Spring 2019

Maternal Health in Eastern Tanzania: Antenatal, Delivery and Postnatal Care

Christina Sego

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MATERNAL HEALTH IN EASTERN TANZANIA:
ANTENATAL, DELIVERY AND POSTNATAL CARE

A Capstone Experience/Thesis Project
Presented in Partial Fulfillment of the Requirements for
the Degree Bachelor of Biology with
Honors College Graduate Distinction at Western Kentucky University

By
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*****

Western Kentucky University
2019

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I dedicate this thesis to my parents, Christopher and Kimberly Sego. I would not be where I am today without their love, encouragement and support through all of my endeavors.
ACKNOWLEDGEMENTS

First, I would like to thank Dr. Mkanta for planning the program that allowed me to conduct this research and experience Tanzania. Through his guidance, I have learned many valuable lessons about healthcare and working with diverse populations that will allow me to be a better physician in the future.

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Fourth, I would like to thank both the Office of Research and Creative Activity and the Mahurin Honors College for the financial support. Without this, I would not have been able to travel to Tanzania and conduct my research.

In addition, I would like to thank Sinza Hospital and Ms. Lydia Nzema, the Hospital Secretary, for their approval for this study. Without the support of the hospital and its staff, this research would not have been possible.

Lastly, I would like to thank my family and friends who have always believed in my abilities to chase my big dreams. I am so thankful for their love and support.
ABSTRACT

The purpose of this study is to evaluate maternal health conditions in eastern Tanzania and identify areas and conditions for improvement of healthcare. Tanzania is ranked 27th highest country in maternal mortality in the world (The World Factbook: Tanzania, 2018). Maternal health is an ongoing challenge Tanzania is facing as a country. This experiment was designed to identity areas of service in the district hospital setting that could advance quality of care. This study was conducted in Sinza Palestina Hospital, a district hospital on the outskirts of Dar es Salaam, Tanzania. Data was collected in the form of observation, interviews and questionnaires with healthcare professionals such as nurses, midwifes and doctors. Information was obtained for the 3 areas of maternal care in the hospital: antenatal, delivery and postnatal care. Many factors are to be considered when evaluating the quality of maternal care such as facility environment, healthcare providers, and cultural influences on care. Antenatal, delivery and postnatal protocol of care were obtained in the results of this study. Challenges for maternal care were determined from healthcare professionals. Challenges were identified to be limited supply of trained healthcare providers, equipment limitations, limited facility space, and cultural influence on care. The data of this experiment identified areas of improvement to be health education, infrastructure, hospital staff, community awareness for care. Improving these areas could enhance the quality of care and improve maternal mortality rates in Tanzania.

Key words: Maternal Mortality, Maternal and Child Health, International Health, Tanzania
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PRESENTATIONS


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INTRODUCTION

Tanzania is a country located in East Africa. The country’s diverse population of nearly 54,000,000 is made up of about 130 tribes (“The World Factbook: Tanzania”, 2018). Many of the tribes have their tribal language; however, Swahili and English are official languages of the country. Tanzania is the largest country in East Africa. Tanzania is also a peaceful country that avoids involvement in external conflict. However, the country faces an internal conflict of its own with the challenges in healthcare. Life expectancy in Tanzania for the total population is 62.6 years with a male life expectancy of 61.2 years and a female life expectancy of 64.1 years (“The World Factbook: Tanzania”, 2018). Infant mortality rates are 39.9 deaths/1,000 live births (“The World Factbook: Tanzania”, 2018). Maternal mortality rates of 556/100,000 live births (Maternal and Child Health Fact Sheet, 2017). Tanzania ranks 27th highest in the world for the maternal mortality ratio (“The World Factbook: Tanzania”, 2018). In additional to maternal health, Tanzanians face a high risk of disease, and a prevalent disease the country faces is HIV/AIDS. In 2016, 1.4 million Tanzanians were living with HIV/AIDS and 33,000 deaths were caused by the disease (“The World Factbook: Tanzania”, 2018). Healthcare professionals face many challenges like these diseases but also in the shortage of their peers. In 2012, the physician’s density was recorded to be 0.03 physicians/ 1,000 population (“The World Factbook: Tanzania”, 2018).

