

Barriers to Implementing Emergency Obstetric Care in Northern Tanzania: Balancing Quality and Quantity

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Thesis for the degree of Philosophiae Doctor (PhD)

at the University of Bergen

Bergen, Norway

2009

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2009

Doctoral thesis submitted in partial fulfilment of the requirements for a PhD degree.

Title:

Barriers to implementing Emergency Obstetric Care in Northern Tanzania:
balancing Quality and Quantity

Published by

Department of Public Health and Primary Care

and

Centre for International Health

University of Bergen, 5021, Bergen, Norway

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Printed by AIT AS e-dit

ISBN 978-82-308-1529-8

Dedication

To my children

Karina Neema

Olaf Amani

Solveig Jalia

Hoping to encourage them in the spirit of their grandparents

The late Dr Ole Halgrim Evjen Olsen and

The still going strong Kari Olsen

And to my wife,

Turid.

Abstract

Background

Improving obstetric care is one key factor for the achievement of the millennium development goals concerning maternal and child mortality. Earlier studies of barriers to implementation of health policies, including plans to improve obstetric care, show that there is a major shortfall in the provision and utilization of services in a developing country such as Tanzania. Only scattered evidence exists on how these findings relate to the health system itself and the ability of the system to provide minimum quality care.

Aims

The main objective of this thesis is to evaluate health system barriers to facility utilization and facility deliveries of adequate quality through the use of EmOC as a monitoring tool in a resource poor environment such as northern Tanzania. The thesis attempts to contribute to increased understanding of the importance of quality in balance with quantity of health services to improve utilization of services in the community.

Material and methods

The study was conducted in six districts in northern Tanzania, and included all facilities in each district (n=129). Each facility in the study districts was assessed in terms of its supply of Emergency Obstetric Care (EmOC) services using pretested and validated assessment guidelines developed by UNICEF/WHO/UNFPA. Data were collected using a facility survey tool including information relevant specifically to the EmOC indicators. Other data sources were the national health management information systems, official planning documents, population surveys and administrative records.

Results

Overall there is a very low availability of Basic Emergency Obstetric Care (BEmOC) units in the study area (1.6/500,000 people). Comparatively there is a high availability of Comprehensive Emergency Obstetric Care (CEmOC) units (4.6/500,000 people). There is a large urban / rural variation. The overall provision of Caesarian sections was 4.6%, also lower than the UN guidelines stipulate (5% – 15 %). On average 1.7 BEmOC qualified staff were available at dispensary level and 7.3 BEmOC qualified staff available at health center level. There were on average only 2.5 CEmOC qualified staff at first referral levels. Compared to global figures the availability of staff per population in Tanzania is very low. There is considerable bypassing of services. Delivering mothers seek perceived quality services, often provided only in urban areas, or by voluntary agencies in rural areas.

Discussion

Using the EmOC tool was useful to assess availability and utilization of health services. Our data suggest that one of the most important determinants of access to quality care is not the knowledge of the mother or her ability to get to a facility, but the lack of quality care provided at the facility. Of concern is the total provision of good-quality services, accessible to all but not necessarily with the same overall coverage, given the severe resource constraints. The issue at stake is not coverage, but health care quality, accessibility and trust. A high coverage of inadequate quality is not pro-poor.

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Preface and Acknowledgements

Completing this thesis was with the help of many. I am grateful to all who contributed in some way or other from the conception to the completion of this study.

The main motivation for my work comes from the ethical foundation inspired in me through the work of my father, the late Dr Ole Halgrim Evjen Olsen, and my mother Kari Olsen. Living their lives tirelessly for others, constantly reminding me of the importance of serving other people as the main purpose of life, gave me the context to which this thesis always seemed relevant.

I am also grateful to the authorities and people of Tanzania, welcoming the concept and providing me with all the necessary permissions and goodwill to complete the study. I am particularly grateful to the Ministry of Health and Social Welfare of the United Republic of Tanzania, the National Institute for Medical Research (NIMR) and the Commission for Science and Technology (COSTECH) for the permits to conduct the study, and to Dr K. Mnyika at the Muhimbili University College of Health Science (MUCHS) for institutional collaboration and facilitation. I am also indebted to the Center for Educational Development in Health, Arusha (CEDHA) for providing office and collegial assistance during the fieldwork. Similarly I would like to thank all the Regional and District authorities, Regional and District Medical Officers and the facility managers of all the 129 facilities in the study area for their cooperation and assistance. My appreciation also extends to my assistant fieldworker, Mr John Gwaha, for professional and efficient data gathering assistance. I am also grateful to The Research Council of Norway for funding the project.

I would further like to convey deep felt gratitude to my supervisor Professor Ole Frithjof Norheim and articles co-author Dr Sydney Ndeki for their inspiring mentorship, critical thinking and good friendship.

I would also like to warmly thank Professor Rune Nilsen, Professor Gunnar Kvåle (co-supervisor), Professor Odd Mørkved, Solfrid Hornell, Borgny Lavik, Ragnhild Hauge and Jon W. Dahl, among many other wonderful staff at the Centre for International Health (CIH) at the University of Bergen, including also Dr William Howlett, for being patient counselors and always believing in me and the concept of the thesis. Also a warm thanks to all the staff and academic colleagues at the Department of Public Health and Primary Care in Kalfarveien, Bergen, Norway for sharing their facilities, generosity and positivity.

The thesis would not have been possible however, without the inspiration and close collaboration, sharing of thoughts, office space, coffee, frustrations and wonderful moments of colleagues and friends such as Dr Sven Gudmund Hinderaker, Dr Bjørg Evjen-Olsen, Bjarne Robberstad, Phillip Setel, Yusuf Hemed, Lydia Kapiriri, Emmanuel Makundi, Candida Moshiro, Douglas Martin, Astrid Blystad, Nils Gunnar Songstad, Ken Leonard, Lars Fjell Hansson, Erling Svensen, Helge Opedal and Anders Wahlstedt.

I look forward to continued collaboration, academic and ethical discussions also with the Research group on global health: ethics, economics and culture at the University of Bergen, of which I feel a deep sense of belonging. My gratitude also extends to the staff at the Haydom Lutheran Hospital, to Dr Isaack Malleyeck, Selina Sanka, Clementina Dakay and many others, who have patiently worked with me during the last years of this endeavor. A particular thanks to the drivers at the hospital traveling far and wide to collect last minute data and help me tie up loose ends. I would also like to thank my colleagues Dr Benedict Ndawi at the Primary Health Care Institute, Iringa and Dr Jens Byskov and Paul Bloch at the DBL – Center for Health Research and Development, Copenhagen, for their stimulating discussions and participation in taking concepts of the thesis to fruition by further research through the EU funded REACT (REsponse to ACcountable priority setting for Trust) project.

Acknowledging all who helped me in this work will never be complete, and most certainly not if I do not mention my uncles Professor Tore and Kari Midtvedt and Reverend Torodd Evjen Olsen as well as my aunt Ida Ermland and their wonderful

families. Thank you “Onkel Torodd” for your wisdom, “Tante Ida” for your warmth and homely comfort and “Onkel Tore” for your ability to give me courage to seize the day (Carpe Diem).

To my brothers and sisters, Anna Kari, Bjørg, Odd Halgrim, Knut and Svein Olaf, thank you for your continued inspiration, motivation and assistance in making this thesis a reality. I know that you all share the sentiment of its origins.

Heapfuls of wondrous respect and humble apologies to my children, Karina Neema, Olaf Amani and Solveig Jalia, for their endurance in times of travel and late working hours. My hope is that the adversity experienced is fully rewarded as their character is constantly built.

And finally, a deep admiration and gratefulness to my wife Turid for the way she has continued to love, believe in and support me and at all times trusting that what I was doing was important.

Executive Summary

Introduction

This thesis set out to explore the barriers to implementation of health policies in a resource poor environment. It was previously known that many of these barriers were related to supply side challenges such as lack of qualified personnel, poor infrastructure and lack of motivated staff. Demand side challenges were also evident as patients would have long distances to the nearest health service. High cost and low quality of the service were also predictors of low utilization patterns. A situation of a collapse, or near collapse, of health services had been described in many different settings in the developing world.

The main objective of this thesis is to evaluate health system barriers to facility utilization and facility deliveries of adequate quality through the use of EmOC as a monitoring tool in a resource poor environment such as northern Tanzania. The thesis attempts to contribute to increased understanding of the importance of quality in balance with quantity of health services to improve utilization of services in the community.

It was assumed that there would be a correlation between a good or poor service and the amount of resources available for these services. The study therefore assessed the availability of resources to further understand if this influenced the output in terms of good or poor services.

The services are provided in a policy context. This context ultimately defines the possibilities and constraints of the entire system to implement. There is a gap in the literature on the system determinants of quality and utilization of services, and in particular on how resources are prioritized to achieve quality and utilization. Although largely beyond the scope of this thesis there is also ultimately a gap in the knowledge of which values guide these prioritization mechanisms.

The limited aim of the thesis is to evaluate the availability and utilization of Emergency Obstetric Care in Northern Tanzania. This component of health care has proven to be a useful indicator for evaluating the entire health care pyramid. This is due to the health care needs of pregnant mothers both at primary and

secondary levels of the health care system. This is particularly relevant given the objectives of reaching the United Nations millennium development goals by 2015.

Exploring barriers to implementation is vital in a context of severe resource constraints. Tanzania is one of the poorest countries in the world in terms of income per capita and per capita spending on health. There is a chronic lack of qualified health personnel and mortality is high for mothers as well as children. The effects of wrong policy choices are therefore accentuated and getting the policy right is of particular importance.

Methods

The study was conducted in six districts in northern Tanzania. The districts were chosen based on their service delivery characteristic. The main characteristics were the urban (n=2) or rural (n=4) setting, the mix of public and private services and the levels of health care reform reached by each district.

All facilities in these district (n=129) were selected for the study. One additional field worker was trained and a pilot tools assessment was conducted in a separate district. Each facility in the study districts was assessed in terms of its supply of Emergency Obstetric Care (EmOC) services using pretested and validated assessment guidelines. These were the UNICEF/WHO/UNFPA guidelines (UN guidelines) assessing six main questions:

- Are there enough facilities providing Emergency Obstetric Services (EMOC)?
- Are they well distributed?
- Are enough women using these facilities?
- Are the right women (those with obstetric complications) using these facilities?
- Are sufficient quantities of critical services being provided?
- Is the quality of the services adequate?

