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# **Hospital-Based Maternal Mortality Rates in Tanzania**

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*Oh Zarya Lucia Carelia Rongxu*  
University of Cambridge



Cambridge Development Initiative  
CUSU, 17 Mill Lane  
Cambridge CB2 1RX  
United Kingdom  
[www.cambridgedevelopment.org](http://www.cambridgedevelopment.org)



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# **Hospital-Based Maternal Mortality Rates In Tanzania: Assessing The Main Factors and Potential Counteractive Measures To Improve The Quality Of Maternal Healthcare**

*Rongxu, O. Z. L.C.*

## **Abstract**

Tanzania suffers from exceptionally high maternal mortality rates. The purpose of this research report is to investigate the main factors contributing to this issue and conduct an analysis to determine which are the most significant contributing factors. The investigation takes the form of a literature review to gather data on the various factors, and an inter-relational diagram is used to analyse which factor is the root cause. The report concludes by recommending possible measures that could be taken to counteract the issue based on the data gathered.

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## **1. Introduction**

### **1.1. Tanzania's Healthcare Sector**

The provision of health care in Tanzania, especially in rural areas, was adversely affected after the economic recession of the 1970s and 1980s, which negatively impacted these services. Maternal mortality, child mortality, HIV/AIDs, pneumonia, and malaria are the main problems that the health system faces. When it comes to meeting health related Millenium Development Goals set by the UN, the country has made progress in achieving many of its 2015 targets for malaria, HIV and AIDS, tuberculosis, and child health, but neonatal mortality has gone down less than planned, and furthermore the decline in Maternal Mortality was not fast enough to reach the MDG. Reproductive, Maternal, Neonatal, Child, and Adolescent Health (RMNCAH) in general is performing less effectively than control of communicable diseases. However, the country does not yet have the capacity for an adequate response (Tzdpq.or.tz. 2014). This suggests that not only is maternal health a neglected health sector, but unless viable solutions are implemented to improve resources dedicated to this sector it will continue to lag behind.

### **1.2. Overview of Tanzanian Health Care System**

The Tanzanian health system is decentralized and the Ministry of Health, Community Development, Gender and Elderly (MOHCDGEC) holds overall accountability over the health and social welfare services. While the President's Office, Regional Administration and Local Government (PO-RALG) is responsible for the management and administration of public services at Regional and Council level, Local Governmental Authorities (LGAs) are responsible for planning, delivering and overseeing public services at the local level. They establish partnerships with communities, NGOs and private providers in health and social welfare, behaving as the main interface between citizens and Government in daily life (Tzdpq.or.tz 2014).

In general, the health services are heavily based on national government financing, with additional funds coming from local government council tax collection and other earnings. The Community Health Fund (CHF) is a tool designed to encourage individuals to participate voluntarily in supporting their own health. It works concurrently with the National Health Insurance Fund, which covers formal sector workers, while the CHF covers the informal sector and rural households. Beneficiaries of the scheme are entitled to services available up to the regional hospital level, subject to an exclusion list composed predominantly of specialized procedures and drugs. Furthermore, the aim is that a portion of CHF enrollment for the poor will soon be subsidized by the government of Tanzania (Lee, B. et al 2018). By promoting the ease of access to healthcare, it aims to increase people's willingness to seek treatment when needed. This could be beneficial for maternal health since one of the factors that deters mothers from seeking early treatment is high fees.

#### **1.2.1. Health and Social Welfare Structure**

The structure of health care services can be depicted as a pyramidal structure (Figure 1) The lowest level at which Public and private providers work is the dispensaries and health centres. Dispensaries provide preventive and curative outpatient services, whereas health centres have the

ability to admit patients and even provide surgical services. Patients are referred to Council hospitals which provide medical and basic surgical services. Regional Referral Hospitals are also referral hospitals but they provide specialist care, and finally Zonal and National Hospitals offer advanced medical care and act as teaching hospitals for medical, paramedical and nursing training. On top of these government provided services, Faith Based Organisations provide pharmaceutical services, along with private pharmacies and Accredited Drug Dispensing Outlets. The Social Welfare Department of the Council and NGOs have social welfare officers and workers who provide social services. (Tzdpq.or.tz 2014)

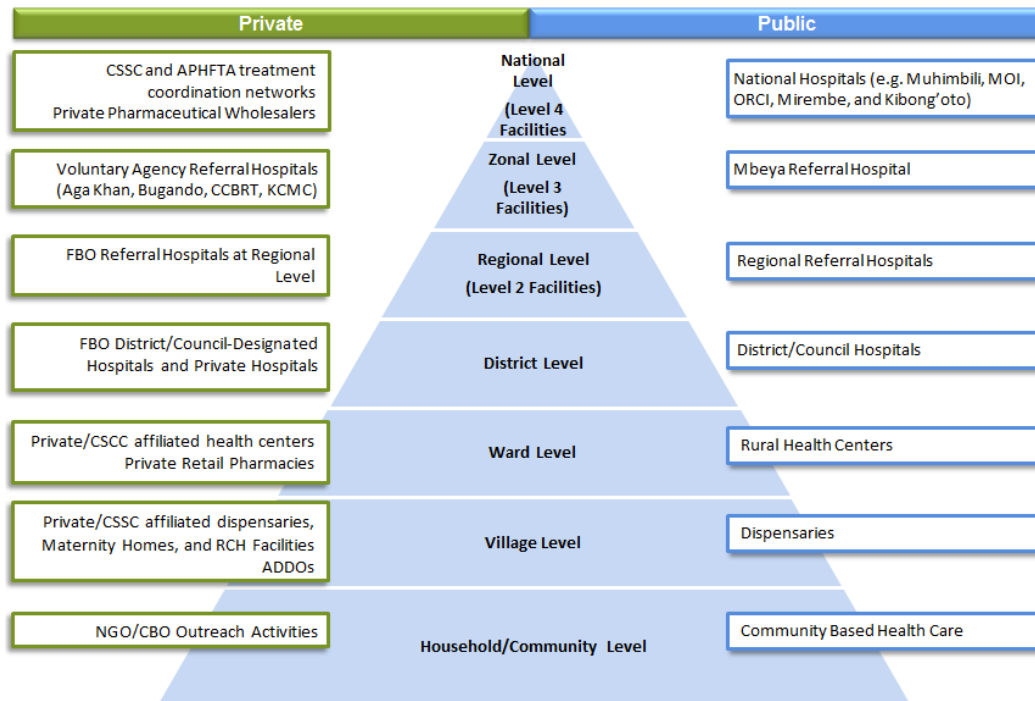


Figure 1: Structure of Health Care Services (Tzdpq.or.tz, 2014)

The number and capacity of each type of Public Sector and Private Sector Facilities as of 2014 is shown in Figure 2.

| Public Sector Facilities including FBO (2014) | Number       | Total No. Of Beds |
|---|--------------|-------------------|
| National general hospitals                    | 1            | 1,362             |
| National specialised hospitals                | 4            | 1,497             |
| Regional referral hospitals (Gov)             | 15           | 3,449             |
| Regional referral hospitals (FBO)             | 12           | 4,581             |
| Zonal hospitals                               | 5            | 2,327             |
| Council hospital                              | 63           | 7,267             |
| Council designated hospital                   | 37           | 6,742             |
| Voluntary Agency hospital                     | 103          | 5,595             |
| Parastatal hospitals and health centres       | 29           | 1,214             |
| Health centres                                | 614          | 14,959            |
| Dispensaries                                  | 5,819        |                   |
| Parastatal dispensaries                       | 168          |                   |
| Specialised clinics                           | 12           |                   |
| <b>Total</b>                                  | <b>6,882</b> | <b>48,993</b>     |
| <b>Private Sector Facilities (2014)</b>       |              |                   |
| Private hospitals                             | 39           | 1,187             |
| Private health centres                        | 78           | 800               |
| Dispensaries                                  | 1,123        |                   |
| Private clinics                               | 40           |                   |
| Private dental clinics                        | 26           |                   |
| Private eye clinics                           | 5            |                   |
| Maternity homes                               | 22           |                   |
| <b>Total</b>                                  | <b>1,333</b> | <b>1,987</b>      |
| <b>Health Sector (Total)</b>                  | <b>8,215</b> | <b>50,862</b>     |

*Source: MOHSW, Department of Curative Services, HMIS report 2013/14, CSSC 2015*

Figure 2: Public Sector Facilities (Tzdpq.or.tz, 2014)

At the village level, most governments employ two or more village health workers who run a community health post providing health education and care for minor ailments. The dispensaries, run by a clinical assistant, supervises this, but unfortunately due to shortages or being in a rural setting, this rule is not well enforced and a medical attendant may take their place. Clinical Officers (COs) - secondary school graduates with 3 years of basic clinical training - run health centers that support the dispensaries, supported by enrolled nurses. Medical doctors serve in some of the district hospitals, but many are run by Assistant Medical Officers (AMOs) who are clinical officers with a further 2 years clinical training, supported by clinical officers and enrolled and registered nurses. Personnel at regional hospitals include general surgeons, general medical physicians, pediatricians, general and specialized nurses and midwives. District Health Management Teams coordinate and supervise health service delivery in their respective districts. The team is normally led by the district medical officer who is typically a medical doctor with a master's degree in public health (Kwesigabo G 2012).