Dr. Alfred Msasu, MD, MSc is a Medical Officer at the University of Dar es Salaam. Dr. Msasu delivered a lecture titled Healthcare System in Tanzania to educate American students studying abroad in the area. The Tanzanian government was the main provider of healthcare until the Private Health Service Provider of 1991 allowed health
professionals to begin private practices (Msasu, 2017). In 2017, Healthcare facilities were 64% government owned and 36% privately-owned (Msasu, 2017). Many privately-owned facilities are supported by various religious groups. Most health services are funded by the government and some privately-owned insurances. However, health services are free for at-risk populations which include: pregnant women, children under the age of 5, people over the age of 60, and people with diseases such as HIV/AIDS, leprosy, tuberculosis, polio, and cancer (Msasu, 2017). Tanzania uses a pyramid structure of healthcare facilities. From the bottom to top of the pyramid facilities rank in the following order: community/village post (where most of the population is served), dispensaries, health centers, district hospitals, regional hospitals, zonal hospitals, and the national hospital (where the least of the population is served through the referral system) (Msasu, 2017).

Maternal health is an ongoing challenge Tanzania is facing as country. Maternal mortality ratios decreased from 578 deaths per 100,000 live births in the Tanzania Demographics Health survey of 2000-2005 to 432 in a Population Census of 2012 (Maternal and Child Health Fact Sheet, 2017). However, the ratio increased to 556 in the Tanzania Demographics Health Survey-Malaria Indicator Surveys of 2015-2016 (Maternal and Child Health Fact Sheet, 2017). Figure 1 displays a map from the World Health Organization on maternal mortality rates per 100,000 live births worldwide. Tanzania, on the eastern coast of Africa, is categorized in the 500-999 per 100,000 live births color.
Many factors can contribute to the risk of mortality during birth such as disease, infection, birth complications, age of the mother, shortened gestation period, etc. However, other healthcare facility environmental factors can contribute to maternal mortality such as lack of health resources, limited staff, medicine shortage, supply shortage, outdated equipment, etc. This study is conducted to investigate the state of maternal health in the hospital environment in order to identify areas of improvement that may contribute to a decrease in maternal mortality in the future.

This research was approved by Sinza Hospital and the WKU Institutional Review Board (Appendix B & C).
Methods

Data for this study was collected from Sinza Palestina Hospital’s maternal ward. Information was obtained from the three divisions of the ward: antenatal ward, delivery, and postnatal ward. Sinza Palestina Hospital is a district hospital. District level hospitals serve a population of 100,000-200,000 patients (Msasu, 2017). Hospital history and information was collected to learn about its profile. This facility is on the middle of the healthcare facilities pyramid and the first hospital level as seen in Figure 2.

Figure 2: Healthcare Facilities Pyramid

This study was conducted from June 9, 2017 to July 5, 2017. Data for this study was collected in the form of questionnaire surveys and personal observations. Questions were modeled after a previous study conducted in southern Tanzania (Mrisho et.al., 2009). The data collection began with two interviews with nurses. Methods of collection were transferred to a questionnaire survey due to limited time to interview during work shifts. On the provider side, twelve nurses/midwives and four doctors participated in the
study. Participants were chosen at random. The same questions asked during the interview were also asked through the questionnaire survey and are displayed in Table 1.