These questions are translated into specific indicators each with their own benchmark for evaluation purposes. These indicators included the availability of facilities qualifying the EmOC standards (Basic and Comprehensive), the distribution in the population, the proportion of expected births in EmOC facilities,

the proportion of expected complicated deliveries in EmOC facilities (Met Need assessment), the caesarean section rate and the case fatality rate of each facility.

Data was collected using a facility survey tool including information relevant specifically to the EmOC indicators. The tool included other information relevant to the contextual and policy analysis objective of the study. Other data sources were the national health management information systems, official planning documents, population surveys and administrative records. The study was a combination of a comprehensive facility survey and a policy document review.

Results

The output analysis showed that overall there is a very low availability of Basic Emergency Obstetric Care (BEmOC) units in the study area (1.6/500,000 people). Comparatively there is a high availability of Comprehensive Emergency Obstetric Care (CEmOC) units (4.6/500,000 people). The accepted minimum standards of the UN guidelines are 4 and 1 respectively. There is a large urban / rural variation. The UN guidelines demand that the number of expected deliveries conducted in EmOC facilities should be more than 15%. In the study area this figure was 36.3%. The distribution of these deliveries show a much higher (more than 100%) utilization in urban areas compared to rural indicating that the mothers travel long distances, even bypassing the nearest facilities, to deliver. In rural areas the services are largely provided by Voluntary Agencies.

Only 58.9% of the expected complicated deliveries were conducted in EmOC facilities (UN guidelines are set at 100%). The overall provision of Caesarian sections was 4.6%, also lower than the UN guidelines stipulate (5% – 15 %). There were large variations between urban and rural provider settings, and again the data showed that most of these procedures in the rural areas were performed by Voluntary Agencies. The Case Fatality Rate varied between below one to above 3 (UN guidelines are set at less than one) for the facilities recording maternal deaths.

The evaluation of available resources (input) showed that compared to the available national guidelines there are sufficient human resources available. On

average 1.7 BEmOC qualified staff were available at dispensary level and 7.3 BEmOC qualified staff available at health center level. This is compared to the respective national guidelines of 2 and 4. There were on average only 2.5 CEmOC qualified staff at first referral levels. Compared to global figures the availability of staff per population in Tanzania is very low.

Discussion

The data indicates that mothers have a tendency to choose quality services once they decide or have the means to reach a facility thus bypassing facilities of lower perceived quality. In fact, our data suggest that one of the most important determinants of access to quality care is not the level of knowledge of the mother or her ability to get to a facility, but the lack of quality care provided at the facility. One obvious solution to this is to increase quality at each facility, but with scarce human resources there is a need to rethink the distribution of qualified personnel.

There is also a substantial distributional challenge between the provision of BEmOC and CEmOC facilities. The findings from the EmOC evaluation correspond well with available findings in the literature. In general there is a low availability of facilities with a tendency to have more CEmOC than BEmOC facilities present.

Most of the facilities providing qualified EmOC services are found in urban areas. In rural areas the qualified EmOC facilities belong to voluntary agencies.

The policy relevant question arising from these findings is how to balance adequate levels of qualified human resources and quality at each facility against the total number of facilities available to the mothers.

The main weaknesses in terms of generalizability of the data collected and analyzed lie in the fact that the districts were not randomized. Although the method used has been validated and used globally for the purposes of monitoring the provision of safe motherhood services, the levels set and inclusion criteria of the facility survey might not be adequately adjusted for different populations and

contexts. It is also important to acknowledge the limitations of the EmOC assessment framework when discussing policy issues resulting from these findings. Other limitations include issues of data quality and the field experience when using the data for policy analysis. Data quality issues include levels of accuracy and availability of registers. The indicators are furthermore subject to ambiguity with regards to the targets set and the use of the results, particularly in relation to equity considerations as aggregated results often mask the urban / rural divide as well as the out-of-pocket expenses to mothers seeking care from private for-profit providers. Strict inclusion criteria to the EmOC concept also does not acknowledge the contribution to health care by facilities nearly qualifying but missing perhaps only one or two signal functions within the past 3 months surveyed.

The practical implications of the findings mean giving higher priority to supply factors relevant to the mothers. Our results indicate that the most important factor is the trust they have in the care provided. More research is needed to get a deeper understanding of which factors builds trust.

This thesis recommends that the availability of qualified EmOC facilities be improved. It is also necessary to improve the recording of maternal complications and deaths in the facilities for adequate evaluation. It is further necessary to use qualified personnel to secure a minimum threshold of quality services before improving facility coverage. EmOC guidelines are useful for monitoring provision of health services but must be continually adjusted for relevance in different contexts.

Conclusion

Using the EmOC tool was useful to assess availability and utilization of health services. Mothers tend to seek services of perceived higher quality even if it means bypassing services closer and even cheaper. There seems to be a lack of trust in the services. By redistributing human resources from many facilities with low quality to fewer facilities with higher quality one can increase the overall quality of care within the present level of resources available.

List of papers

Paper I

Olsen OE, Ndeki S, Norheim OF. *Availability, distribution and use of emergency obstetric care in northern Tanzania*. **Health Policy Plan**. 2005 May;20(3):167-75.

Paper II

Olsen OE, Ndeki S, Norheim OF. *Complicated deliveries, critical care and quality in emergency obstetric care in northern Tanzania*. **Int J Gynaecol Obstet**. 2004 Oct;87(1):98-108.

Paper III

Olsen O. E., Ndeki S, Norheim O.F (2005). *Human resources for emergency obstetric care in northern Tanzania: distribution of quantity or quality?* **Hum Resour Health** 3: 5.

I. Introduction

The main objective of this thesis is to evaluate health system barriers to facility utilization and facility deliveries of adequate quality through the use of EmOC as a monitoring tool in a resource poor environment such as northern Tanzania. To see the importance of this question, some more background is needed. A guiding idea throughout this thesis is that low access and low quality of health services lead to low utilization of services. By exploring the narrower objective of identifying barriers to implementation of Emergency Obstetric Care services this thesis attempts to contribute to increased understanding of the importance of quality in balance with quantity of health services to improve utilization of services in the community.

1.1 The problem

Much research has been undertaken giving evidence of the poor health status of millions of people throughout the developing world. A situation of a collapse of health systems in developing countries has been described [1-5]. Several questions of importance emerge from these descriptions. What is collapsing, and how is it related to population demand and values? There are many presumed and proven causes of these findings and many policies advocated to improve them. Nonetheless there are large discrepancies between the policies put forward at both international and national level and the activities undertaken within the health sector [6]. The policies are argued to be more directed towards the institutional needs of the donors and health ministries rather than the development needs of the health system [7]. Primary health care, minimum health care packages, cost-effectiveness studies, health reforms and health systems performance frameworks are all tools developed to improve the use of resources and improve the health care system performance and ultimately population health [8]. There are attempts to explain why some of these concepts have failed and varying degrees of optimism to whether or not they can succeed [9-10]. It is a relevant question to ask if these tools really can work as intended. Are they addressing the key issues of implementation? Is there something wrong with the

tools, or are they simply not implemented because of lack of resources and political will?

1.II The evaluative framework

Reproductive Health - a tracer policy for evaluation

Although an analysis of possible discrepancies between policies and capabilities in a health system ideally should encompass the whole system, this is in practice difficult because of the resources needed for such a venture. With its limitations, it is therefore useful to find a tracer policy that can shed light on important aspects of policy formulation and implementation. Reproductive health in general and safe motherhood programmes in particular could be used for such a purpose. The following discussion will try to explain why and how.

As reported by Kwast one of the main reasons why reproductive health and safe motherhood initiatives is a good tracer policy is because “The majority of maternal and perinatal deaths could be avoided by access to basic maternity care which is supported by adequate medical and surgical care” [11]. Following up maternal health implies that not only does the health care at primary level need to be effective, but also the health care at secondary level, i.e. at a level with a minimum of surgical and medical care, needs to function. Tarimo supports this claim in his argument towards a “district focus” from WHO and other donors in the fight against maternal mortality [12]. He defines the district health service to include the first referral hospital, and concludes that “reduction in maternal mortality is a good indication of improved performance of district health systems” because a safe motherhood programme links family and community, health centre and district hospital when it works as intended.

Defining a safe motherhood programme

What then defines a safe motherhood programme? Kwast mentions six important elements for a holistic approach. The first two are policy formulation and training. The next are information, education and communication and management and

supervision, and finally logistics and supplies and research, monitoring and evaluation.

In a series of three articles Kwast gives a comprehensive overview of quality of care in reproductive health programmes, focusing on concepts, assessments, barriers, improvements, education issues, monitoring and evaluation [13-15]. Quality of care is perhaps the most important factor when evaluating a Reproductive Health Care programme [16-17]. Quality is argued to be a product of the political environment, financial framework, socio-cultural factors, the health system, education and training and interaction between actors. Outcomes of the services can be measured by the integration of services, utilization, health-outcomes and sustainability.

Kwast and others describe the three main barriers as being barriers to access, to receive and to provide health care. This means that a pregnant woman needs to go through several important steps in order to get help. She needs to 1) recognize the problem, 2) decide what care she wants, 3) be able to access this care and 4) receive quality care once she has accessed it [18].

What to evaluate: supply or demand of obstetric care?