## 2. Issue of Exceptionally High Hospital-Based Maternal Mortality Rates

### 2.1. Background Information

Within Sub-Saharan Africa, Tanzania is one of the countries with the highest maternal mortality ratios (MMR) (Mboera et al. 2019), largely owing to the processes of pregnancy, childbirth and poor quality of health workers (Shija, Msovela and Mboera 2011). From 1961 to 1990, the maternal mortality ratio in Tanzania was on a downward trend from 453 to 200 per 100,000 live births, and from the 1990's there was an increasing trend to 578 per 100,000 live births. Statistics up until 2010 indicate that maternal mortality ratio has dropped slightly to 454 per 100,000 live births. This is far

behind the National Strategy for Growth and Reduction of Poverty target of 265 and MDG target of 133 by 2015. As of 2016, population-based surveys indicate that the mean MMR in Tanzania is 556 per 100,000 live births while the United Nations estimates put the figure at 950 per 100,000 live births. For almost three decades (1990–2016) MMRs in Tanzania have remained high, with no sign of a significant reduction despite several efforts (Mboera et al. 2019).

The sudden reversal in the rate of maternal mortality between 1961-1990 and 1990-2016 could possibly be attributed to the severe economic crisis suffered by Tanzania in the 1980s, which adversely affected the management and financing of basic social services including health care services. For Tanzania, the resource constraints had resulted in shortages of medicines, equipment, medical supplies and low staff morale. As a result, World Bank Economists advocated for the need to liberalize the social sectors, introduce fees and promote investment in cost effective interventions (Mujinja and Kida 2014).

Human resource for health (HRH) is the main input in general health care production. The Health Sector Reforms (HSR) (1994) in Tanzania emphasized human capacity development with a focus on further strengthening district health service delivery by number and skill mix. Since HSR started to be implemented in Tanzania, there has been an acute shortage of quality and quantity of human resources, especially in poor rural areas. The workforce of professional and other health workers has significantly declined in size relative to the size of the population. In 2006, the MOHSW estimated there was a 65% shortage of HRH working in government health facilities, and 86% in the private health facilities. The situation is exacerbated by the massive expansion of the health facilities in the rural areas under the primary Health Care Expansion Programme (Mujinja and Kida 2014). This suggests that the shortage of health workers is potentially an significant factor contributing to the high maternal death rates in Tanzania.

## **2.2. Patterns and Trends**

A retrospective analysis was conducted investigating the patterns and causes of hospital maternal mortality in Tanzania over a 10-year period (Mboera et al. 2019). The study included four tertiary level hospitals - both national and zonal referral - 20 regional referral hospitals and 10 district hospitals. From January 2006 to December 2015 there were a total of 40,052 deaths of women of child-bearing age (15–49 years) of whom 1,987 were maternal related deaths. This is 5.0% of the deaths of all women who are of child-bearing age.

Looking at the MMR, the estimated hospital based MMR ranged from 33.65 to 69.64 per 100,000 births over the 10-year period under review. Over the years, there was an increase of over 40%, despite a declining Crude Birth Rate (CBR) from 42.2 per 1,000 people in 2006 to 36.8 per 1,000 in 2015. The largest number of maternal related deaths, 269, was recorded in 2011, during the same period of time when the highest maternal mortality ratio 69.64 per 100,000 births was reported. The pattern of number of deaths showed a significant increase from 2008, peaked in 2011, dropped in 2012 and slightly increased in 2014. For the 10 year period, 2008 represented a slightly lower number of deaths compared to all other years.



The number of maternal deaths varied significantly across various age groups. The median age of death was 27 years, while the average age of death increased from 25 years old in 2006 to 29 years in 2015. Teenaged women of 15-19 years accounted for 13.6% of maternal deaths, 20-34 year old women accounted for 67.1% of deaths, and elderly women of 40-49 years old accounted for 4.8%. On the other hand, most of the births came from women in the 20–29 years category. Hospital-based statistics further demonstrate trends within the age groups themselves. Out of 2,927 deaths of teenage women, 9.26% were due to maternal health reasons. This percentage decreased as age increased. Comparing the two five year periods, 2006–2010 and 2011–2015, 20-34 year old women died at a higher proportion in Southern highlands, South-western Highlands and Northern zones compared to other regions. This suggests that tailoring education programmes to raise awareness among mothers about maternal health and abortion risks in the age range of 20-29 years especially might be considered for these areas. On the other hand, hospitals in the Western and Lake Victoria regions reported higher maternal mortality among the 15-19 years age group compared to other regions. In these regions, youth education programmes could possibly be useful. .

### **3. Literature Review of the Main Factors leading to High Hospital-Based Maternal Mortality Rates**

#### **3.1. Hospital-Based Factors**

Maternal death is defined by the International Classification of Diseases and related health conditions 10th revision as the death of a woman while pregnant or within 42 days of the termination of pregnancy irrespective of the duration and the site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (Shija, Msovela and Mboera 2011). According to this definition, a direct obstetric death is defined as resulting from obstetric complications during pregnancy, labour and puerperium, from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. Contrastingly, indirect obstetric deaths are defined as those resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but was aggravated by physiologic effects of pregnancy. A study investigating maternal mortality at muhimbili national hospital in Dar-es-Salaam, Tanzania in the year 2011 found the MMR to be 1,541 per 100,000 live births - three times higher than the national estimate of 454 per 100,000 live births (Roosmalen et al. 2014). An unusually high MMR in hospitals is likely due to the accompanying high risk status and level of complication of cases of women delivering in hospital. Other studies in the national hospitals in Nigeria and Kenya showed lower MMRs of 740 and 426, suggesting that the exceptionally high MMR in the Tanzanian National Hospital implies that the overall quality of maternal care in this hospital, the municipal hospitals and their catchment area is poor.

##### **3.1.1. Direct Physical Causes**

Tanzania Journal of Health Research published an article on the challenges and opportunities of reducing maternal mortality in fifty years of Tanzania's independence, describing direct causes to be related to obstetric complications and noting that they contributed to three quarters of maternal deaths (Shija, Msovela and Mboera 2011). It documents that some of the major direct causes include obstetric haemorrhage, obstructed labour, pregnancy induced hypertension, sepsis and abortion

complications, a common issue because the illegality of abortions in Tanzania means that women often resort to street abortions.

Additionally, a ten year retrospective analysis verifies this statistic that direct causes, which include haemorrhage, hypertensive disorders, obstructed labour, and sepsis are responsible for about three quarters of maternal deaths worldwide (Mboera et al. 2019). Of the total of 1,987 maternal deaths over ten years, 83.8% were due to direct causes and the rest to indirect causes. Major direct causes of maternal deaths were eclampsia (34%), obstetric haemorrhage (24.6%), maternal sepsis (16.7%), abortion (10.8%) and ruptured uterus (7.1%). In a study in a rural district of Tanzania, the major causes of death were postpartum haemorrhage and obstructed labour. Several studies point out to consistently elevated risk of maternal mortality from ruptured uterus. Generally in low-income countries, most cases due to ruptured uterus are due to patient ignorance, poverty, unavailability of skilled staff and poor supply of essential medical supplies. Between the two periods, 2006-2010 and 2011-2015, there was a slight decline from 35% to 33% in the proportion of deaths due to eclampsia and 13% to 10% for abortion. However, the proportion of deaths due to haemorrhage increased from 21% to 27% and 9% to 14% for cardiovascular disorders. The proportion of deaths due to ruptured uterus remained the same during the two 5-year periods.