Table 1: Survey Questionnaire

<table>
<thead>
<tr>
<th>Antenatal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 How early do women start antenatal care?</td>
<td></td>
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<tr>
<td>2 How often do they receive care during this period?</td>
<td></td>
</tr>
<tr>
<td>3 Do most women think antenatal care is an important to a healthy pregnancy?</td>
<td></td>
</tr>
<tr>
<td>4 Do all women receive antenatal care?</td>
<td></td>
</tr>
<tr>
<td>5 What are reasons women do not receive antenatal care?</td>
<td></td>
</tr>
<tr>
<td>6 What are routine steps of a typical antenatal checkup?</td>
<td></td>
</tr>
<tr>
<td>7 What is recommended for the mother for at home care?</td>
<td></td>
</tr>
<tr>
<td>8 How could antenatal care be improved?</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Antenatal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Where do most deliveries occur?</td>
<td></td>
</tr>
<tr>
<td>10 What are routine steps when a woman arrives at the hospital in labor?</td>
<td></td>
</tr>
<tr>
<td>11 Are family members allowed into the delivery room?</td>
<td></td>
</tr>
<tr>
<td>12 What are sanitary precautions taken during delivery?</td>
<td></td>
</tr>
<tr>
<td>13 Who typically delivers the baby? (midwife, doctor, nurse, etc.)</td>
<td></td>
</tr>
<tr>
<td>14 What pain medication is used?</td>
<td></td>
</tr>
<tr>
<td>15 Is medical supply shortage a concern during delivery?</td>
<td></td>
</tr>
<tr>
<td>16 What are the most common complications for the mother?</td>
<td></td>
</tr>
<tr>
<td>17 What are the most common complications for the baby?</td>
<td></td>
</tr>
<tr>
<td>18 What do you recommend to the mother for a smooth delivery? (breathing techniques, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delivery</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19 Where do most women receive postnatal care?</td>
<td></td>
</tr>
<tr>
<td>20 When is the first postnatal care preformed?</td>
<td></td>
</tr>
<tr>
<td>21 What are the routine steps of a typical postnatal checkup?</td>
<td></td>
</tr>
<tr>
<td>22 How often do women receive postnatal care?</td>
<td></td>
</tr>
<tr>
<td>23 Do most women think postnatal care is an important to a healthy healing?</td>
<td></td>
</tr>
<tr>
<td>24 Do all women receive postnatal care?</td>
<td></td>
</tr>
<tr>
<td>25 What are reasons women do not receive postnatal care?</td>
<td></td>
</tr>
<tr>
<td>26 How could postnatal care be improved?</td>
<td></td>
</tr>
</tbody>
</table>

Information for this study was also collected through 56 observation hours in the hospital.

Data was recorded in a notebook throughout the duration of the 4 weeks. This
information was used to determine standard protocol for maternal services in the areas of prenatal, delivery and postnatal care.
RESULTS

Information was collected regarding background and history of the hospital in which the research was conducted. This research study was conducted in a district hospital on the outskirts of the urban city of Dar es Salaam. Sinza Palestina Hospital is located in the suburban area called Sinza. The hospital began as a Health Center in 1979 and was promoted to a District Hospital in 2012 (Sinza Palestina Hospital, 2017). According to the hospital records, the facility acts as a referral for 23 public and 50 private dispensaries (Sinza Palestina Hospital, 2017). Dispensaries duties include general consultations, treatments, uncomplicated delivery, vaccinations, distribution of medication, etc. The hospital serves a range of 800-1000 outpatients daily (Sinza Palestina Hospital, 2017). The outpatient services are displayed in Table 2.

Table 2: Sinza Out Patient Department Services

<table>
<thead>
<tr>
<th>Out Patient Department Services</th>
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</thead>
<tbody>
<tr>
<td>• Reproductive Child Health</td>
</tr>
<tr>
<td>• Neonatal services</td>
</tr>
<tr>
<td>• Medical Laboratory</td>
</tr>
<tr>
<td>• Ultra Sound and X-rays</td>
</tr>
<tr>
<td>• Care and Treatment center</td>
</tr>
<tr>
<td>• Dental and Oral health</td>
</tr>
<tr>
<td>• Eye services</td>
</tr>
<tr>
<td>• Mental health services</td>
</tr>
<tr>
<td>• Voluntary Counseling Test</td>
</tr>
<tr>
<td>• TB/ Leprosy</td>
</tr>
<tr>
<td>• Observation</td>
</tr>
<tr>
<td>• Minor surgery</td>
</tr>
<tr>
<td>• Injection</td>
</tr>
<tr>
<td>• Emergency services</td>
</tr>
<tr>
<td>• Dispensing drugs / pharmacy</td>
</tr>
</tbody>
</table>
Most district hospitals are staffed by medical doctors, nurses, midwives, and usually contain one area of specialty. Sinza Palestina Hospital’s largest inpatient department is the maternal ward which consist of an antenatal ward, delivery room, postnatal ward, and post caesarian section ward. Other smaller inpatient departments in the hospital are an operating theatre and a female ward which consist of 4 pediatric patient beds, 4 insurance patient beds, and 4 post-natal beds for patients who have had complications within 42 days after delivery. Sinza Palestina Hospital conducts about 30-45 deliveries per day (Sinza Hospital Profile). The hospital serves a diverse population ranging from locals to members of rural communities/tribes. The hospital works to serve the maternal community and improve maternal health in the region.