There seems to be a continuing discussion as to which level or phase the main resources should be used and what to measure when assessing the accessibility, quality and level of maternal health care. There is agreement however, that contrary to many other health problems, such as infant mortality, maternal mortality is more sensitive to the provision of care, and in particular obstetric care [19]. According to MacLeod and Rhode the most effective answers to reduction of maternal deaths at a district level are effective antenatal care, emergency treatment of complications, transportation, competent referral level and adequate equipment [20]. Berer and Sundari Ravindran also note that most resources have been used on antenatal care in developing countries compared to delivery and immediate post-partum care, emergency obstetric care and safe abortions [21]. At the same time data shows that the majority of complications and deaths arise during and after delivery and in the first hours and days post-partum and from

unsafe abortions [22]. These results show the relative importance of the provision of or supply side of maternal health care. De Brouwere et.al. underline that maternal mortality in itself is not a good indicator for the assessment of maternal health care programmes, and maternal health [23]. Rather it is important to assess the unmet needs, in particular the obstetrical needs, again showing the relative importance of adequate provision of care [23]. They conclude that perhaps the most important indicators are number and quality of first line professional midwives and second line hospital delivery care. Recent reports suggest that it is more efficient (in terms of reducing maternal mortality) to provide access to emergency obstetric care rather than continue to rely on traditional birth attendants and unskilled attendants [22]

Evaluating Components of Maternal Health Care

Bertrand and Tsui provide an overview of the components of maternal health care [24]. In this overview they also give a useful definition of inputs, process, outputs and outcomes which help identify the determinants that could guide any study of a Safe Motherhood Program. Input refers to the resources invested in a program and includes financial, technological and human manpower. Process refers to activities carried out to achieve the program's objectives; they show what is done and how well it is done.

Output refers to the results achieved at the program level. There are three types of output:

- Functional output: measures number of activities conducted in each functional area such as training.
- Service output: measures the adequacy of the service delivery system in terms of access, quality of care, and program image.
- Service utilization: measures the extent to which the services are used.

Outcome refers to changes observed at the population level among members of the target population as a result of a given program or intervention. There are two types of outcome:

- Effects: changes in the short- to medium-range in a behavior promoted by the program.
- Impact: changes that occur over the long-term in fertility, morbidity or mortality rates.

Indicators for Evaluation

The World Health Organization has through the maternal health and safe motherhood programme established indicators to monitor maternal health goals. Table 1 below summarizes the main goals established during the World Summit for Children in 1990, in which WHO and UNICEF adopted two goals with direct relevance to safe motherhood, with corresponding indicators.

Table 1 Maternal goals and indicators adopted by WHO and UNICEF in 1990

<i>Maternal health goal</i>	<i>Recommended indicators</i>
Goal 2: "Between 1990 and the year 2000, reduction of maternal mortality rate by half"	<ul style="list-style-type: none"> • Maternal mortality rate (ratio): Annual number of maternal deaths per 100 000 live births • Annual number of maternal deaths
Goal 11: "Access by all pregnant women to prenatal care, trained attendants during child birth and referral facilities for high risk pregnancies and obstetric emergencies"	<ul style="list-style-type: none"> • The proportion of women attended at least once during pregnancy by trained personnel. • The proportion of births attended by trained health personnel. • Number of facilities providing essential obstetric care per 500 000 population.

These goals were later used to provide input to the United Nations Millennium Development Goals 4 and 5 in which the maternal mortality ratio is to be reduced by three quarters and the under-five mortality rate by two thirds by 2015 from 1990 [25].

Bertrand and Tsui, Wardlaw and Maine and the WHO have all made comprehensive efforts to select useful indicators towards reproductive health program evaluation [24, 26] [27].

Emergency Obstetric Care indicators as process indicators

Wardlaw and Maine focus on the importance of process indicators relative to impact indicators. The latter are expensive and do not account for changes over shorter periods of time for continuous assessment. They therefore advocate the use of process indicators, also adopted by UNICEF / WHO and UNFPA [27].

These seek to answer the following questions:

- Are there enough facilities providing Emergency Obstetric Services (EMOC)?
- Are they well distributed?
- Are enough women using these facilities?
- Are the right women (those with obstetric complications) using these facilities?
- Are sufficient quantities of critical services being provided?
- Is the quality of the services adequate?

Although there is convergence towards outcome and process indicators, there is still some divergence between different agencies and projects. The number of indicators used varies from as little as four by Ronsmans et.al. in Indonesia, to 13 recommended by UNFPA [28]. There exist several sets of indicators for evaluating safe pregnancy. The four main sets of indicators are the Essential Obstetric Functions (EOF), the Essential Obstetric Care (EsOC), The Emergency Obstetric Care (EmOC) and the Neonatal Special Care (NSC) sets. Assessing the Unmet Obstetric Need (UON) is also a similar method to evaluate the gap between the expected need and the actual delivery of major obstetric interventions [29] [30] [23].

The set chosen for this thesis, and as used in the UNFPA / UNICEF / WHO guidelines, are the EmOC functions. These include an assessment of the types of interventions that have been conducted within the last three months. If the facility has performed all (basic) functions they are considered Basic Emergency Obstetric Care units (BEmOC). If they additionally perform more advanced functions (blood transfusion and caesarean section) they are considered Comprehensive Emergency Obstetric Care units (CEmOC).

UNICEF, WHO and UNFPA have set certain “acceptable” levels that, although approximate as guidelines, can serve as useful references for evaluation. They are based on the assumption that at least 15 per cent of all pregnant women will develop serious obstetric complications [26]. Table 2 gives an overview of the questions to be answered and the related process indicators chosen for this protocol, their definition and acceptable levels for comparison.

Table 2 EmOC process indicators, formulas and acceptable levels

Questions	Process Indicator	Definition	Acceptable Levels
Are there enough facilities providing EmOC?	Availability of EmOC facilities	Number of facilities providing EmOC functions per 500,000 population	Minimum 4 Basic EmOC facilities Minimum 1 Comprehensive EmOC facility
Are they well distributed?	Geographic distribution	Distribution of EmOC facilities across Population, Geographical Area and Travel Time	Minimum nationally defined level is met in sub-national areas
Are enough women using these facilities?	Proportion of births in EmOC facilities	Proportion of deliveries in EmOC facilities of all expected births.	Not less than 15%
Are the right women using these facilities?	Met need for EmOC	Proportion of expected complicated deliveries (15% of total expected deliveries) treated in EMOC facilities	Not less than 100%
Are sufficient quantities of critical services being provided?	Caesarean Section Rate	Proportion of estimated live births by Caesarean Section	Not less than 5% and not more than 15%
Is the quality of the services adequate?	Case-fatality Rate	Proportion of direct obstetric deaths in a facility, of the total number of direct obstetric emergencies	Not more than 1%

1.III Description of policy, implementation and utilization in Tanzania

Tanzanian health services and health policy

Village health posts, dispensaries, health centers, district hospitals, regional hospitals and referral/consultant hospitals build up the Tanzanian health services pyramid. The Ministry of Health supervises implementation of the health policy at national level, with regional and district administrative authorities responsible at their respective levels. The main policy objectives are described in the most recent Tanzanian Ministry of Health national policy document from 1994, although it is

currently under revision [31-32]. Many of these objectives are formed through close collaboration with multilateral and bilateral health and development agencies. They include:

- Ensure that health services are available and accessible to all people wherever they are in the country, whether in towns or countryside.
- Reduce infant and maternal morbidity and mortality and increase life expectancy through provision of adequate and equitable maternal and child health services, promotion of adequate nutrition, control of communicable diseases and treatment of common conditions.

With regard to maternal and child health services the policy outline specifically aims to:

- Reduce deaths, diseases and disabilities among children and women of childbearing age.
- Provide comprehensive health education to mothers.
- Promote proper health care to families through home visits and health education.
- Provide care for women before, during and after delivery.
- Equip health centers.
- Continuously train and develop health personnel.
- Prepare a policy on the responsibilities of traditional birth attendants.
- Provide continuous sufficient supplies of potent vaccines and vaccination equipment throughout the country.
- Direct special efforts towards areas with low vaccination coverage.
- Continue to sensitize mothers, communities and leaders at all levels about the importance of child immunizations and solicit their active support.
- Provide special outreach service for underprivileged areas.

The Tanzanian Ministry of Health national policy document goes on to emphasize the importance of equity, accessibility and use. It further identifies the major weakness of its policies (outlined in the National Health Policy, The Medical

Practitioners and Dentists Ordinance, Nurses and Midwives Registration Ordinance, The Pharmaceuticals and Poisons Act and the Private Hospital Regulation Act) to be the implementation phase, and suggests inadequate co-operation between ministries, technicians and other stakeholders as a major problem. In addition it mentions the tendencies towards selective primary health care strategies rather than comprehensive, and the lack of emphasis on cost-effectiveness, efficiency and sustainability. It furthermore sets out to clearly define the role of the various actors on the health care scene and introduce checks and balances in the system in order to ensure acceptable transparency, adequate public information and greater accountability.

It further outlines the role of the Government in providing health care and advocates less of a provider role and more of a facilitator role, all in line with the “part and parcel of other economic and socio-political changes in Tanzania”.

Health policy studies

Several studies from the mid 90's up to today give important information about health policy and reproductive health care in Tanzania.

Barriers to implementation

Gilson explores the health care reforms in Tanzania in particular in relation to alternative financing strategies [33]. She provides an overview of the Tanzanian health policy, and its recent history, as well as provides comments on fundamental weaknesses. In particular she explains the well-defined pyramidal health care structure in the country and key health indicators. In addition to the context of severe economic difficulties in the countries throughout the past two decades she identified a weak referral system, the shortage of vehicles and basic supplies, the isolation of the health worker, and the lack of proper supervision

Both cost and quality measures were estimated in the study. The quality assessment was done by reviewing inputs to health care, (structural quality), the provision of health care (process quality) and community satisfaction. Structural quality included an evaluation of the availability and condition of the physical

infrastructure and supplies, the availability of services and staff and practices and support. Process quality was done by assessing the performance of the staff on curative consultations, nursing activities and antenatal care. The main findings showed inefficient use of drugs and personnel, low availability of drugs but adequate availability of qualified staff using most of their time on curative services. There were inefficient and incorrect diagnostic and prescription procedures with some association between level of training and performance. The community generally gave high priority to curative services and drugs, while complaining about the attitudes of staff and low availability of drugs.

Gilson showed that the range and type of problems are broadly confirmed in other Tanzanian assessments and are common to countries both within and outside Sub-Saharan Africa with a need to improve public sector management, and in particular strengthen district level management.