Further analysis showed that the direct causes have a co-morbid effect, with up to two other direct causes being associated with the primary cause of death, but most commonly one other direct cause (Mboera et al. 2019). The highest observed associations were between abortion and maternal sepsis at 8.3%, ruptured uterus and haemorrhage at 2.4%, and eclampsia and haemorrhage at 1.14%. Maternal sepsis was associated with most of the main direct causes. Comparing across the different types of hospital, eclampsia, haemorrhages, cardiovascular disorders and organ failure were the major causes of maternal deaths reported in zonal hospitals, while the primary causes of maternal deaths in regional referral and district hospitals were haemorrhage, sepsis, anaemia, abortion, ruptured uterus and ectopic pregnancy.

Ranking the main causes of maternal deaths was done for each age category. Eclampsia proved to be the number one killer among 15–34 year old women, while haemorrhage was the leading cause of death among the older women aged 35–49 years. Maternal sepsis and abortion ranked high among 15-34 year olds, while ruptured uterus was more common among women older than 45 years (Mboera et al. 2019).

In the study conducted in Muhimbili national hospital in Dar-Es-Salaam, they conducted a classification of the causes of maternal deaths from 1st January to 31st December 2011 (Roosmalen et al. 2014). There were 10,057 live births and 155 maternal deaths, resulting in an MMR of 1,541 per 100,000 live births. A majority of 69.5% of the maternal deaths were a result of direct causes, with preeclampsia or eclampsia as the main 19.9% of all deaths, followed by post partum haemorrhage (14.9%), abortion complications (9.9%) and sepsis (9.2%). This is consistent with the main direct causes in the 10 year retrospective analysis.

### **3.1.2. Indirect Physical Causes**

Indirect causes account for 20-25% of maternal deaths. These indirect causes include malaria, HIV/AIDS, hepatitis, diabetes mellitus and heart diseases, as well as the effects of pre-existing disorders such as tuberculosis, mental diseases, and epilepsy (Mboera et al. 2019). Malaria in

pregnancy predisposes women to a number of complications including anaemia, which places them at higher risk of maternal mortality from haemorrhage, and contributes to spontaneous abortions and low birth weight babies. Anaemia occurs in 16 - 26% of antenatal care attendees in Tanzania and affects about half of all pregnant women and adolescents. Several factors have been associated with maternal deaths; and they include antenatal care, maternal education, age and the number of times a woman has given birth. For instance, the highest parity (number of times a woman has given birth to a fetus with a gestational age of 24 weeks or more) maternal mortality ratios have been reported among women who have given birth 2 or more times.

The ten year retrospective analysis included 34 publicly owned hospitals from all levels. Its findings concluded that anaemia at 14.9% and cardiovascular disorders at 14.0% accounted for the highest percentage of the indirect causes, followed by malaria (1.3%), respiratory diseases (1.0%) and HIV/AIDS (0.8%). Other indirect causes were diabetes (0.4%), meningitis (0.35%) and tuberculosis (0.05%). In this study the major indirect causes were discovered to be anaemia, cardiovascular disorders, malaria, HIV/AIDS and meningitis. Similar indirect causes have been reported by other studies in Tanzania.

### **3.1.3. Combination of Physical Causes**

The main causes of maternal deaths are due to an interrelation between direct and indirect causes (Mboera et al. 2019). For example, cardiovascular disorders and anaemia were at the central point of the network with a strong linkage with haemorrhage. Ruptured uterus was strongly linked with haemorrhage, anaemia and cardiovascular disorders. Deaths due to these were more prevalent in the southern highlands and south-western highlands (Mboera et al. 2019) It is common for sepsis and abortion to be linked. Deaths associated with these factors were more prevalent in the Southern Highlands than in all other zones. In many countries, haemorrhage has been reported as the most consistently important cause of death in hospital studies. Haemorrhage has been associated with several conditions, including obstructed labour. The association of anaemia and maternal mortality observed in this study is most likely to be a cofactor in death from haemorrhage or nutritional deficiencies. In Muhimbili National Hospital in 2011, anaemia was identified as the leading indirect cause (11.3%) of all deaths, followed by HIV/AIDS (9.9%) (Roosmalen et al. 2014). Anaemia is a serious issue in Tanzania, with recent statistics indicating that 45% of women are anaemic (Mboera et al. 2019).

### **3.1.4. Inadequate Hospital Infrastructure**

There have been repeated recordings of poor quality of services at primary health-care facilities due to chronic shortages of equipment and supplies like vaccines, antibiotics and other essentials (GHWA 2013). The lack of crucial drugs at all levels of the health delivery system leads to unnecessary referrals. Problems with hygiene are regularly encountered, especially in dispensaries and health centres where water supplies are absent, unreliable and unsafe.

The referral system is another problem area. The referral system suffers from a limited number of ambulances, unreliable logistics and communication system and low community based facilitated referral system. The poor referral systems from lower to higher level health facilities, the long distance between hospitals and the poor infrastructure is a serious issue, with studies indicating that it is the reason for more than 25% of maternal deaths in Tanzania (Mboera et al. 2019). As a result,

there is a higher proportion of maternal death associated with eclampsia in zonal referral hospitals than in the regional or district hospitals because severe and complicated cases are received when it is too late at zonal referral hospitals, and the chances of survival are too low. Inadequate communication between health service providers at the various levels means that their skills and facilities are not being maximised (Kwesigabo G. 2012).

In a recent study covering 15 districts of Tanzania, only 11.6% and 3.9% of all the facilities had all elements of reproductive and delivery services respectively (Shija, Msovela and Mboera 2011). Furthermore, all elements of delivery services were not available in Kigoma, Meatu, Rungwe, Songea, Kaskazini A and Wete, and the proportion of trained staff for supporting delivery in the districts was quite low.

Accessibility to maternal health care services is still inadequate, particularly in rural and underserved areas. Available reports show that only 51% of pregnant women are attended by skilled providers during delivery (Shija, Msovela and Mboera 2011). Emergency obstetric care service is available in 64.5% of health facilities. A poor utilization of less than 30% of postnatal check-up services increases the risk of maternal death even further. It is estimated that over 80% of the Tanzanian population live within 5km from the health facility but not all components of essential maternal services are provided. Despite a high attendance (96%) of pregnant women to antenatal clinics, deliveries assisted by skilled attendants in rural areas are significantly lower than urban areas at 42% instead of 83%.

### **3.1.5. Shortage of Health Workers**

The provision of quality maternal healthcare is severely hindered by the inadequate numbers and uneven distribution of skilled health workers, particularly in the provision of skilled attendance during labour and emergency obstetric care. In certain regions such as Kagera, Shinyanga, Tabora and Kigoma, there exists a shortage of more than twice the number of health workers per 10,000 people. Oftentimes, medical attendants who possess only marginal skills provide the health care services, especially at lower level facilities in under-served areas. Dispensaries and health centres have shortages of 65.6% and 71.6%, respectively. The number of clinicians and nurses is below the national average in 13 regions, while 554 dispensaries are without skilled health workers (Kwesigabo G. 2012). A survey conducted in 2006 found that 52% of all doctors work in the Dar es Salaam region, with a huge difference of 25 doctors for every 100,000 people in Dar es Salaam compared with the national average of 3.5. Even worse, 14 out of 26 regions, there was only one doctor or less per 100,000 people (MOHSW and WHO 2007). This situation is also confirmed by the recent review of the performance of the health sector strategic plan III (MOHSW 2009). It is revealed that health workers density varies from below 4 per 10,000 in Rukwa, Kigoma, Shinyanga and Tabora regions to more than 10 in Kilimanjaro, Dar es Salaam and Iringa regions. The shortage of health workers in rural areas is further worsened by the workers working less productively for only about half of the working hours even when they are physically present in health facilities (Manzi 2012). When conducting this survey, there was a critical absence of health workers with 44% of clinical staff not even available on the day at the facility.

