened including supportive supervision, ensuring availability of drugs, supplies and equipment. Timely and reliable health information was ensure through improvement of record keeping, strengthening monitoring and evaluation and maternal death review. This program was very successful, maternal death was reduced by50%, there was an increase in utilization of maternal health services especially EmONC (65). Although this study was conducted more than 10 years ago, the methods are still useful on improving EmONC services. It has addressed all the challenges identified in Dodoma survey.

4.6.3. Training and utilization of pantographs.

Improper utilization of Partograph, subject women to preventable morbidity and mortality. In Uganda, a hospital performed poorly prior the implementation of training on how to using Partograph. After training there was a marked improvement on the utilization of the Partograph. This improved patients documentation (66).This was possible because health workers became interested to practice together.

CHAPTER 5.

5.1. Discussion

This section explains the findings from the survey conducted in Dodoma region and literature. The contents are presented following the sequence used in chapter 3.

The literature has revealed governance problems where the health facilities boards and committees are weak. The members don't know their roles and responsibilities and to some, there is no cooperation between the committees and health staff. This weakens the leadership and affect the planning which result to poor performance of health facility. In this case the provision of EmONC will also be affected and lead to preventable deaths of women. In other words lack of good governance contribute to failure to prevent or reduce maternal deaths. Amelia et al (2016) shows the importance of governance on improving EmONC. The clinical governance introduced in Indonesia improved the services and reduced maternal death. Ensuring all committees and boards members perform their responsibilities will have an impact on health facility provision of EmONC.

Shortage of skilled health workers was observed more in dispensaries than HCs. Thirty six percent of dispensaries had no CO, CA or AMO. And 8% of dispensaries had no any nurse. Retention problem was found to be one of the problems which leads to shortage of staff. Shemdoe et al (2016) found that retention problem is higher in rural than urban. This creates urban rural inequity in EmONC. Lack continuing education is one of the demotivation to staff and can make them quit their work. All these problems can be existing in Dodoma and might be the reason of shortage of skilled staff.

Severe shortage of Magnesium sulphate was found in all HFs. This means that the HFs were not capable preventing death due to eclampsia. However there was very good stock of uterotonic which means HFs could control haemorrhage. Saving mothers should also mean saving the neonates, but this was not the case with results from Dodoma. Less than half of all dispensaries had functioning ambu bag, mask and suction apparatus. And this means more than half will not be able to save the life of new born in case of emergency. Study by Townsend et al (2014) revealed success to interventions done to different countries which lead to increased utilization of magnesium sulphate and other services. This means that, probably lack of training and shortage of skilled staff is the reason of not using magnesium sulphate in Dodoma HFs. Shortage of transport delays service and can lead to maternal death. In

Dodoma 4 out of 7 HFs had ambulance. Majority of HFs had means of communication although half HFs, staff use their own money to pay for work phone calls. This means when they don't have money during the emergency they will not be able to communicate.

Health financing mostly determines the quality and coverage of health care provided. This study has shown that the government in (2014) spent USD. 20 per person less than the recommended amount of USD. 86. This has made an increase of OPP. This means that, many people are using their own money for health which then brings inequity on accessing services. The use of CHF has not covered issues like ambulance while in Rwanda the CBHI includes emergency transport and can cross district on emergency purposes.

Timely and accurate health information influence the quality of services. The study has found that health workers have been obliged to collect information but they have never been trained on how to use the tools. As a result, the tools are not recorded properly. This can result to false information which will affect the entire health system. There was also a shortage of staff for HMIS the problem of unreliable information has been a challenge nowadays in many countries. It leads to relying on estimates which may not be accurate. Some interventions fails because of poor information system. In order to be able to plan monitor and evaluate interventions and programs accurate information is needed. Mutale et al (2013), on a study reported that training of health workers on HIS and the use of technology, improves the quality of information and reduces the problem of HIS staff shortage.