The role of management

Sandiford et.al. also focus on the role of managers in their study on the relationship between information system development, management training, use of planning and evaluation methodologies and health sector reforms in Kisarawe District in Tanzania [34]. It was found that although there was clear evidence of inefficiencies and inequities in the allocation of health resources, health managers were often reluctant to decide upon actions which would alleviate the problems. This was particularly the case in situations where there were potential losers as well as winners, even if the benefits greatly outweighed the costs. Sandiford et.al.. summed up the fundamental weaknesses into four main categories. These were inappropriate financing mechanisms, lack of autonomy at district level, inadequate human resource management and low management performance.

Delivering maternal – child health services in developing countries

Grindle and Hildebrand study the ability of the governments in six developing countries, including Tanzania, to deliver maternal-child health services [35]. The main aim was to identify factors that constrained or facilitated the ability to perform effectively, efficiently and sustainably, as well as to assess the interventions

needed to correct capacity gaps. The study demonstrated the extent to which performance can be constrained by a wide variety of factors. Interestingly they find that the dimensions of capacity are interdependent. For instance, remedies introduced at the human resource, organizational or inter-organizational level may not lead to improvements if constraints along other dimensions of capacity are more binding. For Tanzania a major constraint to performance was brain drain and the siphoning off of time and energy from government activity towards other income generating activities. The inability of the health system to pay for supplies, equipment, vehicles and training was another major constraint. Furthermore there was found to be low participation from the community on the political issues surrounding health care. In the public organizational context low salary levels, lack of effective performance standards, inability to fire people, no rewards for good performance, lack of recruitment procedures and promotion patterns were other constraints.

Human resources for health

A major barrier to implementation of existing policies is the lack of qualified human resources for health [36]. These findings are confirmed in Tanzania [37]. Among the most influential reports assessing the human resource situation in Tanzania is the report by the McKinsey Company [38]. This report shows that there are not enough qualified human resources to implement policies at health facility and grassroots levels. The reasons for this include lack of training facilities, inadequate working conditions, poor retention policies, inadequate managerial capacity and fragmented donor and government bodies' coordination. Only a little more than 30% of the needed personnel are present within the system, leading to severe lack of implementation capacity within the system.

Maternal health care studies

Several studies have been undertaken to assess primary health care and maternal health in Tanzania [20, 39]. Urassa et.al., in a community-based incident case-referent study in Ilala district, gave valuable input to increase our understanding of how socio-economic factors (low household economy, single and divorced mothers, increased distance from home to hospital etc.) all increased the risk of

maternal death [40]. In another study a follow-up study of maternal deaths in the same district was undertaken to study the operational factors affecting maternal mortality [41]. Poor-quality care was identified in 77% of the cases reaching health care. The district health staff identified poor treatment in 61% and the referral centers in 12% of their cases. Lack of equipment at the referral centre and wrong decisions at the district level were the main reasons for inadequate care. They conclude that the provision of core resources and supplies for emergency obstetric interventions, as well as clear protocols for management and referral, are necessary for increased maternal survival.

Atherton et.al., through a descriptive study of operational research aimed at improving the quality and uptake of reproductive health service in the Mbeya region, found that great improvements can be made through research and intervention addressing the constraints on effective service provision [42]. The main outcomes measured were health service utilization rates, client perceptions of health service quality and situation analysis of health service provision. Staff factors, service factors and facility factors influenced service quality.

Other studies from Tanzania confirm the importance of having access to adequate emergency and antenatal care as a determinant of maternal and perinatal mortality [43-44].

A very small study (only four hospitals included) from Kwimba and Missungwi districts in Tanzania using the EmOC framework also show that there is a need to improve access to and use of emergency obstetric care services in Tanzania [45]. These findings are supported through a larger study in the Tanga Region using the UON framework [46]. This study showed that only 1% (with a threshold of 2%) of all deliveries were done performing a major obstetric procedure. This study also showed large urban – rural variations. A similar study using the same methodology (UON) from Mtwara Region basically showed the same trend although closer proximity to the service delivery point showed improved utilization [47]. Seven of the 20 districts passed the threshold of 2%, 7 showed levels between 1% and 2%, while the rest fell short of 1%.

National Responses

The report on the Health Sector Reform identifies several key factors necessary for implementing health policies [48]. One key finding in the report was that forty per cent of the districts reviewed have dispensaries with no delivery units and thirty per cent do not have mother and child health care units. Overall the referral system is weak and not followed. Traditional birth attendants conducted 92% of all home deliveries, and play a major role in delivery care. Differences were observed between districts regarding number of vehicles available relative to their populations. The range was from 1:8,000 to 1: 300,000. 49% of all facilities require major repairs, 23% minor repairs and 12% are in good condition. The District Health Management Teams (DHMT) recognizes the weak structural maintenance system and poor infrastructure. 68% of the health facilities lack basic amenities such as water, adequate working space, light and ventilation. Water supply and sanitation facilities were recognized to be main problems across all districts studied. In addition the proportion of revenue from local, central government and donors was not uniform in all districts and there were large variations in allocations per capita, ranging from TSh 4,502 to TSh 34 (1 USD ~ 1,200 TSH). Data on actual allocations and expenditure are not adequately kept, and there was no cost tracking system. The District Executive Director (DED), municipal directors and heads of various programmes within the districts had relatively extended financial control compared to the DHMT. Personnel expenditures consumed 80% and other expenditures were fuel, drugs, equipment and maintenance. There is lack of clear definitions between the roles of the Regional Health Management Team (RHMT) and the DHMT, as well as within the DHMT. The ongoing Health Care Reforms are concerned with defining priorities, refining policies and reforming the institutions responsible for implementing these policies [49].

Gaps in the literature

The studies described earlier show a more or less uniform picture in terms of quality and utilization of the health services in a developing country such as Tanzania. All of these studies show that there is a major shortfall in the provision

and utilization of services. The main barriers to implementation and use of services are generally related to availability of resources, accessibility of services, quality issues, management and other provider related mechanisms at district or facility levels. Some studies show that there is a lack of infrastructure and planning procedures. They also show the relative low level of autonomy and influence at district and population level over the components and priorities within the system. Only scattered evidence exists on the health system itself and on the system determinants of quality and utilization services.

II Objectives of the study

The main objective of this thesis is to evaluate health system barriers to facility utilization and facility deliveries of adequate quality through the use of EmOC as a monitoring tool in a resource poor environment such as northern Tanzania.

Specifically the objectives include

1. To determine the availability and distribution of facilities in northern Tanzania providing delivery services, as well as their use by the pregnant mothers. (Paper 1 and 2)
2. To determine the quality of obstetric care for resource allocation in northern Tanzania. (Paper 2)
3. To evaluate the current status of human resources quality, availability and distribution in northern Tanzania in order to provide emergency obstetric care services and discuss the usefulness of distribution indicators for describing equity in the decision making process. (Paper 3)
4. To discuss the usefulness of the EmOC framework as a monitoring tool for adequate delivery services.

III Material and methods

III.1 The Setting

Tanzania, with its population of about 37.6 million, is one of the 20 poorest countries in the world [50]. The pressure on the social services in the country is immense, and will only increase given a population growth of 2.8% [51] and a meager US\$ 350 average national income per person in 2006 (compared to US\$ 40,000 in the United Kingdom) [50]. About 36 per cent of the population live below the US\$ 1 per day [52]. Health as a percentage of total expenditure has varied between 9.4% in 2002 to 10.8% in 2007, with a brief high of 12.6% in 2005 [53]. Tanzania has a high coverage of antenatal care with 96% visiting at least once and 69% at least 4 times), but one of the worlds lowest doctors to population ratio with the added challenge of high maternal and infant mortality rates [54]. For every 1,000 births almost six women die in child birth and one in ten children dies before their fifth birthday, although this rate has declined by more than 25 percent in the past five years [55] [56].

The administrative system is based on a highly structured system introduced by the late President Julius K. Nyerere in the mid 70's. The households (cells) are clustered into groups of ten, with a ten cell leader. These are organized into sub-villages, villages, wards, divisions, districts and regions.

The health services infrastructure pyramid has a wide base with more than 5,000 village health workers, 4,000 dispensaries, 400 health centers and 180 hospitals [57]. Tanzanian health policy states that there should be two village health workers per village, two health workers (Assistant Clinical Officer and MCH Aide) at dispensary and four health workers (Clinical Officer, Nurse, Midwife and two Nurse Auxiliary) at health center levels. There should be one dispensary per about 6-10,000 and one health center per 50,000 population [58]. Not all districts have a district hospital, and there are a few Voluntary Agency hospitals designated as district hospitals. There is a significant policy relevant difference between the role of the district hospital as a supervisory institution within the Ministry of Health administration pyramid, and the role of the hospitals as first referral hospitals. All

hospitals are part of the national health care system as first referral hospitals, but only the government and designated voluntary agency hospitals are part of the health administration pyramid. Most regional hospitals have the status of secondary referral hospitals, and there are additionally four consultancy hospitals in the country serving as tertiary referral hospitals.

In principle each administrative level in the health care pyramid is responsible for supervising the activities at the level below. There is little planning and monitoring activities at the dispensary and health center levels however. The district health management is responsible for planning dispensary, health center and hospital activities and to monitor their implementation. The regions are responsible for monitoring district performance and finally there is a zonal level of monitoring with the Ministry of Health on top of the administrative pyramid.

The Tanzanian health system has been subject to an extensive health reform during recent years. A stepwise introduction of all districts into this process has now been completed. The main elements of the reform are decentralization, program integration, self contribution, essential service packages, sector wide approaches, civil service reforms, community based insurance financing methods and the increased inclusion of the private sector [48].

III.II The Study Area

The districts chosen for the study are all situated in northern Tanzania. Two are in Kilimanjaro Region (Moshi Urban and Hai District), two in Arusha Region (Arusha Urban and Arumeru District) and two in Manyara Region (Hanang and Mbulu Districts). The Manyara Region was established as a region at the end of the data collection period, and no regional functions were established until the data collection was completed. The regional functions of the districts in the Manyara Region were therefore handled by the Arusha Regional Health Management Team during the data collection period. The study area has a population of about 1.5 million people. The districts were chosen to reflect different stages of health sector reform implementation, urban and rural settings and public private mix of services.