There are a variety of reasons leading to the shortage of health workers. These include an uneven distribution of skilled workers, inadequate incentives and salary packages, a problem of lack of motivation among healthcare workers, inadequate performance assessment and reward systems, and poor retention of staff. These issues are especially urgent in remote and under-served areas with

inadequate supportive supervision (Shija, Msovela and Mboera 2011). Other reasons such as inconsistency in training quality, insufficient recruitment, and weak enforcement of policies and regulations have fueled the shortage and led to low productivity. In 2012, doctors held several extended strikes at the national and other hospitals in Tanzania expressing dissatisfaction with salaries, lack of staff welfare and the conditions under which they work, with the inevitable result that patients suffered (Kwesigabo G. 2012).

Below is presented figure 3, a table of the Health workforce supply in 2014 across the different kinds of health workers (Kwesigabo G. 2012).

**Table 3 Health workforce supply in the base year 2014**

| Occupation  | Supply in 2014 | % of the total workforce | % FTE in public sector | FTEs by sector |              | Density of health worker per 10,000 population |
|---|----------------|--------------------------|------------------------|----------------|--------------|--|
|   |                |                          |                        | Public         | Private      |  |
| 1. Medical Specialists  | 929            | 1.4                      | 70.0                   | 650            | 279          | 0.20   |
| 2. Medical Doctors  | 1,157          | 1.7                      | 80.0                   | 926            | 231          | 0.25   |
| 3. Dental Specialists + Dental Officers                                   | 104            | 0.2                      | 95.0                   | 99             | 5            | 0.02   |
| 4. Assistant Dental Officers + Dental Therapists                          | 933            | 1.4                      | 87.7                   | 818            | 115          | 0.20   |
| 5. Assistant Medical Officers   | 1,710          | 2.6                      | 90.0                   | 1,539          | 171          | 0.37   |
| 6. Clinical Officers + Clinical Assistants                                | 6,496          | 9.8                      | 70.0                   | 4,547          | 1,949        | 1.42   |
| 7. Pharmasists  | 707            | 1.1                      | 96.5                   | 682            | 25           | 0.15   |
| 8. Pharmact Technologists + Assistant Pharmacy Technologists              | 1,132          | 1.7                      | 95.4                   | 1,080          | 52           | 0.25   |
| 9. Nursing Officers   | 2,843          | 4.3                      | 97.7                   | 2,777          | 66           | 0.62   |
| 10. Assistant Nursing Officers  | 4,861          | 7.3                      | 90.0                   | 4,375          | 486          | 1.06   |
| 11. Enrolled Nurses +NMs  | 13,848         | 20.9                     | 80.0                   | 11,078         | 2,770        | 3.03   |
| 12. Health Laboratory Scientists  | 93             | 0.1                      | 89.2                   | 83             | 10           | 0.02   |
| 13. Health Laboratory Technologists + Assistant Health Lab. Technologists | 2,508          | 3.8                      | 92.1                   | 2,310          | 198          | 0.55   |
| 14. Environmental Health Officers   | 1,205          | 1.8                      | 99.8                   | 1,202          | 3            | 0.26   |
| 15. Assistant Environmental Health Officers+ Environmental H. Assistants  | 1,119          | 1.7                      | 100.0                  | 1,119          | 0            | 0.24   |
| 16. Allied Health Professionals   | 1,245          | 1.9                      | 97.5                   | 1,214          | 31           | 0.27   |
| 17. Managers  | 384            | 0.6                      | 98.4                   | 378            | 6            | 0.08   |
| 18. Allied non-Health Professionals                                       | 2,235          | 3.4                      | 91.5                   | 2,046          | 189          | 0.49   |
| 19. Support Staff   | 3,460          | 5.2                      | 95.6                   | 3,309          | 151          | 0.76   |
| 20. Medical Attendants  | 19,379         | 29.2                     | 96.1                   | 18,632         | 747          | 4.24   |
| <b>TOTAL</b>  | <b>66,348</b>  | <b>100.0</b>             | <b>88.7</b>            | <b>58,864</b>  | <b>7,484</b> | <b>14.50</b>                                   |

Source: MOHSW, Human Resources Planning Division, Human Resources for Health Information Systems (HRHIS) and Training Institutions Information System (TIIS) (2014)

Figure 3: Table of the Health Workforce Supply in 2014

The table demonstrates the severe lack of health workers, in particular those that are more highly qualified such as Medical Specialists, Medical Doctors and Assisted Medical Officers (AMOs) compared to Clinical Officers (COs). In an attempt to fill the gap of health professionals, Tanzania

has implemented a system of mid-level health workers (MLHWs). This is defined as “health care providers who have received less training and have a more restricted scope of practice than professionals, and who, as opposed to community or lay health workers, have a formal certificate and accreditation through licensing bodies” (Kwesigabo G, 2012). This includes Clinical Officer and Assistant Medical Officers (GHWA 2013). The extent of the shortages of MLHWs is more extensive at the lower level health facilities in the public sector, whereas in the private sector it is most extensively experienced at the higher level health facilities.

In total, the Tanzanian health system has 400 specialists, 940 medical officers, 1400 AMOs, 6900 COs, 5500 registered nurses, 3580 diagnostic and support staff and 7070 enrolled nurses. The estimated average annual production of MLHWs in Tanzania is 300 COs and 40 AMOs in comparison to 50 Medical Doctors per year (GHWA 2013). In a recent article by Munga & Maestad (2009), they indicated the spread of MLHWs in Tanzania (GHWA 2013). Figure 4 below shows that the majority of health workers and MLHWs are concentrated in the government sector, with the minority found in the private sector. The distribution of different levels of health provider cadres is much more equal in the private sector.

| <b>Table 1: Distribution of health workers across cadres and sectors (%), Tanzania (n= 46 896)</b> |                   |                |                           |              |
|--|-------------------|----------------|---------------------------|--------------|
| <b>Cadre</b>   | <b>Government</b> | <b>Private</b> | <b>Voluntary Agencies</b> | <b>Total</b> |
| Medical Officer  | 0.8               | 0.3            | 0.2                       | 1.3          |
| Assistant Medical Officer  | 1.0               | 0.2            | 0.3                       | 1.5          |
| Clinical Officer   | 9.0               | 1.1            | 1.7                       | 11.7         |
| Nurse/Nurse-Midwife  | 18.3              | 2.1            | 7.4                       | 27.8         |
| Medical Assistant  | 30.7              | 1.6            | 7.9                       | 40.2         |
| Other  | 10.6              | 1.5            | 5.3                       | 17.5         |
| <b>Total</b>   | <b>70.3</b>       | <b>6.7</b>     | <b>22.9</b>               | <b>100.0</b> |

**Source: Munga & Maestad (2009)**

*Figure 4: Distribution of Health Workers Across Cadres and Sectors*

AMOs are allowed and regulated to practice general medicine, minor surgery, obstetrics, dermatology and anesthesia, making them an advanced MLHW, trained at the post-basic level, while the CO is only a basic level MLHW. An AMO is allowed to work independently, with limited or no supervision from a physician within the context of medical practitioner shortages, especially in rural areas. AMOs can be deployed at District Hospitals and Health Centre Levels, where they can perform the role of Medical Doctors at those levels. On the other hand, COs are legally prohibited to perform caesarean sections. Tanzania initiated the training of AMOs in the early 1960s, and now has more than 1300 AMOs, along with approximately 5000 COs. The majority of COs and AMOs work in the public sector, with a minority in the private sector. Dovlo (2004) estimates that roughly 75% of COs and AMOs served in rural areas (GHWA 2013). COs and AMOs are supposedly required to be supervised by a more senior health care practitioner, but in reality this rule is often ignored, meaning that these cadres hold huge responsibility despite the fact that they have limited opportunities to refer patients to higher levels of care. Tanzania has a board regulating the training of these MLHW cadres, but they do not register and control practitioners.

It is difficult to ascertain the salaries of health workers due to inaccurate and incomplete databases, but there is some literature asserting that AMOs are paid lower salaries than certain nurses, lab technicians, and midwives, despite having a qualification that is recognized and supported by their Ministry of Health (GHWA 2013). Attrition among workers is an issue in Tanzania, as a recent report by the Touch Foundation shows that at current rates of attrition, nearly sixty per cent of increased

throughput will be soaked up by filling slots vacated through attrition. Human resources for health (HRH) is defined as all people engaged in actions the primary intent of which is to enhance health (Sirili et al. 2020). It appears that the issue of retention of HRH is not comprehensively considered in either the National Health Plan or the Human Resources for Health Strategic Plan 2008 – 2013.