Pregnancy consist of three trimesters. The first trimester is a term to describe the first three months around weeks one through twelve. This stage begins with conception of the egg and sperm through the placenta connection to the uterus. The second trimester is used to describes months four to six (weeks 12 to 28). During the second trimester, the mother feels movement and the fetus sleeps and wakes regularly (American College of Obstetricians and Gynecologists (ACOG), 2015). The third trimester describes months 7-9 (weeks 29 through 40). During this stage, the fetus has almost fully formed at 32 weeks (ACOG, 2015).

Antenatal care is a term used to describe healthcare services provided from conception to delivery. Most women began receiving antenatal care during the first trimester and received care two to six times prior to delivery (Sego, 2017, unpublished survey). Recommendations from healthcare providers for at home care for patients during pregnancy are eating a balanced and healthy diet (such as eating fruits), rest, restriction of
heavy activities, and observation for danger signs (Sego, 2017, unpublished survey). Near the end of the pregnancy term, mothers are prescribed a few items to pick up from a dispensary which include: oxytocin, sterile glove set, and a roll of cotton. These items are a necessity for delivery as hospitals only have a limited supply of medical items.

When a maternal patient enters the hospital in labor they first are registered in the antenatal ward. Before registration, patients depart from their families because patients are not allowed to have visitors throughout their stay due to limited space and risk of infection. Patients come to this ward from home or as a referral from an outside facility. The antenatal ward is on the second floor of Sinza Hospital with the rest of the maternal health wards. The ward contains 13 patient beds. The ward receives a range of 30 to 45 admissions per 24 hours (Sinza Palestina Hospital, 2017). Therefore, it was observed for two to three patients to occupy one bed at the same time. During the patients stay in this ward, registration is completed, vital signs are collected, and head to toe examinations are conducted. Patients are also tested for HIV and hemoglobin levels. Patient also receive vaccinations during this time if needed. It was observed that mothers brought a variety of items in at least one 5-gallon bucket. Most mothers had a thermos of soup and bottles of water because the hospital was not able to provide nutritional items to patients. The buckets also contained their prescribed items of oxytocin, sterile glove set, and cotton. While over the course of the research, very few mothers would forget nutritional or the prescribed items, but they all consistently carried kanga fabric in their buckets.

Patients were moved to the delivery ward when they were 10 centimeters dilated. When the decision to move to delivery was made, patients would collect their belongings and buckets, and walk to the delivery ward down the hall. Often, patients would spend
time waiting on a wooden bench at the entrance of the delivery ward until a hospital bed became available.

Most deliveries occur in health care facilities; however, few occur in home due to personal beliefs or lack of education according to survey results (Sego, 2017, unpublished survey). Sinza Hospital conducted an average of 486 per month (Sinza Palestina Hospital, 2017).

Figure 3: Sinza Palestina Hospital Delivery Ward.

Figure 3 displays the delivery room which contained 9 patient beds separated by white curtains. Figure 4 depicts a patient-ready, sanitized delivery bed.
Patients were assigned beds as they became available. Mothers would lay the kanga fabrics down before lying on the bed. Patients were encouraged to lie in a left lateral position to prevent hypertension and fainting. Head to toe assessments and vitals were recorded. After, oxytocin was often administered if needed. Oxytocin was used to induce uterine contractions and reduce bleeding. No additional medications or fluids were used during vaginal deliveries. Lidocaine injections were only injected to suture tears after delivery or before performing an episiotomy. Deliveries were typically performed by midwives and some instances nurses. Rarely, doctors would perform the delivery. Emergency caesarian sections were also performed at Sinza Hospital, but no data was obtained. The most common maternal complications during delivery determined by survey participants were displayed in Figure 5.
Resources such as diagrams were displayed above the healthcare provider desk in the delivery room for reference during complications. Blood estimation figures were displayed in the delivery room to assist healthcare providers. This is shown in Figure 6.