Very few health workers in Dodoma were trained on EmONC. Three out of 9 HCs and 17% of dispensaries had at least one health worker trained on EmONC. At the same time 1 out of 6 HCs and 19% of dispensaries health workers were filling the pantographs correctly. This brings an impression that lack of EmONC training affects the use of Partograph. At the same time training on CEmONC training includes Caesarean section, and because there are no health workers trained on CEmONC, only one Hc out of 9 provide Caesarean section. Likewise, manual removal of placenta at dispensary, only 30% of dispensaries can provide that service. There is high need to train health workers on EmONC to improve these services. Mfinanga et al (2009), in a study in Tanzania, found similar results. This shows that Dodoma has similar chacteristics with the rest of the rural Tanzania. Tayler et al (2013) a study in Burundi, found that training and provision of communication, transport and equipment improves the quality of EmONC. If similar

intervention is done in Dodoma there is high possibility increasing the HF readiness to provide EmONC.

This study has shown how the relationship between health system functions can relate with health care quality. Comparing Dodoma findings and the literature, it shows the relationship with health system. Poor governance, finance and health information are cross cutting factors influencing the entire system.

The use of this framework, made it easy to relate different sections and see how they influence each other. However, more literature could broaden the relationship and bring new findings. The data from the survey did not include all system functions, more study taking this in consideration will be better.

5.2. Conclusion

Health facility readiness to provide EmONC, depends on fulfilment of special cardinal functions. This study has shown that, many HFs in Dodoma cannot meet the criteria. This means most of dispensaries and HCs are not ready enough to provide EmONC. Shortage of staff, lack of EmONC training were major problems to health workers. Lack of Magnesium sulphate no use of Partograph and inadequate resuscitation equipment were also major findings. The findings from the literature have shown a relationship of the problems and health system functions. Governance problems including weak board and committees, lack continuing education and recruitment contributed. Low government spending on health, poor quality of health information also influenced the problems in Dodoma and the country. Dodoma is a fast growing region because the government has shifted there. This means there will soon emerge high utilization of health care. Without restoring the situation, the quality of service will drop. Experience from othe countries has shown a success. Improving governance, training and recruiting health workers is needed. Improving transport and supplies will also improve the service. Interview with regional health leaders and committee leaders will add more details necessary for interventions.

5.3. Recommendations

5.3.1. Ministry of Health

- Incorporate EmONC training to pre service
  In service training of health workers on EmONC is expensive, irregular and not sustainable. Incorporating it to Pre service training will ensure sustainability but also cost effectiveness. A good example is training of

IMCI in Tanzania. This will need review of curricula, TOT and budget for resources.

- Advocacy to insist the government to increase the budget on health. This is policy issue and will need the parliament.

5.3.2. RMO DODOMA
SHORT TERM

- **Train health workers on EmONC to improve HFs readiness to treat obstetric emergencies**
- Training on EmONC has been conducted irregularly by partners depending on budget. This is not sustainable. The regional health office can include this kind of training on their annual budget and ensure regular orientation to health workers. This will be preceded by training of trainers (TOT) who will remain permanent at regional or district. This will be cost effective.

- **Distribute Magnesium sulphate to HFs for emergency management of eclampsia/ pre-eclampsia**
- This medicine is recommended by WHO for the management of Eclampsia and pre-eclampsia. Its shortage to all health facilities shows the reason is known by the administration. This distribution can follow the EmONC training because the EmONC package includes Magnesium sulphate. Eclampsia is the second cause of maternal death, so it is good to ensure its availability. This activity is less expensive, it only needs its consumables.

- **Train health boards and committees on their roles and responsibilities**
  Studies have identified challenges faced by board and committee members. Some of the studies were conducted in Dodoma. Other studies have shown when these members perform their duties, there is a big impact on the quality of services and motivation to health workers.

LONG TERM

- **To set a budget for procuring Ambulance**
- It is agreed by ministry of health that every HC to have an ambulance. Because many of the district are not performing operation nor do they provide blood transfusion. Emergency transport is important.

- **CEmONC training and upgrade HCs**
  Comprehensive Emergency Obstetric Care to HC will shorten the distance clients have to travel during the emergency. This is a long term plan because will need long term training of health workers. Construction of theatre and othe infrastructure will need time and budget.