MDs are taken to be any person who has a minimum of degree of Doctor of Medicine (MD, MbChb, MBBS and any other meant to practice medicine) up to specialization level be it clinical, basic science or public health. The training and deployment of MDs was assessed, determining the number of MDs available in 2011, and determined the number of MDs recommended for the health sector from 1992 to 2011 (Sirili et al. 2020). During the early years of the 1990 Health Sector Reforms, the deployment system was decentralized. Nevertheless, central government interference continued to exist which created a bureaucratic and expensive system that made it difficult for poor resource districts to get MDs. In 2006, the deployment system changed to a combination of a centralized and decentralized system, called a partial centralized system. Despite this, the documented number of MDs in the country has remained critically low. By 2012, the country had a total of 0.3 MDs, nurses and midwives per 1000 people. The recommended critical threshold is 2.28 MDs, nurses and midwives for 1000 people.

Tanzania needs between 3326 and 5535 MDs. By 1992, Tanzania had 1265 MDs working in the country. From 1992 to 2010, 2622 MDs graduated both locally and abroad, meaning that there were a total of 3887 MDs by 2011. However, a survey was conducted and captured only 1299 MDs working. This number is less than 40% of all MDs trained in and needed for Tanzania by 2011. In 2012, Sikika reported that 26% of MDs who were born in Tanzania were working abroad (Sirili et al. 2020).

Figure 5: Number of MDs Available in Tanzania as of July 2011

| Place/institution type            | Number of facilities | Number of MDs available |
|-----------------------------------|----------------------|-------------------------|
| Districts                         | 117                  | 309                     |
| Regional hospitals                | 24                   | 123                     |
| Referral and consultant hospitals | 09                   | 340                     |
| Training institutions             | 15                   | 61                      |
| MoHSW units                       | 45                   | 170                     |
| NGOs                              | 10                   | 72                      |
| FBOs                              | From 24 regions      | 224                     |
| Total                             |                      | 1299                    |

Additionally, there was a significantly uneven distribution which favoured big cities. The eastern zone, despite containing less than 30% of the population, hosts more than 50% of all MDs. Within regions, there was a wide variation of the MDs available, with a large number concentrating in urban districts. Table 6 below shows the distribution of MDs per zone and population.

Figure 6: Distribution of MDs Per Zone and Population.

| Zone               | Number of MDs vs population, N [%, MD: 1000 population] | Population [2012 Census] N [%] |
|--------------------|---|--------------------------------|
| Central zone       | 56 (4.31, 0.02)   | 3 454 225 (7.92)               |
| Eastern zone       | 575 (44.26, 0.07)                                       | 7 681 701 (17.61)              |
| Lake zone          | 159 (12.24, 0.01)                                       | 11 832 857 (27.12)             |
| Northern zone      | 257 (19.78, 0.04)                                       | 6 804 733 (15.60)              |
| Southern zone      | 37 (2.85, 0.02)   | 2 135 506 (4.90)               |
| Southern highlands | 172 (13.24, 0.03)                                       | 5 727 636 (13.13)              |
| Western zone       | 43 (3.31, 0.01)   | 5 988 696 (13.73)              |
| Total              | 1 299 (100, 0.03)                                       | 43 625 354                     |

The size of the entire health workforce has declined in absolute numbers and relative to the size of the population. In 2006, the MOHSW estimated that there were 29000 staff working in government health facilities (65% shortage) and about 6000 staff working in private facilities (86% shortage) (Kwesigabo G. 2012). The MOHSW estimated that an additional 144700 workers would have to be trained and employed to work in the government sector and a further 39400 for the non-government sector, between 2007 and 2017, as shown in Figure 7 below (Kwesigabo G. 2012).

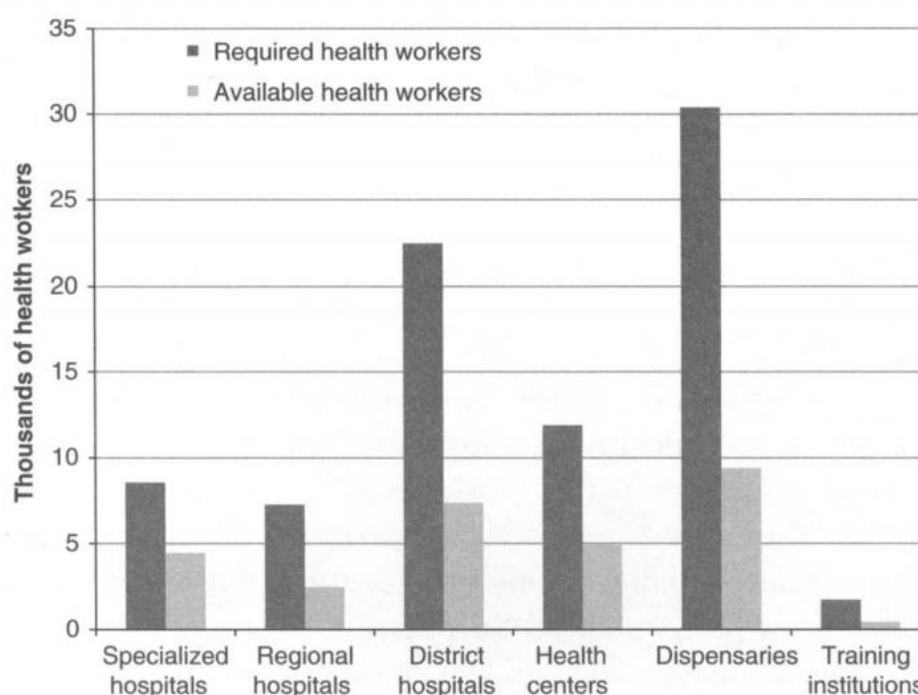


Figure 7: Health Workers Available and Required by the Government, Tanzania 2006

### 3.1.6. Inadequate Quality of Healthcare Service

Only a very small proportion of Tanzania's health workers are professionals, most are MHSWs. In Tanzania, nurses and midwives make up 27% of the health workforce compared to about 50% in the rest of Africa, and only 1.7% are doctors compared with 9.7% in the rest of Africa (Kwesigabo G. 2012). There is a lack of satisfactorily complete diagnostic examinations at dispensaries and district hospitals. Despite this, primary care workers often go months without supervision, and reports about



quality are inadequate, resulting in low motivation to comply with standards and produces problems with absenteeism.

Inadequate service is a leading factor in high maternal death rates. In fact, the majority of deaths occurred among women who had received treatment from modern health care systems. Of the medical service factors, inadequate (26.1%) or no blood for transfusion (19.3%), delay in receiving treatment (18.3%) and mismanagement (17%) were the common factors. A total of 116 (82.3%) of the deceased women had substandard care factors identified, among these 28 had a patient factor only and 71 had a medical service factor only. Seventeen cases had both patient and medical service factors (Roosmalen et al. 2014).

On top of this, there is an increasing number of caesarean section rates. For example, at Muhimbili National Hospital, a study conducted at MNH in 2006 reported a rate of 29.5%. Furthermore, it is common for women to have repeat caesarean sections and a previous caesarean section even acts as an indicator for a second one, suggesting that the decision made for emergency caesarean section is suboptimal and surgery should have been avoided. The increase in the number of caesarean sections at referral hospitals is chalked up to a lack of round-the-clock availability of comprehensive obstetric care services at some district hospitals, health centres and dispensaries, prompting the health facilities to refer pregnant women directly to referral hospitals where caesareans are administered.

These failures in service point toward a need for improved training, supervision and enforcement of lower level healthcare workers and recruitment of more higher level workers. Strengthened welfare or benefit schemes for workers could boost motivation and help to attract more people into the health sector.

### **3.1.7. Inadequate Health Information Systems**

In 2006, the government attempted to establish a proper Human Resources for Health Information System (HRHIS), consisting of the information system that collects all the information from districts, regions, consultants and referral hospitals, and the Training Institution Information System (TIIS) that collects information from all of the training institutions. The information system captures information from both the public and the private sector (Sirili et al. 2020). However, the HRHIS is not well established and contains very limited detail, hampering decision making and planning. Specific difficulties are the lack of coordination between different units, unreliability in the data and multiple sources of data which lead to confusion (Shija, Msovela and Mboera 2011). These are only made worse by the severe lack of information specifically from the private sector on human resources, and the limited ability and skills to analyze demand and supply in order to inform forecasting (GHWA 2013).