Figure 6: Blood Loss Estimation Diagram

Another diagram displayed in the delivery room for healthcare providers was the “Guide to use of ARVs and CPT in Prevention of Mother-to-Child Transmission Services: HIV-Exposed Pregnant Women”. This is displayed in figure 7.
The most common complications for the child during delivery were determined from survey results to be: birth asphyxia, low APGAR (appearance, pulse, grimace, activity, and respiration) score, fetal distress, neonatal sepsis, and low birth weight (Sego, 2017, unpublished survey). Normal birth weight was determined to be between 2.5-3.5kg (5.5lbs-7.7lbs). Data was obtained during the study for perinatal death count for neonatal deaths and still births in the month of June 2017. The data is displayed in Figure 8.

Figure 8: Perinatal Death Record for June 2017.
The three areas that were recorded were macerated still birth (MSB), fresh still birth (FSB) and neonatal death. Macerated still birth is used when death occurred prior to labor. Fresh still birth is when death occurs after the start of labor but prior to delivery. Neonatal death is when death occurs soon after delivery.

After delivery, patients and their newborn are transferred to the postnatal ward. The mother walks down the hall to the postnatal ward while the baby is transferred in a bassinet by hospital staff. The postnatal ward consists of two rooms, one room designated to post-cesarian section recovery and one designated to post-vaginal deliveries. The post-cesarean section contains 8 patient beds with a 1:1 patient to bed ratio. All babies whose mothers are recovering in the ward are placed in a community crib and monitored by nurses. The post-vaginal delivery recovery room consists of 8 patient bed and floor cots. The patient to bed ratio was 3:1 along with each mother’s baby (total person to bed ratio was 6:1). Figure 9 displays an image of the post-cesarian recovery room.

Figure 9: Sinza Hospital Post-Cesarean Recovery Room Postnatal Ward.
Postnatal care begins in the hospital immediately following delivery. Before discharge babies are vaccinated, mothers are monitored and education for mother and baby health occurs. Babies receive an intradermal tuberculosis vaccine and an oral polio vaccine during their antenatal stay. During this time, patients are also educated on the concept of family planning. This idea is encouraged by USAID, a donor to Sinza Hospital. USAID has been supporting the idea of family planning in Tanzania since the late 1980s (Family Planning and Reproductive Health Tanzania, 2018). USAID says the goal of the program is to “increase the prevalence rate of contraceptives” and “contribute to the goals of reducing maternal mortality and improving child survival” (2018). While in the postnatal ward mothers are able to receive pregnancy prevention in the form of birth control or intrauterine device(IUD). Mothers are also educated on danger signs to monitor after delivery. These are displayed on a piece of fabric in the ward and are covered in-depth in a presentation by a nurse that occurs multiple times throughout the day to all patients in the room. A picture of this fabric in the postnatal ward is displayed in Figures 10 and 11.
Figure 10: Risk Indicators for the Child Need to Report to Physician or Nurse

(Viaashiria Hatari Kwa Mtoto Ukiviona Toa Taarifa Kwa Daktari Au Nesi)

![Image of sign listing risk indicators]

Figure 11: Risk for Mother to Report to the Physician, Nurse, or go to Nearest Health Center (Dalili za Hatari kwa Mama Ukiziona toa Taarifa kwa Daktari au Nesi au Uende Kituo cha Afya Kilicho Karibu)

![Image of sign listing risk indicators]

The dangers signs that are discussed were translated into English and displayed in Table 4.
Table 4: Danger signs for both mother and baby discussed by nurses to patients during postnatal recovery.

<table>
<thead>
<tr>
<th>Danger Signs for Mother</th>
<th>Danger Signs for Baby</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Excessive PV bleeding</td>
<td>• Poor suckling/feeding</td>
</tr>
<tr>
<td>• Convulsion</td>
<td>• Persistent/abnormal crying</td>
</tr>
<tr>
<td>• Breathing difficulties</td>
<td>• Lethargy</td>
</tr>
<tr>
<td>• Severe headache</td>
<td>• Purulent eye discharge or yellow discolouration of the eyes, skin or mucousis membranes</td>
</tr>
<tr>
<td>• Severe abdominal pain</td>
<td>• Failure to pass stool or urine</td>
</tr>
<tr>
<td>• Foul smelling lochia</td>
<td>• Skin pustules</td>
</tr>
<tr>
<td>• Fever and too weak to get out of bed</td>
<td>• Breathing difficulties</td>
</tr>
<tr>
<td>• Heart palpitations/excessive tiredness</td>
<td>• Not feeding at all</td>
</tr>
<tr>
<td>• Urine dribbling or pains during passing urine</td>
<td>• Bleeding from the cord or redness around the cord</td>
</tr>
<tr>
<td>• Perineal pain or draining pus</td>
<td>• Convulsions</td>
</tr>
<tr>
<td>• Painful or redness in breasts</td>
<td>• Diarrhea</td>
</tr>
<tr>
<td></td>
<td>• Fever or feels cold</td>
</tr>
</tbody>
</table>