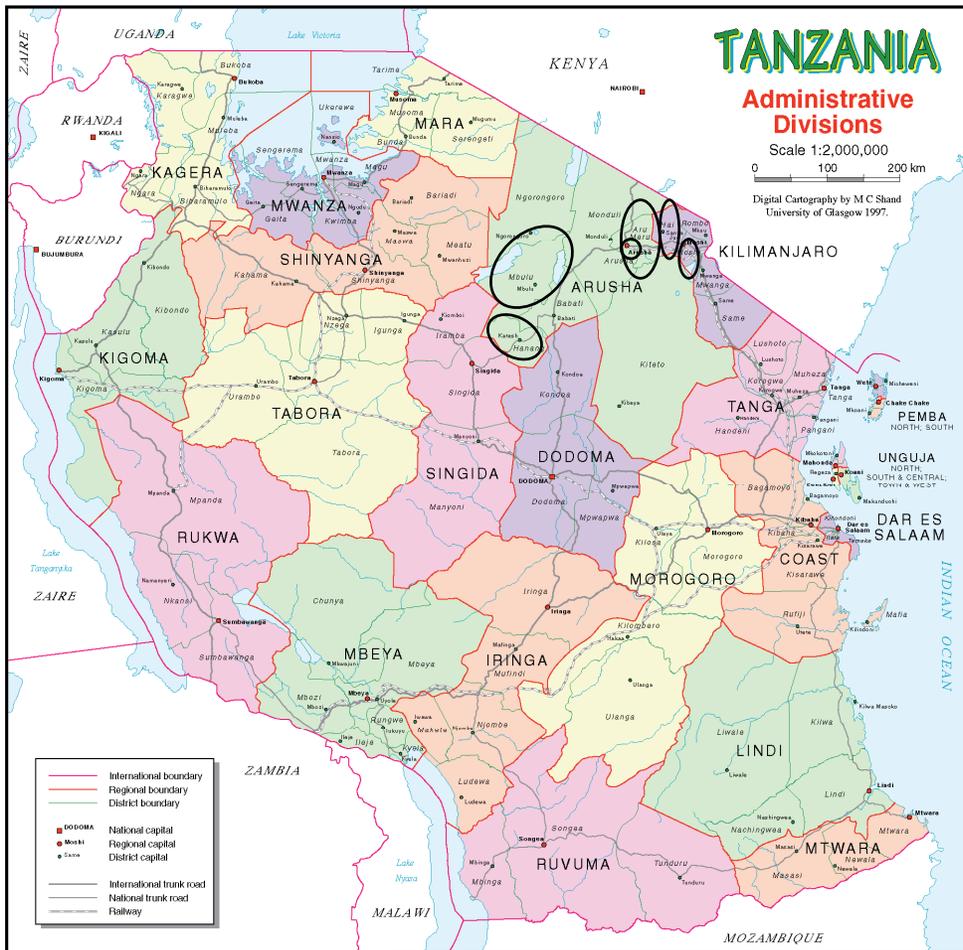


Figure 1 Map of the study area showing the relative placement of the six study districts

Two of these districts are urban, while four are rural. Two of the rural districts are connected to the urban districts however. This was done to better capture the flow of delivering mothers across districts from rural to urban facilities. Similarly Mbulu was chosen next to Hanang district as large parts of the population in Hanang district travel to facilities in Mbulu district for health care. The population in the

northern areas of the Hanang district also has a choice of facilities in the neighboring Babati district.

The districts differ somewhat in terms of available infrastructure. The urban districts have a well functioning public transport system on relatively adequate roads. The main highway between Arusha and Moshi (the two large towns in the study area) goes through the middle of the two rural districts of Hai and Arumeru. Along this highway, and along the main feeder routes, the public transport system is functioning. The situation is very different in the more remote areas of these districts. The infrastructure in Mbulu and Hanang is typically rural with gravel roads and large seasonal variations between dry and rainy seasons. There is a public transport system along the main roads, but much of the population does not have easy access to this transport.

The urban districts have similar characteristics in terms of availability of dispensaries, health centers and hospitals. There are government, voluntary agency and private for profit facilities in these districts. Only Moshi Urban has a tertiary referral hospital. The four rural districts differ somewhat more although Mbulu, Arumeru and Hai districts all have district hospitals as well as voluntary agency hospitals. Hanang district does not have a functioning hospital, and relies on neighboring districts for this service. Hai district further has a very high number of dispensaries compared to the other districts. All 6 districts have a functioning District Health Management Team.

All facilities providing delivery services at all levels of services (dispensary, health center, first referral hospital, secondary referral hospital) were identified and surveyed (n=129). These included Government (G), Voluntary Agency (VA) and Private For-Profit (PFP) facilities.

III.III The Study

This is a study of a particular subset of the existing health services provided to the people of Tanzania (emergency obstetric care), and its relation to the policies defining the same service. Focus is on the supply side – inputs and process - of

the health services, although specific output and outcome indicators were sought for evaluation purposes. Reproductive health, in particular safe motherhood aspects, was used as a tracer policy for specific evaluation. Although the general aim of the study concerns health policy in Tanzania, the study design was restricted to issues related to reproductive health policies in Tanzania.

To further guide the data collection and analysis process the following project outline was used:

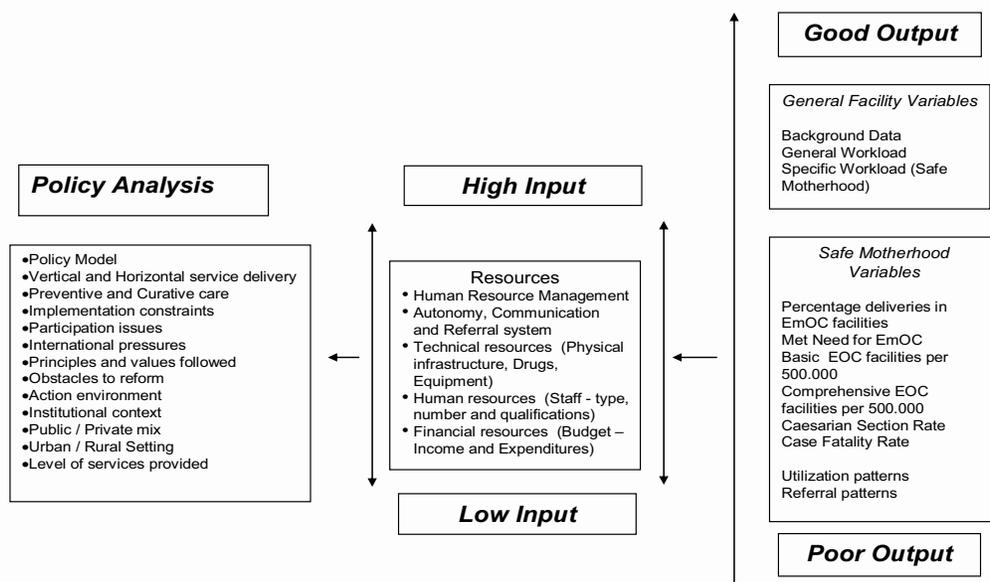


Figure 2 Main data collection guide

The study focused on three main aspects, moving from right to left in the above figure.

1. Reproductive Health as a tracer policy

Policy evaluation levels as described earlier by Bertrand and Tsui were applied [24]. The main indicators used were those outlined by Wardlaw and Maine in the UN Guidelines shown previously in this thesis [27]. The objective was to show good or poor output in terms of safe motherhood service delivery and utilization in the study area. This was described against the backdrop of general facility and district variables.

2. District and facility resource availability

The output described above was furthermore related to the availability of resources at facility and district levels. This was important in order to inform the analysis of the output results, but also to discuss the priorities related to distribution of resources in a resource poor environment. Important features analyzed were:

- Human Resource Management
- Autonomy, Communication and Referral system
- Technical resources (Physical infrastructure, Drugs, Equipment)
- Human resources (Staff - type, number and qualifications)

3. Health Policy Analysis

A complete analysis of the barriers to implementation and utilization of health services needed to be described within the policy context at all levels from the international and national policymaking levels all the way to the implementing levels including the districts and facilities. Important issues are:

- Policy model (Top-down, Bottom-up)
- Vertical and horizontal delivery
- Preventive and curative care
- Implementation constraints
- Participation issues
- International pressures
- Principles and values followed
- Obstacles to reforms
- Action environment
- Institutional context of the public sector
- Public / Private mix
- Urban / Rural setting
- Level of service provided

This is basically a synthesis of the different models described in the conceptual background and defines the framework in which the policy barriers could be studied.

I further developed a theoretical model that could serve as a guide for the study. This model was based on the theoretical input as outlined earlier, but with a particular emphasis on supply of health services. Identifying relevant input factors was crucial to understanding the determinants of supply. The main domains were identified through an extensive study of the literature prior to data collection. The following figure illustrates the main fields relevant to the study design:

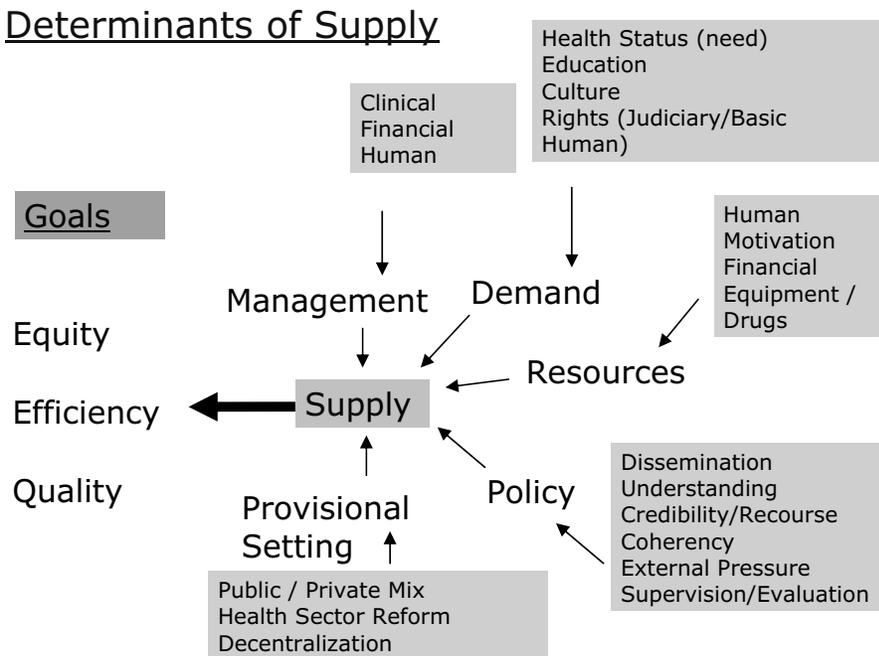


Figure 3 Theoretical outline of the determinants of supply developed for this study

From the literature previously described it is possible to see how supply of services is related to issues of management, demand, availability of resources, policy

environment and the provisional setting. The overarching goals of the services are to provide equitable, efficient and quality services.