6.   Study limitations

- The baseline survey did not include an observation of how health workers perform the procedures, so it will not complete the required cardinal functions

- Because the survey was designed for a different project, the selection of the HFs did not fit exactly the requirements of this study.

- The secondary data did not include the assisted delivery procedure (Vacuum or forceps extractor) and use of MVA for post abortion care.

References

1. URT. Basic Demographic and Socio-Eonomic Profile Statistical Tables, Tanzania Mainland. 2014.

2. NBS. The United Republic of Tanzania Basic Demographic and Socio-Economic Profile Report:Tanzania Mainland. 2014.

3. National Bureau of Statistics (NBS). Tanzania National Panel Survey Wave 3, 2012-2013. 2014;

4. NBS, United Republic of Tanzania. Tanzania Demographic and Health Survey and Malaria indicator Survey. Dar es Salaam; 2015.

5. (URT) UR of T. Tanzania in Figures. Natl Bur Stat Dar es Salaam, Tanzania. 2016;

6. Project HP. Health Financing Profile. Dar es Salaam; 2016.

7. The United Republic of Tanzania Ministry of Health and Social Welfare. Primary Health Services Development Programme - MMAM: 2007-2017. 2007;1–130.

8. MoHSW. United Republic of Tanzania Ministry of Health and Social Welfare The National Road Map Strategic Plan To Accelerate Reduction of Maternal , Newborn and Child Deaths in Tanzania. 2008;(April):1–102.

9. Afnan-holmes H, Magoma M, John T, Levira F, Msemo G, Armstrong CE, et al. Tanzania ' s Countdown to 2015 : an analysis of two decades of progress and gaps for reproductive , maternal , newborn , and child health , to inform priorities for post-2015. 2015;396–409.

10. Honorati Masanja PS. Tanzania Service Availability and Readiness Assessment (SARA). Dar es Salaam; 2013.

11. MoHSW. Tanzania Service Provision Assessment Survey 2014-2015. Usaids [Internet]. 2014; Available from: https://dhsprogram.com/pubs/pdf/SPA22/SPA22.pdf

12. The United Republic of Tanzania Ministry of Health and Social Welfare. The National Road Map Strategic Plan to Accelerate Reduction of Maternal,and neonatal care Tanzania. 2014.

13. Care O. Maternal Mortality Update 2002 : Afocus on emergency obstetric care. New York; 2002.

14. WHO. Monitoring emergency obstetric care. Geneva; 2009.

15. Response U. Providing Emergency Obstetric and. 2012;(December):1–8.

16. Say L, Chou D, Gemmill A, Tun??alp ??zge, Moller AB, Daniels J, et al. Global causes of maternal death: A WHO systematic analysis. Lancet Glob Heal. 2014;2(6):323–33.

17. Nour NM. An introduction to maternal mortality. Rev Obstet Gynecol [Internet]. 2008;1(2):77–81.

18. MoHSW. Ministry of Health and Social Welfare: Strengthening Health Information System. 2010;

19. Filippi V, Chou D, Ronsmans C, Graham W, Say L. Levels and Causes of Maternal

Mortality and Morbidity. 2016;1–31.

20. NBS T. Demographic and Health Survey. Dar es Salaam; 2010.

21. Kirigia JM, Oluwole D, Mwabu GM, Gatwiri D, Kainyu LH. Effects of maternal mortality on gross domestic product (GDP) in the WHO African region. Afr J Heal Sci [Internet]. 2006;13(1–2):86–95.

22. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. [Newsl Womens Glob Netw Reprod Rights. 1991 Jul-Sep] - PubMed Result. Soc Sci Med [Internet]. 1994;38(8):1091–110.

23. WHO. E verybody's Business Strengtherning H ealth Systems to Improve H ealth Outcomes W HO ' S Framework For Action. Geneva; 2007.

24. WHO. Systems thinking for Health Systems Strengtherning. Geneva; 2009.

25. Mounier-jack S, Griffiths UK, Closser S, Burchett H, Marchal B. Measuring the health systems impact of disease control programmes : a critical reflection on the WHO building blocks framework. BMC Public Health [Internet]. BMC Public Health; 2014;14(1):1–8.