According to policy, mothers should stay for 24 hours following delivery. However, most mothers stay for an average of 6 hours if they exhibit signs of a normal recovery and successful breastfeeding due to overcrowding. Standard postnatal care after discharge includes checkups at 7, 14, 21, 28 and 42 days before the puerperium period ends. Survey participants report that most women believe postnatal care is important to healthy healing however, not all women receive postnatal care due to lack of education and healthcare access (Sego, 2017, unpublished survey).
DISCUSSION/CONCLUSION

This research led to major findings such as cultural influences on care, areas for improvement in antenatal, delivery and postnatal care, and major factors that may be contributing to quality of care. The observation of Kanga fabrics throughout the duration of the delivery process were discovered to be a cultural influence on care. Kanga fabrics are an important component of culture in Tanzania and other Swahili speaking groups in East Africa. Kanga fabrics are around 45 x 65 inches and sold in pairs (Ressler, 2012). Fabrics are a machine printed cloth with vibrant colors and designs. They also contain a message or phrase in swahili at the base of the pattern. The message contains wishes of goodwill, love, or messages of faith in God; for example, “Mungu ndiye tegemeo letu” which translates to, “We depend on God”. Giving kanga as a gift not only gives fabric, but also the message it carries. These kangas serve many purposes and functions for Tanzania culture. Kangas are mostly used as clothing for men, women and children. Mothers uses kangas to wrap the baby and as a carrying pouch to wrap around the mother. In delivery, kangas are used with corresponding messages to bring about a smooth delivery. Mothers often indicate specific kanga for designated aspects of delivery such as covering the hospital bed, wrapping the baby (as displayed in Figure 12) and for the mother to wrap around herself after delivery. This cultural custom influenced the patients approach to the delivery process. The belief in the messages these fabrics symbolized had an impact on their perception of the aspects of delivery such as pain, safety, and care.
The findings reported in Table 5 suggested that there were key areas of improvement.

Table 5: Areas identified for improvement in antenatal, delivery and postnatal care.

<table>
<thead>
<tr>
<th>Maternal Health: Areas of Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Equipment</td>
</tr>
<tr>
<td>• Facility space</td>
</tr>
<tr>
<td>• Nurse to patient ratio</td>
</tr>
<tr>
<td>• Health education</td>
</tr>
<tr>
<td>• Infrastructure</td>
</tr>
<tr>
<td>• Availability of vaccines</td>
</tr>
<tr>
<td>• Availability of lab services</td>
</tr>
<tr>
<td>• Regulated antenatal visits prior to delivery</td>
</tr>
<tr>
<td>• Medical supplies</td>
</tr>
<tr>
<td>• Community awareness</td>
</tr>
</tbody>
</table>
One area of improvement is in hospital equipment. For example, during the duration of this study, the hospital’s only infant warmer was broken and not usable. The hospital was also limited on numbers of Doppler monitors and ultrasound devices. If the fetus was in fetal distress, the Doppler monitor was crucial in determining if emergency cesarean section was needed. The hospital also had two bassinets. It was very common that two babies occupied one bassinet before they were carried to the postnatal ward (as seen in figure 12). There was one hospital crib in the cesarean section recovery that every baby whose mother was in recovery was placed in. Another area that could benefit from improvement was facility space. Due to limited hospital beds in the antenatal ward, patients were often occupying a hospital bed with one to two other patients. This causes an increased risk of infection. This can cause the spread pathogens that may be harmful for both the mother and child. However, the hospital places multiple patients because of the large influx of mothers in active labor everyday. While this allows earlier monitoring and prevention of complications, there are risk to multiple patient per bed occupancy. Survey results also suggested that there is a nurse shortage in the antenatal and delivery wards. Most nurses work 5 days a week. Nurse shifts are 7:00am -7:00pm, 7:00pm-12:00am and 12:00am- 8:00am. It was reported that the nurse to patient ratio is low. This can result in delay of care for patients and hinder early recognition of signs of complications. While patient education was discussed in the postnatal ward, education was limited in the antenatal and delivery wards. Educating patients, especially first-time mothers on warning signs during delivery may lead to early recognition of complications. Not all mothers are educated and aware of what to expect. For many mothers, this may
also be their first admission to a hospital or healthcare facility. Early education in antenatal may increase the overall patient experience.