Monitoring the progress of the health system in maternal mortality reduction needs reliable data and a good coverage of vital registration, but the HRHIS is characterised by weaknesses in collection, as well as untimely and unreliable data for decision making and planning. For example, most data on the MMRs are derived from population surveys and Population and Housing Census (Mboera et al. 2019). This is unreliable in that it is likely to be affected by recall ability of the respondents, and is available only after every five and 10 years, respectively. It is important to keep hospital records, as they are readily available and suffer less quality issues as compared to those from vital registration systems. These can then be used to monitor the patterns and causes needed for timely actions during

care. However, there is limited utilization of data on hospital-based maternal mortality in Tanzania despite the inclusion of maternal deaths in the national surveillance systems since 2004.

### **3.2. Knowledge-Based Factors**

#### **3.2.1. Inadequate Knowledge Possessed by Mothers**

##### **3.2.1.1. Nutrition**

Malnutrition is a leading cause of maternal and fetal complications in developing countries. A poor nutritional status occurs not only through inability to access sufficient food, but traditions and cultural beliefs surrounding nutritional practices during pregnancy also plays a role. A study was conducted which interviewed 12 pregnant Maasai women, originating from the Ngorongoro Conservation Area in Northern Tanzania about how they would describe their current dietary pattern and what they believe is the role of nutrition during pregnancy (Lennox, Petrucka and Bassendowski 2017). Five main recurring themes were that eating less food will make the birth quicker and smoother, not producing their own food means more dependence, working hard will negatively affect the foetus, the importance of knowing what is needed for a successful pregnancy and the preference for traditional ways governing pregnancy and birth. Traditionally, Maasai women consume a modified diet, restricting caloric consumption during the third trimester, reducing intake of protein rich foods, and increasing water intake. Powell interviewed NCAA Maasai regarding their perceptions of dietary restrictions during the third trimester and found that they felt the dietary restrictions keep their bodies 'clean' during pregnancy in order to readily absorb nutrients contained in the perinatal diet.

Another study conducted in southern Tanzania revealed that 69% of the women avoided fish and farm meats (Schellenberg et al. 2002). Eggs are avoided in Tanzania because of fears that the animal's characteristics will be transferred to the child, and also that eating eggs can lead to sterility (Adamson 2015). The temperature of the food eaten and herbal remedies are also frequent concerns, often relating to ensuring that the baby will not be too large to ensure a smooth birth. Elders, mother-in-laws, husbands and family members often endorse and reinforce these dietary taboos. Adherence to cultural practices tended to be more consistent in teenage pregnancies, women with a low body mass index, and among less educated women (Lennox, Petrucka and Bassendowski 2017).

The Tanzanian National Food and Nutrition Policy focuses on four major nutritional deficiencies affecting the population of Tanzania which include protein energy malnutrition, nutritional anemia, iodine deficiency disorders, and vitamin A deficiencies. According to the 2010 Tanzania Demographic and Health Survey 40% of women aged 15–49 were classified as anemic, a slight decrease from 48% in the 2004/2005 survey (National Bureau of Statistics & ICF Macro 2011).

Mosha and Philemon reported factors influencing pregnancy outcomes in the Morogoro District of Tanzania with nearly two-thirds of the women knowing the right foods to eat during pregnancy but only 1 in three classifying fruits and vegetables as contributing to their iron status (C.E. Mosha and Philemon 2010). A minority (3.2%) of women were unaware of the role of diet and nutrition throughout their pregnancy. The women often prefer taking traditional medicine, even believing that some vaccines and supplements will have negative side effects (Ng'ong'a 2020).

##### **3.2.1.2. Lifestyle**

Use of family planning has shown to significantly reduce maternal mortality, since it minimizes the chances of getting unplanned pregnancy which increases risk of unsafe abortion (Shija, Msovela and Mboera 2011). Even though there is supposedly a high knowledge of family planning among women of reproductive age, only 27% use family planning methods. Another cause of unwanted pregnancy and subsequent unsafe abortion is poor access to reproductive service increases risks of getting unwanted pregnancies. Currently, 27% of married women of 15-49 years use modern family planning among versus 45% of unmarried women. The proportion of women who use family planning is far behind the National Strategy for Growth and Reduction of Poverty target of 60% (Mboera et al. 2019).

Several other factors have been identified as contributing to high maternal deaths among young women. These include biological, economic, and cultural factors, malnutrition, immature reproductive tract, child marriage, and gender inequities (Mboera et al. 2019).

### **3.2.1.3. Early Signs and Symptoms of Medical Issues in Pregnancy**

A lack of awareness of the signs of dangerous obstetric complication is one of the contributing factors for delay or not seeking care even when there are issues with the pregnancy, leading to high rates of maternal deaths when the complication goes untreated (Shija, Msovela and Mboera 2011). Most Tanzanian women are not aware of danger signs of obstetric complications. There has been introduced focussed antenatal care that attempts to raise awareness of danger signs of obstetric complications, especially counselling regarding danger signs and other education messages including birth plan and emergency readiness. Despite this, less than 50% of the women receiving antenatal care are informed of danger signs of pregnancy complication (Shija, Msovela and Mboera 2011). In Mtwara, a study was conducted which proved the benefits of recognising symptoms. It showed that as the knowledge of pregnancy danger signs increased among women, the proportion of women whose babies were delivered with skilled care increased (Mpembeni et al. 2007).

## **3.3. Culture-Based/Behavioural Factors**

### **3.3.1. Unwillingness/Inability to Access Maternal Health Care**

Thaddeus and Maine developed a three phase delay model to explain factors which affect access to effective interventions to prevent maternal and neonatal deaths when complications occur (Thaddeus, S. and D, Maine. 1994). The first is delay in making the decision to seek care because of failure to recognize complications. The second is delay in reaching care, due to poor roads and geographical barriers. The third delay is receiving care in health facilities.

More than 94% of women attend antenatal care (ANC) in health facilities at least once but only 47% deliver in these facilities. Even women who deliver in health facilities do not all receive skilled attendance at birth. 53% of births occur outside the health facilities, and out of these 31% are attended by relatives, 19% by traditional birth attendants, while 3% have no assistance at all. At Muhimbili National Hospital in 2011, the common factors contributing to maternal death surrounding mother's behaviour was found to be a delay in seeking care (73.3%) as well as a complete lack of antenatal care (11.1%) (Roosmalen et al. 2014). More than 80% of maternal deaths could be prevented if pregnant women had access to essential maternity care and were certain of being able to access skilled

attendance at childbirth and emergency obstetric care. Studies have concluded that having skilled attendance present during delivery and access to quality emergency obstetric care promptly when a complication occurs are the best ways to avoid deaths and morbidities in women (Shija, Msovela and Mboera 2011).

In the first 24 hours to 7 days after delivery, haemorrhage and sepsis leading to maternal death are the most common factors, making postnatal care crucial for both the mother's and baby's survival. If women were able to access family planning counselling, management of anaemia, referral for bleeding and infection complication and check-ups for their baby, maternal death rates would be reduced. However, postnatal care in Tanzania is highly inaccessible, especially to women who deliver at home, with 82% of health facilities offer antenatal care, and out of these only 60% offer postnatal care services (MoHSW 2009). The report also indicated overall poor attendance to postnatal check-up in the country of less than 30%, with a majority of 71% only attending after four weeks due to economic barriers to access health care services and cultural taboos around leaving the home during period of seclusion.

### **3.3.1.1. Cultural Beliefs**

Most rural people seek care first from traditional healers and then medical care as they deem necessary. The MOHSW estimated in 2007 that about 60 per cent of all those seeking health services depend on some traditional health services, and that about 53% of deliveries take place at home, most with traditional birth attendants. (Kwesigabo G 2012) This is often because the women have a misconception of the healthcare packages available in hospitals (Ng'ong'a, G. 2020).

It is a tendency among the community to believe that maternal health is the responsibility of the mother, and men do not play an active role in facilitating the health care of mothers. Sometimes, men even discourage or prohibit their wives to seek both pre and post-natal healthcare. Furthermore, there is a widespread understanding that a woman should attend a medical check-up for her pregnancy only once it has become visible. Lastly, because many women are under the influence of cultural beliefs that suggest that their health complications are due to witchcraft, they will first seek traditional methods of healing before turning to hospital care as a last resort (Ng'ong'a, G. 2020).