III.IV Data Collection

This thesis includes an analysis of selected health policy analysis issues, reproductive health indicators and availability of human resources through quantitative facility surveys and document reviews. The survey-questionnaires were developed from a detailed literature review and pretested and refined through a pilot study in a district outside of the study area (Monduli District) (not reported here).

Data sources for the study included:

- ◆ Health Management Information Systems (facility, district and regional levels)
- ◆ Facility surveys
- ◆ Population Surveys (DHS)
- ◆ Population Census (1988 and 2002)
- ◆ Administrative Records
- ◆ Official planning documents

The study was therefore based on a combination of a comprehensive facility survey and policy document review [31-32, 48-49, 51, 55, 59-61]. The facility survey was conducted through a structured analysis of facility documents with the aid of a facility manager interview. Separate quantitative questionnaires were developed for each analysis level (facility, district, and region) and the data collected included a wide range of questions focusing on workload Emergency Obstetric Care (EmOC) Unit status, economic, infrastructure and staffing resources, training, inventory and standard of equipment. (See Appendix 1 and 2 for a sample of the facility and district questionnaires used)

Facility data was gathered from the routinely recorded Health Management Information System (HMIS) at each facility known as Mfumo wa Taarifa za

Uendeshaji wa Huduma za Afya (MTUHA). The MTUHA collection includes 12 recording books covering most of the facility activities. The Facility Survey sources include delivery records (Book 12 of MTUHA), annual facility summaries (Book 2 and 10 of MTUHA) as well as other types of records kept in some facilities (such as loose pieces of papers, notebooks etc.) Additional information at district and regional health authority included district health plans, district processing files (MTUHA summary) and annual regional reports. All activity information gathered was for the complete year of 2000. In addition to the principle investigator the project employed one competent field assistant to aid the data collection process.

The data collection tool was based on the UN Guidelines for defining and monitoring the Emergency Obstetric Care units. Reviewing relevant documents and asking the following question during the interview with the facility managers determined the EmOC status of every facility:

Were the following services performed at least once during the last 3 months (Yes/No):

- | | |
|---|--|
| <input type="checkbox"/> Parenteral antibiotics? | <input type="checkbox"/> Removal of retained products? |
| <input type="checkbox"/> Parenteral oxytocics? | <input type="checkbox"/> Assisted vaginal delivery? |
| <input type="checkbox"/> Parenteral sedatives /
anticonvulsants? | <input type="checkbox"/> Blood transfusion? |
| <input type="checkbox"/> Manual removal of placenta? | <input type="checkbox"/> Caesarean Section? |

To identify the availability of human resources the facility questionnaire provided an overview of all cadres and number of employees in each cadre. In addition the facility managers were specifically asked to list the number of employees capable of conducting procedures at Basic Emergency Obstetric Care level and Comprehensive Emergency Obstetric Care level. In principle this would mean anyone capable of doing all six BEmOC procedures or additionally the two CEmOC procedures. A pragmatic summary of these procedures would be anyone capable of handling a normal delivery with only minor complications (BEmOC capable staff) and those capable of handling complicated deliveries measured by their ability to perform a Caesarean Section (CEmOC capable staff). The study did not attempt to conduct a clinical capability audit of each staff member, but

relied on the facility manager to provide the number of staff qualified at the time of the survey.

III.V Analysis

The main quantitative methods used were an analysis of inventories and development of specific numerical indicators as outlined earlier. Due to the complete sample of facilities within the study area only descriptive statistics was used. The data was entered into Microsoft Excel spreadsheets by separate data entry personnel. Three main files were created:

1. Facility inventory including UN Guidelines indicators
2. District activity based on available documents
3. Birth registry of all individual births recorded at the facilities

These files were initially cleaned by the data entry personnel and the principle investigator. They were then converted into SPSS version 11.0 files for further cleaning, classification and descriptive statistical analysis.

If the facility had performed all of the 1-6 functions mentioned above, they were considered Basic Emergency Obstetric Care units (BEmOC). If they additionally performed 7 and 8 they were considered Comprehensive Emergency Obstetric Care units (CEmOC).

The facility deliveries was determined by registering the official statistics as they were reported to the Ministry of Health through the MTUHA system in the annual summary and other facility delivery sources as described later (See section on data quality).

The percentage normal deliveries and complicated deliveries at these facilities, of all expected deliveries and complications, was determined by recording all births at the facilities using the delivery registry at each facility. In addition the official statistics as they were reported to the Ministry of Health through the MTUHA system were used. We followed the method described in the UN Guidelines using

Plan 3. This plan computes the complicated deliveries by subtracting normal deliveries from total deliveries and multiplying by a factor of 1.25 to correct for underreporting. The quantity of critical services is described using the Caesarean Section rate in these facilities. The figures used for Caesarean Sections were also obtained from the delivery registers and MTUHA records. The Case Fatality Rate was calculated using existing facility data only for those facilities qualifying as a Comprehensive Emergency Obstetric Care unit and registering maternal deaths.

The expected number of births was calculated using the population figures from the most recent population census of 2002 [51] with growth estimates of 4.0% in Arusha Region, 1.4% in Kilimanjaro Region and 3.8% in Manyara Region and Crude Birth Rates of 34.4/1000 in urban districts and 43.5/1000 in rural districts [61].

Data on Human Resource availability was compiled and categorized according to different analytical contexts. These were total HR availability at district level, urban or rural setting, availability at each level of health services (dispensary, health center, first referral hospital and secondary referral hospital) and availability according to ownership of the facilities. The availability of human resources in the study area was analyzed in terms of expected and actual workload by calculating number of expected and actual deliveries per qualified worker within the different analytical contexts.

III.VI Ethical Considerations and Research Clearance

Approval and research clearance from the Commission for Science and Technology (COSTECH) and the National Institute for Medical Research (NIMR) in Tanzania, as well as the Research Ethics committee in Norway was applied for and granted. Additional clearance and cooperation was obtained from all administrative levels in all regions, districts and facilities, as well as from the relevant ministries in Tanzania.

III.VII Conflict of interest

I am presently working within the health system analyzed in this thesis as the Managing Medical Director of a hospital in northern Tanzania. I did not assume this position until after the data collection, analysis and publication of the three papers included in this thesis.

IV Results

IV.1 Main results

The following table gives background information in which the articles are put into context. For further details, see the individual papers (paper I-IV)

Table 3 Summary of background information and main EmOC findings

		District						
		Total	Moshi Urban	Hai	Arusha Urban	Arumeru	Hanang	Mbulu
Facilities Surveyed		129	9	44	11	29	16	20
Population Year 2000		1 538 289	139 754	251 706	260 547	476 296	189 839	220 146
Any Facility per 500 000		41.9	32.2	87.4	21.1	30.4	42.1	45.4
Level of Facilities Surveyed	Dispensary	93	1	38	1	25	13	15
	Health Center	18	4	4	3	1	3	3
	First Ref Hospital	15	2	2	6	3	0	2
	Secondary Ref Hospital	3	2	0	1	0	0	0
EmOC Status of Facilities Surveyed	BEmOC	5	1	0	1	1	1	1
	CEmOC	14	3	1	6	2	0	2
	Not EmOC	110	5	43	4	26	15	17
Facility Deliveries (%)	BEmOC	1370 (3.9)	130 (2.1)	0 (0)	382 (2.8)	48 (1.2)	731 (54.5)	79 (1.6)
	CEmOC	21589 (62.1)	5967 (94.8)	704 (17.0)	10085 (72.8)	770 (19.0)	0 (0)	4063 (80.0)
	Not EmOC	11797 (33.9)	195 (3.1)	3431 (83.0)	3389 (24.5)	3236 (79.8)	610 (45.5)	936 (18.4)
Total Facility deliveries (%)		34756 (100)	6292 (100)	4135 (100)	13856 (100)	4054 (100)	1341 (100)	5078 (100)
Expected deliveries		63273	4808	10949	8963	20719	8258	9576
Expected deliveries (%)	Not in Facility	44.1	-30.9	53.5	-47.8	82.1	83.2	43.0
	At any Facility	55.9	130.9	46.5	147.8	17.9	16.8	57.0

IV.II Synopsis of the papers

Paper I: Availability, Distribution and Use of Emergency Obstetric Care in Northern Tanzania

The objective of this paper was to determine the availability, distribution and quality of facilities providing delivery services, as well as their use by the pregnant mothers. This has important policy implications in terms of priority setting for equity and efficient use of resources to provide quality.

The study is a survey of all facilities providing delivery services (n=129) in six districts in northern Tanzania. The framework provided by the UNICEF/UNFPA/WHO (UN) Guidelines is applied. An attempt is made to answer the three first questions in this audit outline; -are there enough Emergency Obstetric Care (EmOC) facilities? -are they well distributed? -and are enough women using them? The indicators are assessed in the context of the urban/rural setting, level of services and ownership of the facilities (public/private mix).

The results show that there is a very low availability of Basic Emergency Obstetric Care (BEmOC) units (1.6/500.000), and a relatively high availability of Comprehensive Emergency Obstetric Care (CEmOC) units (4.6/500.000), both with large urban / rural variation. The percentage of expected deliveries in EmOC facilities is 36.3%, compared to the UN Guidelines minimum accepted threshold (15%). Nevertheless the distribution shows a much higher utilization in urban districts compared to rural, indicating that mothers have to travel long distances to receive adequate services when in need of them. Most facility deliveries are conducted at CEmOC facilities. The pregnant mothers tend to utilize the services of Voluntary Agencies to a greater degree than Government services in rural areas, while the Government services have a higher burden of the workload in urban areas.