Another area of improvement was availability of vaccinations and lab services. Limited availability of lab services requires the hospital to refer the patient to another healthcare location which cause a delay in the patient care. Vaccines are delivered to the mother in the Antenatal Ward if needed and to the child in the Postnatal Ward. Vaccinations administered at the hospital facility directly after birth decreased the child’s risk of acquiring that disease. When vaccinations are not administered due to a limited supply this decreases the likelihood that the children will be vaccinated due to the necessity to travel back to a healthcare facility to get the vaccination. Travel can often be difficult due to the distance of travel and poor infrastructure. The roads are often filled with large holes that also make traveling difficult on mothers in labor. Infrastructure can cause delay in getting to the hospital to receive care. Improving city infrastructure could lead to improvements in maternal health. Another area of improvement that was identified was a shortage of medical supplies. In efforts to prevent this, mothers are given a prescription to pick up including oxytocin, sterile gloves, and cotton. These supplies are limited in the hospital and it is crucial that mothers bring these items. This limitation encouraged the emphasis of resourcefulness for healthcare providers. Healthcare providers were very skilled in the area of improvisations to make the most of the supplies that they had. For example, instead of using tourniquets, healthcare providers would tie extra gloves to replace the tourniquet function when putting in IVs. Another area of improvement is attendance of antenatal visits prior to labor. Healthcare providers at Sinza feel that most women believe that antenatal care is important for a healthy pregnancy and
majority receive antenatal care throughout gestation. Some reasons that were reported for why mothers do not receive antenatal services are: unplanned pregnancy, lack of education, poverty, travel, transportation, city infrastructure, and traditional beliefs. Attending antenatal visits allow monitoring of mother and fetus, prevention of complications, and education. Another area that could benefit from improvement is in the area of community awareness and education of maternal health. Educating people on maternal health in the areas of expectations, danger signs, and healthy practices will allow people to be prepared prior to delivery. Improvements in these areas may lead to increased quality of care and improved patients experience.

There were research limitations that existed for this study. One of the largest limitations for this study was the language barrier. The primary language in Tanzania is Swahili. Most patients did not speak English. People who experienced higher education, such as nurses and physicians, spoke English due to an emphasis on learning English throughout their education. Therefore, all survey participants could speak English as a second language. Although they spoke English, some words were not translated with the same meaning in American English. Often researchers would discuss items with Swahili names based on function and utilization to determine the English equivalent. Another barrier of these research was participation. Due to the limited down time during healthcare providers shifts there was little time to collect survey data. The original interview questions were converted to a written survey to increase participation. The results gathered were based on the twelve nurses/midwives and four physicians that participated in the survey. Another limitation of this study was the limited time that the survey was conducted. Due to the fact that the research was conducted during an
undergraduate study abroad trip, data was collected from June 9, 2017 to July 5, 2017. Increasing the time of data collecting could improve the amount of observations and data.

Table 6: Major Factors Affecting Quality of Care

<table>
<thead>
<tr>
<th>Major Factors Affecting Quality Care</th>
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</thead>
<tbody>
<tr>
<td>Maternal Education</td>
</tr>
<tr>
<td>Limited supply of trained healthcare providers</td>
</tr>
<tr>
<td>Outdated equipment</td>
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<tr>
<td>Limited facility space</td>
</tr>
</tbody>
</table>

The results in Table 5 were summarized and four key areas were determined to be influencing quality of care. These areas are listed in Table 6. Sinza hospital and staff strive to be adaptable and resourceful with the supplies available to them. Hospital partnerships with organizations such as United States Agency for International Development (USAID) are helpful for supplying medical equipment and supplies. With additional supplies the hospital is able to serve more patients and improve health in their region. Future research may lead to an explorations of public health strategies and performance improvement programing to be applied to the key areas in Table 6. Making improvements to the areas discussed in this study may contribute to the efforts to decrease maternal mortality in eastern Tanzania.
REFERENCES


Family Planning and Reproductive Health Tanzania [PDF]. (2018, August). USAID.