### **3.3.1.2. Socio-economic Factors**

Poverty and inequity significantly undermine the survival of mothers both during pregnancy and after delivery. Maternal care in Tanzania is supposed to be provided free of charge, but nonetheless substantial out-of-pocket payments are common. The potential costs of healthcare treatment inevitably deters mothers from seeking professional help early on, which as discussed above is a key factor for reducing maternal deaths. Gender discrimination, low levels of female education, and inability to access care have been described to result in delays for seeking treatment and unnecessary maternal deaths (Mboera et al. 2019).

## **4. Discussion**

### **4.1. Current Government Goals and Initiatives**

The specific objectives as laid out in the Big Results Now (BRN) plan is to apply the plan to all regions in the country and beyond 2018. The targets for quality improvement set for 2018 are

to achieve a 20% reduction in maternal mortality ratio and neonatal mortality rate in 5 poorly performing regions. Community health programmes will contribute to improved community mobilisation, bringing services like family planning, advocating utilisation of the available services like skilled birth attendance and stimulating families to seek early medical assistance through outreach activities or use of mobile health supported by text message campaigns. The health sector will collaborate with stakeholders such as the Ministry of Gender, Women and Children and the Ministry of Education and Vocational Training to achieve greater accessibility of services. Maternal and perinatal death surveillance and response will be implemented countrywide to assess the quality of care, to perform critical incident analyses, and to identify opportunities for improvement.

By the end of the HSSP IV period, the aim is to increase Skilled Birth Attendance to over 80%. The initiatives hope to result in a reduction of maternal mortality ratio from 432 to 292 per 100,000 live births. Capacity building of human resources for RMNCAH services hopes to be continued. Review of legislation and regulations will take place to enable cadres to perform required services through task shifting. The sector will facilitate supply of essential medicines, other commodities and equipment, including the availability of blood close to CEmONC centres in the country. The referral system will be fully operational, to guarantee that pregnant women get the services they need. In short, the goals are targeting the quality of healthcare service, including health worker capacity and efficiency, as well as medical resources and supplies. On the community level, accessibility of services are highlighted, while on the administration front, the lack of proper monitoring and evaluation is emphasized.

These initiatives suggest that these areas are deemed to be urgently in need of improvement and might be contributing significantly to the problem of high maternal health rates. Implemented solutions could consider aligning with these goals as a guideline for effective action.

#### **4.2. Interrelational Diagram**

I have constructed an interrelationship diagram to analyse and identify the root cause issues and the links between them for the purpose of identifying an area to target for improvement in order to achieve the greatest impact.

## High hospital-based maternal mortality rates in Tanzania

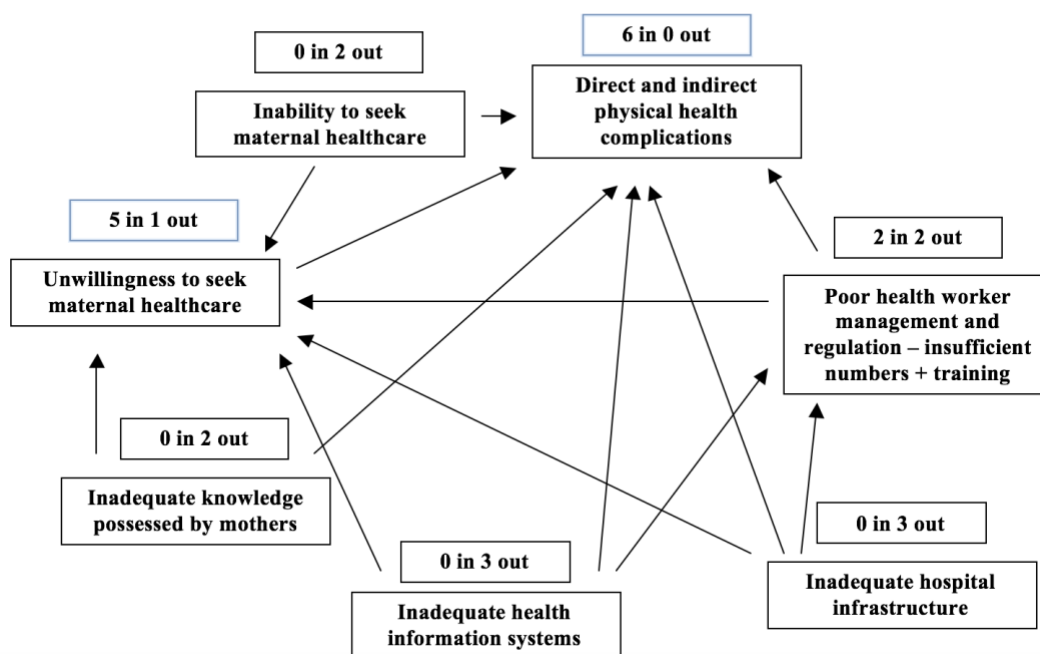


Figure 8: Interrelational Diagram

As can be seen from the diagram, the element with the highest number of outgoing arrows, and hence the biggest drivers and root cause of the issue, is tied between the inadequate health information system and inadequate hospital infrastructure. This appears to suggest that the basic foundational building blocks of a well operating, effective maternal healthcare system is missing in Tanzania. This in turn has severely hampered HRH management which subsequently affects numerous other elements. In order to achieve the most far reaching results in terms of counteractive measures, it would be wise to focus on ensuring hospitals are provided with the required facilities and equipment, and to concentrate efforts on improving the health information system, which will be expanded upon in the recommendation section below.

The element with the highest number of incoming arrows appears to be direct and indirect physical health complications, which indicates that the issue with the quality and availability of maternal healthcare manifests in the physical complications in the pregnancies leading to the death of mothers. This means that it could serve as a useful measure of success when attempting to track the impact of any measures taken to address the issue.

The study conducted in Muhimbili national hospital proved that substandard care factors contributing to deaths were identified in 116 of all cases, which is 82.3%. Among these, 71 had only medical service factors involved, 28 had patient factors only, and 17 had both a patient and medical service substandard care factor. This shows that while priority should be focussed on improving the healthcare services provided, nonetheless, it is important to address both medical service and patient factors.

## 5. Recommendations

### 5.1. Health Infrastructure

The evidence from the interrelationship diagram suggests that focussing on addressing the infrastructural and referral system weaknesses in the Tanzanian healthcare system would be the most direct approach to minimise the effects of complications during pregnancy and an unwillingness to seek healthcare among mothers. By working to improve the chronic shortage of essential supplies like vaccines, antibiotics, potable water and blood for blood transfusions (issues especially severe in rural areas), there would be better access to healthcare for mothers in both rural and urban Tanzania. The government has called upon investors to establish pharmaceutical factories within the country. However, firms operating locally will face several challenges such as need for skilled human resources, availability of modern technology and the ability to reach sufficient scale to compete with international suppliers. If lower level healthcare facilities were able to provide skilled attendants and all the components of essential maternal services, it would cut down on the need to refer and transport patients to higher-level facilities, which would save time that is critical, especially for treating mothers with serious complications, such as eclampsia, which requires immediate attention. Women may also be more willing to seek healthcare earlier on if the system was efficient and the quality of healthcare was better. In addition, linkages, from the communities, local dispensaries and health centres to first referral hospitals that are adequately equipped, need to be developed and sustained (Shija, Msovela and Mboera 2011). Since shortage of health workers is further aggravated by allocative and administrative inefficiencies, improving the poor referral systems and communication systems between health service providers at the various levels would in turn lessen the impact of the shortage of healthcare workers since their skills and facilities would be maximised. (Sirili, N. et al 2017)

## **5.2. Healthworkers**

Over the period 2009 to 2014, the Government has been working to expand the number of health institutions available, as well as the number of health workers deployed. In 2013, only 66000 health workers were employed out of the 149,000 required. The Regional Referral Hospitals are still facing shortages of specialists and are struggling with quality issues.. The MOHSW has developed the Tanzania Quality Improvement Framework (TQIF) and a Quality Improvement Strategic Plan (2013-2018), with guidelines, tools and training aimed at the improvement of the quality of service delivery (Tzdpdg.or.tz 2014). The Big Results Now initiative aims to achieve a 100% balanced distribution of skilled health workers at the primary level by 2018, through increasing the density of clinicians and nurses in nine crucial regions and reducing the number of facilities without skilled health workers by 70 percent, but this would require an estimated US\$8 million (Tzdpdg.or.tz 2014)

Three key challenges in terms of health workers are: 1) the skewed allocation of health workers, mainly allocated to urban areas 2) Difficulty retaining health workers in local institutions 3) the inadequate number of the medical specialists produced by local institutions.