Paper II: *Complicated Deliveries, Critical Care and Quality in Emergency Obstetric Care in Northern Tanzania*

The objective of this paper was to determine the availability and quality of obstetric care for resource allocation in northern Tanzania.

Again this study is based on the survey of all facilities providing delivery services (n=129) in the six districts in northern Tanzania using the UNICEF/UNFPA/WHO (UN) Guidelines for monitoring Emergency Obstetric Care (EmOC). For this paper however, the three last questions in this audit outline were examined; - Are the right women (those with obstetric complications) using Emergency Obstetric Care facilities (Met Need)? - Are sufficient quantities of critical services being provided (Caesarean Section Rate (CSR))? - Is the quality of the services adequate (Case Fatality Rate (CFR))? Complications are calculated using plan 3 of the UN Guidelines to assess the value of routine data for EmOC indicator monitoring.

Of the expected complicated deliveries in the study population 58.9% were conducted at EmOC qualified facilities. 81.2% of the expected complicate deliveries are conducted in any facility (including facilities not qualifying as EmOC facilities). There is an inadequate level of critical services provided (CSR 4.6) although this figure shows large variations between the districts (23.2 in Moshi and 0 in Hanang). Voluntary Agencies provide most of these services in rural settings. All indicators show large variations in terms of the provisional setting (urban/rural location, level and ownership of facilities). Finally there is large variation in the CFR with only one facility below the minimum accepted level.

Paper III: Distribution and Quality of Human Resources for Health in Northern Tanzania – what is pro-poor?

The lack of qualified human resources for health care is described as a major limiting factor in implementing health policies and health reforms in the developing world.

The aim of this article is to determine Human Resources quality, availability and distribution towards the provision of Emergency Obstetric Care services in the study area. The article also aims at discussing the usefulness of distribution indicators alone to describe equity within the decision making process.

A quantitative facility survey was conducted in 6 districts of northern Tanzania. Data was collected from all facilities (129) providing delivery services in the study area. The data included information on the Emergency Obstetric Care indicators as described by the WHO/UNICEF/UNFPA Guidelines for monitoring the provision of obstetric care. The inventory also included information on the numbers of qualified health personnel at Basic and Comprehensive Emergency Obstetric Care level. The distribution and workload of the available human resources is analyzed in a wider policy context with a particular focus on equity, utilization and quality using descriptive statistics and the Spearman's correlation test.

There are adequate levels of human resources in terms of national standards in Tanzania. These resources are inequitably distributed however. There is lower availability in rural districts, while Voluntary Agency facilities in rural districts are overall better staffed than Government facilities. There is a correlation between availability of qualified human resources and utilization of services, but the availability of qualified human resources does not automatically translate into higher availability of qualified services.

V Discussion

V.1 Methodological considerations

Chance, Bias and Confounding

The research protocol deliberately included all facilities in the six identified districts. By studying a complete sample the analysis has eliminated chance, and enables extensive use of descriptive statistics.

We used an established and previously validated set of indicators to evaluate the implementation of Emergency Obstetric Care. There could be a selection bias however in the selection of districts, and as shown in the results there is a slight overrepresentation of urban districts (see next section for a discussion on generalizability). In terms of measurement bias the discussion is more complex. The methodology used (Emergency Obstetric Care Indicators) is an established methodology used in many different countries. There is much literature published using the framework. Nevertheless it is based on a range of ambiguous criteria, each of which could influence the results.

The EmOC indicators were constructed in order to establish a monitoring framework that was simple to implement and with the potential to monitor progress within the existing data sets commonly available in health management information systems across countries [62]. They were designed for operations and health systems research and are not tools useful for epidemiological information related to outcome monitoring. There are attempts to combine the information gathered by the process indicators for informing the epidemiological information needs by estimating maternal deaths averted [63].

The current experience of using these indicators in different settings have revealed several critical issues relevant to the analysis and usefulness of each indicator [64-66].

The first indicator, measuring the availability of EmOC, has primarily been subject to challenges related to quality of data and to the field experience when utilizing the indicator for policy purposes. The quality of data is compromised by the inclusion criteria of the signal functions. It is not always clear to the monitoring teams if the criteria are met when the necessary equipment or trained personnel is available or if the signal function has actually been performed the past 3 months. In different settings the signal functions are performed by different staff categories complicating the assessment [67-68]. Different inclusion criteria will inflate or deflate the reported availability and make comparison difficult across regions and time. More importantly however is the fact that some facilities do not have enough complicated deliveries to conduct all signal functions needed for inclusion within the 3 month period in which they are assessed. They might therefore have the capability, but will not qualify as they have not performed the signal function for lack of need or due to few mothers seeking care for lack of trust to - or perceived quality of the facility, or due to long distances and lack of resources etc. Furthermore the facilities classified as “non-EmOC” might have performed some or nearly all of the functions and as such contributed to the overall health service, but this will not be captured in the monitoring process as they are not included. In facilities with few deliveries it could be the case therefore that they will move in and out of the EmOC qualifying status when monitoring a region over time, making comparison of availability of services difficult. Several authors propose that data should be presented in a more dynamic form indicating the number of facilities missing specific signal functions enabling a more detailed monitoring of the health system over time. Finally data analysis has been challenged by the distinction of Basic and Comprehensive EmOC in that a majority of the studies reported show high numbers of CEmOC and low numbers of BEmOC availability within a population. This might reflect an improving service to the population on the one hand while it might mask the need for decentralized services on the other. An aggregate total number of EmOC services available has been considered [64].

The second indicator, the geographic distribution of EmOC facilities is particularly useful for equity considerations. It has been shown however, that large aggregate national data, while perhaps showing good coverage of EmOC facilities per

population, mask the fact that these facilities are provided either largely in urban areas or provided by for-profit actors or masking other utilization considerations important to the equity considerations of policy makers. It is useful therefore to disaggregate these figures and preferably map according to population concentrations (urban, rural) and stratified by the provider group (public, not-for-profit, for-profit).

The third indicator – proportion of births delivering in EmOC facilities also suffers from issues of data quality in the given health information systems. The target of this indicator is also subject to confusion on different levels. First the relatively low percentage target of 15% does not indicate if these are the mothers actually needing institutional delivery. If facilities comply with this indicator it can be wrongly assumed that all is well with the health system. In a context in which there is a need for policy makers for political or donor reasons to show adequate delivery of services these figures can be misused for this purpose. In addition this indicator can be used as an advocacy tool promoting institutional deliveries in general, while this was initially not the purpose of the indicator. Finally this indicator is often confused with the “births by skilled attendants” indicator and the “institutional delivery” indicator and is therefore not easily recognized in its own right. It has therefore been proposed that each country should set their own targets based on their own policy needs [66].

The fourth indicator, met need for EmOC, is probably the most useful indicator among the six EmOC indicators framework. It is useful to set the target of including all complicated deliveries (100 %) as the policy ideally should be to reach all mothers in need with appropriate interventions. Although for most countries this is an unattainable target, monitoring the progress towards this target can still be useful. The estimated number of complications set at 15% of all deliveries is nevertheless subject to more debate and was recommended by an expert working group but has not been validated empirically. The incidence is also not likely to be the same across different populations [69]. In addition this indicator is subject to large variations due to the lack of consistency with regards to the inclusion of abortion related complications. Although the framework encourages the inclusion of abortion related complications this is not always included either due to missing

data or for political and legal reasons where it might be illegal in many countries to record and perform abortions. This indicator is also often confused with another proposed framework named Unmet Obstetric Need (UON) [23, 70]. The UON is strictly an indicator focusing on the absolute maternal indications (AMI) as a measure of life threatening complications and is therefore more demanding in terms of quality data but on the other hand perhaps more useful for improving quality of services within institutions. The Met Need indicator is also subject to many data quality issues in which under- and overreporting are often present as different detail of the information needed is present in different records within an institution. Logbooks and registers might include data not included in patient files and complications might not be recorded both due to lack of recording practices and to different interpretations of the definitions of a complication. Double counting is also possible as some mothers are admitted more than once to a facility during a pregnancy.

The fifth indicator, the caesarean sections rate, is generally considered to have a higher data accuracy as the registers are kept in the theatres and logged by the surgeon or operator. When reviewing national figures there is however a tendency to under-report this rate due to the often missed inclusion of private (for profit and not for profit) institutions. The data suggest that a high proportion of caesarean sections are performed in private institutions either due to higher perceived quality by mothers [71-72], increased presence of skilled personnel or due to provider incentive mechanisms such as fee for service and therefore a lower threshold for performing surgery [66]. The specified target of 5 – 15% is also subject to much debate. It has particularly been noted that it is important to identify the reasons for the surgery to be performed (such as the AMI), and not only the numbers performed. Proponents of the target argue however that a major effort is placed on the availability of easily collected data and that as such the target also only indicates a range useful for monitoring changes over time.

The final indicator, the Case Fatality Rate, is particularly subject to data issues given that the number of deaths in a facility can be very low and therefore show large fluctuations with only small increases in actual numbers. In addition there is a fear of underreporting of the data as it can be perceived as a tool for policy

makers to reprimand and deface service providers thus providing an incentive to hide or not report the needed data. It is also clear that the CFR is not useful when aggregated across facilities as each facility is subjected to very different reasons for the levels achieved. As an example a facility with a high perceived quality might admit mothers from large catchment areas with little hope of survival simply because they are known to provide good care. This indicator is therefore proposed used only for individual facilities, in conjunction with other indicators such as the met need, and over time, for it to be a useful indicator of quality of services.

Most of these indicators use population estimates in the denominator for analysis. This is challenging as the population does not confine their utilization of services to administrative borders, making comparison difficult. In addition population surveys are seldomly conducted, and the catchment area population is often calculated using other information such as estimated crude birth rates and expected number of live births. The proponents of the EmOC framework acknowledge the weakness of these data, but refer again to the main objective of introducing low-cost and easily obtainable and easily calculated indicators useful for overall policy analysis.