Maternal Mortality Ratio (per 100,00 live births) [Map]. (2015). World Health Organization.

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Mrisho, Mwifadhi, Brigit Obrist, Joanna Armstrong Schellenberg, Rachel Haws, Adiel Mushi, Hassan Mshinda, Marcel Tanner, and David Schellenberg. "The Use of


APPENDEX A

Survey Questionaire

Job title (nurse, doctor, midwife): ________________________________

Please read and sign the informed consent form before completing the survey!

Antenatal

1. How early do women start antenatal care?

2. How often do they receive care during this period?

3. Do most women think antenatal care is an important to a healthy pregnancy?

4. Do all women receive antenatal care?

5. What are reasons women do not receive antenatal care?

6. What are routine steps of a typical antenatal checkup?

7. What is recommended for the mother for at home care?

8. How could antenatal care be improved?

Delivery

9. Where do most deliveries occur?
10. What are routine steps when a woman arrives at the hospital in labor?

11. Are family members allowed into the delivery room?

12. What are sanitary precautions taken during delivery?

13. Who typically delivers the baby? (midwife, doctor, nurse, etc.)

14. What pain medication is used?

15. Is medical supply shortage a concern during delivery?

16. What are the most common complications for the mother?

17. What are the most common complications for the baby?

18. What do you recommend to the mother for a smooth delivery? (breathing techniques, etc.)

Postnatal

19. Where do most women receive postnatal care?

20. When is the first postnatal care preformed?
21. What are the routine steps of a typical postnatal checkup?

22. How often do women receive postnatal care?

23. Do most women think postnatal care is an important to a healthy healing?

24. Do all women receive postnatal care?

25. What are reasons women do not receive postnatal care?

26. How could postnatal care be improved?

ASANTE SANA!!!!
Dear Christina Segos,

RE: Maternal Health in Sub-Saharan Africa Region: Antenatal, Delivery and Postnatal Care

As the Medical Officer Incharge of Sinza District Hospital, Dar es Salaam Tanzania, it gives me great pleasure to write this letter of support for the project titled: Maternal Health in Sub-Saharan Africa Region: Antenatal, Delivery and Postnatal Care that you plan to carry out at our hospital. The hospital will provide you with the required support necessary for your research activities between June 9 and July 9, 2017 when you are in Tanzania.

In support of this study, the hospital will give you access to previously collected and de-identified data related to women’s health and especially on data that will allow you to research on maternal health in the areas of antenatal, delivery, and postnatal care. It is our expectation that we will be included in the dissemination of your findings so we can learn on our own performance, and determine if there are any areas of improvement in our services.

Sinza hospital has been supportive of KHS students in Tanzania for many years in their practicum and field practical experiences. We welcome the idea of being involved in research as well, we hope it will grow to be a good addition in our collaborations.

Thank you and please let us know if you need any further information in support of your project.

Sincerely,

[Signature]

MEDICAL OFFICER INCHARGE
SINZA HOSPITAL

[Signature]

MEDICAL OFFICER INCHARGE
SINZA PALESTINA HOSPITAL
APPENDIX C: IRB Approval Form

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Western Kentucky University (WKU) IRB's records.

DATE: May 30, 2017
TO: Christina Sego
FROM: Western Kentucky University (WKU) IRB
PROJECT TITLE: [1076901-1] Maternal Health in Sub-Saharan Africa Region
REFERENCE #: IRB 17-460
SUBMISSION TYPE: New Project
ACTION: APPROVED
APPROVAL DATE: May 30, 2017
EXPIRATION DATE: May 30, 2018
REVIEW TYPE: Expedited Review

Thank you for your submission of New Project materials for this project. The Western Kentucky University (WKU) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of May 30, 2018.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Paul Mooney at (270) 745-2129 or irb@wk.edu. Please include your project title and reference number in all correspondence with this committee.