- 1) As shown in the interrelational diagram, the HRH crisis is aggravated by the health system structure and existing regional disparities. HRH is mostly concentrated in urban areas where there are hospitals. This skewed distribution is because of the preference of HRH to work in urban areas due to factors such as career plans, salary levels, recruitment and appointment procedures, and retention measures' individual worker preferences. The MOHSW instituted an accelerated salary package for health workers in the public sector in Tanzania, with salary increases of 37%, 45% for AMOs, 32% for COs, 37% for nursing officers and 31% for pharmacists. (GHWVA 2013) Incentives such as increasing the salaries of health professionals,

especially those of higher levels, in rural areas might be a viable means of motivating health workers to take up jobs in these areas rather than urban areas, evening the distribution.

- 2) Retaining the number of MDs trained in Tanzania is steadily increasing at a significant rate, but the number who remain to practice in the country is stagnant. At the higher level of policy making, increasing the salaries and staff welfare benefits would create incentive for more workers to remain in the healthcare industry. Increased investment in training and retaining skilled staff, ensuring availability and supervising the implementation of updated evidenced based protocols of care and adequate equipment and supplies are urgently needed.
- 3) The study investigating the training and deployment of medical doctors in Tanzania post-1990s health sector reforms recommend the number of MDs based on a needs assessment conducted by a team of stakeholders led by the Ministry of Health and Social Welfare (Sirili, N. et al 2017). The team considered the healthcare needs of the population, number and needs of health facilities available, and the needs of organizations, institutions and agencies dealing with health. Figure 9 below summarizes the concluding results.

*Figure 9: Number of MDs Recommended in Staffing Levels*

| Type/Level of facility                                     | Number of health facilities | Number of MDs recommended per facility  | Total number of MDs recommended |
|--|-----------------------------|---|---------------------------------|
| Health centres (level 1)                                   | 464                         | 1                                       | 464                             |
| District hospitals/designated hospitals (level 2)          | 145                         | 8–23                                    | 1160–3335                       |
| Regional hospitals and other RRH (level 3)                 | 34                          | 29–30                                   | 986–1020                        |
| Referral/specialized hospitals/national hospital (level 4) | 10                          | Varies depending on catchment           | 607                             |
| MoHSW agencies   | N/A                         | Varies depending on responsibilities    | 81                              |
| Allied health training institutions (that require MDs)     | 8                           | Varies depending on size of institution | 28                              |
| Total  |                             |   | 3326–5535                       |

Source: United Republic of Tanzania, MoHSW, staffing levels for MoHSW departments, health service facilities, health training institutions and agencies 2014–2018

These recommended numbers could act as a potential target to guide the recruitment of staff. The World Health Organization recommends consideration of Human Resources in Health in three critical stages: entry (training and placement), availability (deployment and motivation) and exit (retention and succession plan).

Among the challenges which face the HRH planning in Tanzania for many years has been the poor coordination among trainers and employers, which inhibits the projection of the actual number of HRH to train and deploy. This suggests the need for coordination between the training institutions, professional registration bodies and the employers. CDI could possibly help to set up a facility or organisational body that would foster collaboration between these groups in a sustainable and orderly arrangement. For example, local offices in which both training institutions and employers can register the number and detail of employees that they work with, which can then be processed and presented in a shared database.

### **5.3. Health Information Systems**



Poor Health Information Systems is another element identified by the Interrelationship Diagram as being a key factor. The routine Health Information System is crucial for providing process indicators to monitor progress towards reduction of maternal mortality. (Sirili, N. et al 2017) It is important that a reliable and continuous capacity-built HRH audit be carried out in all health facilities, institutions, organizations and agencies in the country, which would allow for a clear database that can be maintained and updated regularly. Stakeholders in both the public and private sectors must collaborate to work towards these ends. CDI could contribute by joining up with official bodies to ensure that audits are carried out thoroughly and regularly, and that they are recorded in a uniform manner such that the compilation of information is clear and reliable.

#### **5.4. Education and Raising Awareness**

##### **5.4.1. Mothers**

Raising awareness of the importance of getting proper nutrition during pregnancy, choosing to give birth in a proper health facility and attending pre and post-natal check-ups must be reinforced. Additionally, teaching mothers about their pregnancy and what signs and symptoms to look out for as warning signs for more serious complications is a crucial part of encouraging seeking healthcare at an early stage. For example, anaemia and HIV/AIDS leading to infection were identified as leading causes of indirect maternal deaths. Attending antenatal clinics early in pregnancy and accepting preventive measures for anaemia including de-worming and intermittent preventive treatment for malaria, and starting PMTCT plus recommended treatment when HIV-positive, would help to minimise maternal deaths (Pembe, A.B 2014).

Empowering women from lower socio-economic backgrounds, through education, entrepreneur skills and facilitating access to financial capital and assistance for self-reliance activities is an indirect way to prevent the risk of abortions and a lack of preparedness and subsequent ambivalence towards seeking healthcare that accompanies unwanted pregnancy. The Partnership for Maternal, Newborn & Child Health (PMNCH) is the world's largest alliance for women's, children's and adolescents' health, bringing together over 1,000 partner organizations from 10 constituencies across 192 countries. An example of the type of projects they undertake is a webinar series in collaboration with youth organisations to share learning and best practices around key areas such as how youths can use the Global Financing Facility to seek healthcare. CDI could make a real impact by teaming up with governmental bodies or private organisations such as this to facilitate similar training sessions. Working together with healthcare workers to design workshops to educate young women or produce a maternal health awareness training pack including early warning signs to look out for, first aid advice and information about how to access healthcare could be distributed in schools and community centres. Working with a local NGO to set up a community fund to subsidize the healthcare treatment of mothers could also help to encourage them to seek early treatment or give birth in a health facility.

##### **5.4.2. Wider community**

A study in north western Tanzania revealed that knowledge of danger signs of obstetric complications and use of district hospitals by women with obstetric complications increases when there is sensitization and involvement of the community (Shija, A., Msovela, J. and Mboera, L. 2011). Outreach health education services is one way to ensure that communities have a better understanding of how to use reproductive healthcare services such as family planning, especially targeting adolescents and males who are not as engaged with these services. Two thirds of Tanzania's population are youths, while males are both financial and decision makers and hence determinants of

the family health care seeking behaviour. Therefore, advocating for male partner involvement should be done by designing strategies for educating, sensitizing and encouraging male partners participation. Successful community engagement would require collaboration with community leaders, NGOs, and schools to ensure success and sustainability. Training workshops could be conducted to inform not only young women but men and adolescent boys about the importance of family planning and seeking maternal healthcare.

## **6. Conclusion**

The government budget allocation cannot meet the need of the health system, but rather than rely on unsustainable donor funding, there is a need to mobilize resources within the country to fill in the gaps. To mount an effective maternal health effort aimed at reducing maternal mortality, multiple levels of programme and policies need to be in place and functioning, which means combining quality care in both first line and referral facilities. Future research could include the measurements of the impact of previous improvements in healthcare facility infrastructures to determine which improvements have been the most effective. It would also be pertinent to compare the severity of maternal mortality in rural and urban areas more thoroughly to understand which areas need to be targeted most urgently. Government support and leadership commitment, strong public-private partnership in health service delivery, sharing of best practices experiences, and an organized monitoring and evaluation system backed up with a well functioning health information system is needed to facilitate improvement of delivery of quality maternal health care services. For example, USAID works with the Tanzanian Government to train health workers, improve maternal health facilities, and scale up voluntary family planning services. Partnering with NGOs and also through service agreements with faith-based organizations, which own and operate 40% of the hospitals in levels 2 to 5 of the national health system, could help to extend public health service provision. To complement these adjustments, specific strategies should be in place to empower women, men and community members at large which are complemented with adequate health information to make informed decisions about their mothers' healthcare. This combination of infrastructural and community based strategies has a better chance of effectively addressing the high maternal death rates in Tanzania.

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