These limitations also influence the data presented in this thesis. The most important are related to the strict inclusion of facilities in the Basic and Comprehensive Emergency Obstetric Care groups. The result is based on the activities in the past three months. About 90% of the facilities had less than 100 deliveries per year. This is approximately 25 deliveries per 3 months. Is it reasonable to assume that all six signal functions are necessary or would have been conducted within these 25 deliveries? If not it is possible that many more of the facilities could have qualified as EmOC facilities if the time span was longer. Similarly the level of expected complicated deliveries (set at 15% of expected deliveries) is probably different between populations and contexts. It could be therefore, that the variations in complications are of such a magnitude as to influence the results. One of the reasons for using plan 3 of the UN Guidelines was to assess its value in routine evaluation of EmOC at district level. This is because it offers a feasible method of gathering important information. Nevertheless there is a possibility of confounding factors as the numbers of complications used for the analysis is estimated, based on the recorded

complications found. Multiplying by a factor of 1.25, as recommended in plan 3 of the guidelines, to correct for underreporting could in fact lead to over recording if the recording procedures are reasonably adequate in the facilities. Furthermore, and probably most importantly, it does not discriminate between different types of complications. Although we argue that the type of complications are not important for decision makers in terms of allocating resources, it is important from a clinical point of view as well as for comparison with other studies. These sets of indicators have since the implementation of this research protocol been subject to evaluation and revisions have been proposed. [73].

Several training sessions were conducted and a pilot study completed, thus reducing the possibility of different interpretation of data when determining the level of the indicators and assessing availability of human resources by the two main investigators. However it can not be ruled out that they have interpreted data differently.

Included in the data collection was a large amount of qualitative information through focus group discussions and semi-structured interviews with key implementers, policy makers and stakeholders within the whole range of the health care system. An analysis of this information would have provided a more comprehensive picture of barriers to implementation, but remained outside of the scope of the PhD due to time and resource constraints. The same applies to the wide range of financial data also collected from each facility.

Data Quality, Reliability and Generalizability

The quality of data is the main challenge in terms of methodological problems surrounding the data presented in this thesis. Of the possible 129 facilities identified as providers of delivery services all of them were willing to be interviewed. As for the reliability of data, nine facilities (7%) did not have any delivery registers in any form despite providing the services. Of these, six were Dispensaries, two Health Centers and one Private for Profit hospital. For another 36 facilities (28%) supplementary delivery records were used. These included

notebooks and loose pieces of paper. Nevertheless it is assumed that the possible errors with regard to the total registration of deliveries in the study area is relatively small, as this is most likely to occur in facilities providing a low number of deliveries. This is because more than 80% of the facility deliveries are conducted in less than 10 facilities, all of them CEmOC facilities with a higher quality record of deliveries. The observed underreporting is both due to the absence of MTUHA recording books in the facilities, but more often due to incomplete MTUHA records. There is an important remaining challenge to instruct and guide these facilities in the use of the official reporting procedures. It is my impression that the incomplete reporting often is due to lack of perceived applicability of the MTUHA recording system to the facility managers.

Although the study includes all facilities providing delivery services in the districts chosen, the choice of districts could represent a generalizability problem. The districts were not randomized but chosen on specific criteria believed to be relevant to the study design. The following table shows that the study area includes relatively more urban districts and a higher percentage of first and secondary referral hospitals than the country in general [74].

Table 4 Comparison of internal distribution of population, facility ownership and level of health services in study area and Tanzania

		Study Area	Tanzania ^a
		Number(%)	Number(%)
Population	Urban	(26)	(30)
	Rural	(74)	(70)
District Status	Urban Districts	2 (33)	21 (20)
	Rural Districts	4 (66)	83 (80)
Facility Ownership	Private For Profit	11 (9)	699 (15)
	Voluntary Agency	41 (32)	761 (17)
	Government	77 (59)	3153 (68)
Level of Services	Dispensary	93 (72)	3955 (86)
	Health Center	18 (14)	479 (10)
	First Referral Hospital	15 (12)	154 (3.5)
	Secondary Referral Hospital	3 (2)	25 (0.5)

In addition there is a slightly higher number of Voluntary Agency facilities, but a more similar distribution of the urban and rural population, in the study area compared to the rest of the country. These figures indicate that, because of the relatively unfavorable situation in the rural areas compared to the urban, the process indicators probably show an even bleaker picture nationally than that described in the study area.

The study only used one policy as a tracer policy. We still believe that the findings related to this policy are relevant to the health system of Tanzania, although such generalization should be done with caution. The reason for assuming generalizability is the need for adequate Emergency Obstetric Care services throughout the health care pyramid at different skill levels and the uniform distribution of the need for these services throughout the population. In addition the skills needed to cater for these services represent a minimum of what is expected of the health personnel at the different levels, both in terms of the prevalence of the need and as described by the policy guidelines of the Tanzanian authorities.

V.II Implementation and utilization of EmOC

The results of the empirical data show that there is a distribution challenge between Basic Emergency Obstetric Care and Comprehensive Emergency Obstetric Care facilities. While there are enough CEmOC facilities there are not enough BEmOC facilities. The facilities are also found mostly in urban areas except for where there are Voluntary Agencies providing them in rural areas, necessitating travel over long distances for delivering mothers as almost all deliveries were conducted at CEmOC facilities and Voluntary Agency facilities.

In addition the data show that there are not enough complicated deliveries taking place in facilities providing EmOC services, and that there are not enough services provided towards the objective of reducing maternal and child deaths around the time of delivery (critical services).

Finally the data show that although there are presumably enough qualified human resources available, these resources are found mostly in urban areas around the CEmOC facilities. The benchmark for adequate availability is set at a national level as qualified staff per population. The total available qualified staff per population is distributed very thinly over a large number of facilities making the number of staff available per facility low.

The findings on availability of EmOC facilities are congruent with those found elsewhere with the exception of Rajasthan in India where there were enough BEmOC but not enough CEmOC present [75] [28, 45, 76-80]. These studies also show similar findings as presented in this thesis with regard to the utilization and provision of critical services with a common picture showing a shortfall in the use and provision of emergency care at the time of delivery.

The findings in this thesis related to the availability of qualified staff do not show the same overall congruent picture. While the staffing levels set by national policies in Tanzania seemingly approve of the staffing levels found and presented in this thesis, other findings from Tanzania show a severe shortfall of qualified human resources in the health sector [37]. There is therefore an indication that there is a mismatch between the defined national threshold levels of staffing per population and levels of staffing per facility in different policies and the real needs. The staffing levels set as the benchmark at national levels do not reflect the actual need for qualified staff at facility level and is therefore probably set too low. This is also in line with reviews of the relationship between the level of qualified human resources available and the provision of quality EmOC. There is a clear relationship between the shortage of qualified human resources in developing countries and the level [and quality] of care provided [71]. This relationship is based on issues such as the clinical aspects and interpersonal aspects of care. The same review of the available literature on the relationship between human resources and quality of EmOC concludes that these aspects greatly influence the satisfaction of the care received by the women giving birth. This in turn influences trust and utilization.

The distribution of facilities within the geographical catchment areas needs revision given the utilization pattern of the services. It is evident that the delivering women “vote with their feet” in that they will bypass lower quality facilities (BEmOC or non-EmOC facilities) to reach CEmOC facilities [72]. The women tend to seek services of higher perceived quality. Finding that there are more CEmOC facilities in urban areas is also no surprise. It seems reasonable that larger cities and densely populated areas provide services at a higher level being centralised locations. At the time of delivery the complication will often arise very quickly and often without warning. In rural areas the mother will therefore be situated far from the facility providing the necessary critical care services, and without ambulance services or other means of getting to a CEmOC facility quickly, the mother will not reach this facility in time. Large distances to a CEmOC facility can possibly explain the low levels of complicated deliveries conducted at qualified facilities. It is more difficult to elucidate why the level of critical care provided is also not adequate. It would seem logical that if the policies were aimed at saving mothers and children’s lives there would be enough resources allocated towards providing higher levels of care closer to the mother and child.

The findings show that there are low levels of implementation and low levels of utilization of EmOC services. There must be a reason why mothers do not want to use the facilities and why the facilities are not providing the services required. The findings indicate that long distances, inadequate resources and low quality of services contribute to this near collapse of the health services in the study area. Apart from these often described reasons there is however, a call for a new focus on implementation and a more detailed scrutiny of the implications of management, availability of qualified human resources and remunerations schemes (particularly with the recent focus on pay-for-performance schemes) on the provision and utilization of quality services [71, 81]. These issues are highly correlated to the perceived quality and trust in the services, by the mothers, as well as the retainment of staff in the facilities, both vital to the utilization and quality of services. In particular there is a lack of information and insight regarding the prioritization of resources and therefore also the value basis for which to achieve quality and subsequently utilization of services.

In order to address severe resource constraints and poor infrastructure [3-5, 82-84], there is a need to rethink how the resources are distributed: improving quality at strategic points of services seems to be more important than securing equal quantities of services. The total provision of good-quality services accessible to all is key, not necessarily with the same overall coverage. The issue at stake is not so much the coverage of the services as it is the health care quality, accessibility and community trust of these services.

VI Recommendations

It follows from the discussion that the recommendations of this thesis are as follows:

VI.I Recommendations on Practice

- To improve availability of qualified Emergency Obstetric Care facilities, either through improved quality of existing services, or through shifting resources between dispensary and health center levels to provide quality before quantity.
- To improve recording procedures of complications and deaths at delivery
- To adjust the provision of Emergency Obstetric Care services to reach rural areas and utilize Voluntary Agencies for this purpose.
- To increase national standards in terms of qualified personnel needed at dispensary and health center levels to better reflect the need for quality and equitable services.

VI.II Recommendations on Policy

- To improve and utilize the Emergency Obstetric Care Guidelines for monitoring and evaluation of the provision of health care in resource poor settings.
- To include and monitor Quality as a major intermediate objective in all health policies.

VI.III Recommendations on Research

- To shift research focus from a narrow system perspective of lack of qualified personnel, poor infrastructure and lack of motivated staff to the more overarching question of the determinants of trust and the role of international and national policies in pursuing values relevant for priority setting and utilization at the local level.

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VIII Papers

The appendices follow immediately after the papers.

IX Appendices

Appendix 1: Quantitative facility questionnaire

Appendix 2: Quantitative district questionnaire

Appendix 3: List of facilities studied