26. Hsiao WC, Sparkes SP. A Common Analytical Model for National Health Systems. 2012;

27. Mounier-Jack S, Griffiths U. Measuring the health systems impact of disease control programmes: a critical reflection on the WHO building blocks framework. BMC public … [Internet]. 2014;1–8.

28. Nyoni J, Gedik G. Health Workforce Governance and Leadership Capacity in the African Region Review of Human Resources for Health. 2012;

29. Kessy F. Technical Review of Council Health Service Boards and Health Facility Governing Committees in Tanzania. Dar es Salaam; 2008.

30. IHI. Health Facility Governing Committees. Are they realy working? 2011;7(7):1–4.

31. Kilewo EG, Frumence G. Factors that hinder community participation in developing and implementing comprehensive council health plans in Manyoni District, Tanzania. Glob Health Action. 2015;8(1):1–10.

32. Dickson Mkoka et al. Governing the implementation of emergency obstetric care: experiences of rural district health managers, Tanzania. BMC Health Serv Res [Internet]. 2014;14(1):333.

33. USAID. The Health System Assessment Approach : A how to Manual. 2012;

34. WHO. Health Workforce Requirement for Universal Health Coverage and SDG. Geneva; 2016.

35. Siril N, Kiwara A, Simba D. Challenges towards realization of health care sector goals of Tanzania development vision 2025: training and deployment of graduate human resource for health. East Afr J Public Heal. 2013;10(2):476–86.

36. Dieleman M, Gerretsen B, van der Wilt GJ, Jan van der Wilt G, van der Wilt GJ. Human resource management interventions to improve health workers' performance in low and middle income countries: a realist review. Health Res Policy Syst [Internet].

2009;7(7):7.

37. URT. Ministry of Health and Social Welfare, Human Resource for Health and Social Welfare Strategic Plan 2014 - 2019. Hrh Strategic Plan 2014 – 2019. Dar es Salaam; 2014.

38. Shemdoe A, Mbaruku G, Dillip A, Bradley S, William J, Wason D, et al. Explaining retention of healthcare workers in Tanzania: moving on, coming to "look, see and go", or stay? Hum Resour Health [Internet]. Human Resources for Health; 2016;14:2.

39. Ministry of Health and Social Welfare. Mapping of the medicines procurement and supply management system in Tanzania [Internet]. Dar es Salaam; 2008.

40. Rutta E. Medicines in Health Systems : Advancing access, affordability, and appropriate use. Alliance Heal Policy Syst Res Flagsh Rep 2014. 2014;1–20.

41. Kaale E, Manyanga V, Chambuso M, Liana J, Rutta E, Embrey M, et al. The quality of selected essential medicines sold in accredited drug dispensing outlets and pharmacies in Tanzania. PLoS One. 2016;11(11):1–9.

42. Dias V. MDS-3: Managing Access to Medicines and Health Technologies. Manag Sci Heal. 2012;Chapter 9.

43. Mikkelsen-Lopez I, Cowley P, Kasale H, Mbuya C, Reid G, de Savigny D. Essential medicines in Tanzania: does the new delivery system improve supply and accountability? Heal Syst [Internet]. 2014;3(1):74–81.

44. USAID Deliver Project. Health Logistics in Tanzania: A decade of supply chain accomplishments. 2016;

45. WHO. The Abuja Declaration : Ten Years On. Abuja; 2015.

46. Poullier J, Hernandez P, Savedoff WD. Patterns of Global Health Expenditures : Results for 191 Countries. Policy. 2002;(51):1–17.

47. Schneider H. Primary Care Systems Profiles & Performance (PRIMASYS) - Tanzania Case Study. Geneva; 2016.

48. Kalolo A, Gautier L, Radermacher R, Stoermer M, Jahn A, Meshack M, et al. Implementation of the redesigned Community Health Fund in the Dodoma region of Tanzania: A qualitative study of views from rural communities. Int J Health Plann Manage. 2017;(July 2016):1–15.

49. Schneider H. Primary Care Systems Profiles & Performance (PRIMASYS) - Tanzania case study. Geneva; 2016.

50. AbouZahr C, Boerma T. Health information systems: The foundations of public health. Bull World Health Organ. 2005;83(8):578–83.

51. Wilms MC, Mbembela O, Prytherch H, Hellmold P, Kuelker R. An in-depth, exploratory assessment of the implementation of the National Health Information System at a district level hospital in Tanzania. BMC Health Serv Res [Internet]. 2014;14(1):91.

52. Nyamtema AS. Bridging the gaps in the Health Management Information System in the context of a changing health sector. BMC Med Inform Decis Mak [Internet]. 2010;10(1):36.

53.   Msuya E. Challenges in data collection, consolidation and reporting for local government authorities in Tanzania [Internet]. Research on Poverty Alleviation. Dar es Salaam; 2010.

54.   Kabadi G, Savigny D De. Innovations in monitoring vital events birth and death registration : A scalable solution. 2013;30.

55.   Mselle LT, Moland KM, Mvungi A, Evjen-Olsen B, Kohi TW. Why give birth in health facility? Users' and providers' accounts of poor quality of birth care in Tanzania. BMC Health Serv Res [Internet]. 2013;13:174.

56.   Tayler-Smith K, Zachariah R, Manzi M, Van den Boogaard W, Nyandwi G, Reid T, et al. An ambulance referral network improves access to emergency obstetric and neonatal care in a district of rural Burundi with high maternal mortality. Trop Med Int Heal. 2013;18(8):993–1001.

57.   Mselle LT, Kohi TW, Mvungi A, Evjen-Olsen B, Moland K. Waiting for attention and care: birthing accounts of women in rural Tanzania who developed obstetric fistula as an outcome of labour. BMC Pregnancy Childbirth [Internet]. BioMed Central Ltd; 2011;11(1):75.

58.   Mfinanga GS, Kimaro GD, Ngadaya E, Massawe S, Mtandu R, Shayo EH, et al. Health facility-based Active Management of the Third Stage of Labor: findings from a national survey in Tanzania. Health Res Policy Syst [Internet]. 2009;7:6. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2676279&tool=pmcentre z&rendertype=abstract

59.   Amelia D, Clinical E, Lead T, Budi LK. Case Study : Clinical Governance as an Approach to Improve Maternal and Newborn Health in 22 Hospitals in Indonesia. World Heal Popul • Vol16 no2. 2016;16–23.

60.   Otolorin E, Gomez P, Currie S, Thapa K, Dao B. Essential basic and emergency obstetric and newborn care: From education and training to service delivery and quality of care. Int J Gynecol Obstet [Internet]. Elsevier B.V.; 2015;130(S2):S46–53.

61.   Townsend J, Clark H, Council P. Essential Medicines for Maternal Health: Ensuring Equitable Access for All. Supplies Coalit. 2014;

62.   Kalisa I, Musange S, Collins D, Saya U, Kunda T. The Development of Community-Based Health Insurance in Rwanda: Experiences and Lessons. Kigali; 2015.

63.   Development O. Delivering maternal health. 2012;(May).

64.   Mutale W, Chintu N, Amoroso C, Awoonor-Williams K, Phillips J, Baynes C, et al. Improving health information systems for decision making across five sub-Saharan African countries: Implementation strategies from the African Health Initiative. BMC Heal Serv Res [Internet]. BioMed Central Ltd; 2013;13 Suppl 2(Suppl 2):S9.

65.   Santos C, Diante D, Baptista A, Matediane E, Bique C, Bailey P. Improving emergency obstetric care in Mozambique: The story of Sofala. Int J Gynecol Obstet. 2006;94(2):190–201.

66.   Aliona Masika M, Peter Katongole S, Govule P. Improving Partograph Documentation and Use by Health Workers of Bwera Hospital: A Process Improvement Research. Int J Nurs Heal Sci [Internet]. 2015;2(4):37–45.

1. MoHCDGEC Tanzania: http://hfrportal.ehealth.go.tz/index.php?r=site/index (viewed on 14/04/2017)
2. http://www.statcompiler.com/en/ DHS web (viewed 17/04/2017)
3. Global health expenditure database https://www.imf.org/external/pubs/ft/weo/2015/01/weodata/index.aspx (viewed in 31/07/2017)