

**MORNING AVAILABILITY OF BLOOD ON SUSTAINABILITY OF MATERNAL
HEALTH SERVICES: A CASE OF QUEEN ELIZABETH CENTRAL HOSPITAL,
BLANTYRE, MALAWI**

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DECLARATION

I declare that this applied research project is my original work and that it has not been presented in any other university for academic credit.

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SUPERVISOR'S DECLARATION

This applied research proposal is submitted for examination with my approval as the university supervisor

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DEDICATION

I would like to dedicate this research project to my parents Mr. & Mrs. Lukhere and my husband Vita Nyasulu who supported me financially for this research proposal.

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ABSTRACT

The research study was carried out in order to assess monitoring availability of blood on sustainability of maternal health services at Queen Elizabeth Central Hospital in Blantyre, Malawi. The general objective of the study was to assess monitoring availability of blood to on sustainability of maternal health services at Queen Elizabeth Central Hospital in Blantyre, Malawi. The specific objectives of the study were to assess availability of blood on sustainability of maternal health services at Queen Elizabeth central hospital, to investigate rate of maternal survival to ensure on sustainability of maternal health services at Queen Elizabeth central hospital and to assess blood data management to on sustainability of maternal health services at Queen Elizabeth central hospital in Blantyre, Malawi. This study used descriptive survey research design. There were 45 Laboratory staff at Queen Elizabeth Central Hospital (QECH), so the population size was 45. Census approach was used whereby the total population would be used as sample size. Therefore, the sample size was 45 and 45 Laboratory staff at Queen Elizabeth Hospital would be issued with closed ended questionnaires so that they may respond to questions regarding to assessment of availability of blood on maternal health. Only 39 laboratory staff answered the questionnaires. Theory of change and evaluation theory was applied in this research. The dependent variable was sustainability of maternal health services and the independent variable is monitoring availability of blood which was defined by availability of blood, rate of maternal survival and blood data management. Data was coded, cleaned, verified and analyzed. The data was analyzed using Statistical Package for Social Sciences (SPSS) software. All the findings were presented in tables. The results showed that there is need to improve availability of blood on sustainability of maternal health services at QECH, Blantyre, Malawi. These findings provided an opportunity for future research to be carried out in the same field. The conclusion was that the hospital mostly had sufficient blood supply, most of the women give birth successfully after receiving blood and the hospital tried their best in managing database for blood. It was recommended that QECH management should make strategies in improving blood for emergencies, more staff in wards to be recruited and strategies for blood data management has to be very effective. Further research would be recommended on the influence of partnerships among stakeholders towards sustainability of maternal health services at QECH in Blantyre, Malawi.

DEFINITION OF TERMS

Availability of blood: Operationally defined, the number of blood pints in blood bank.

Blood data management: For the purpose of this study, handling of records of blood in laboratory.

Rate of maternal survival: Operationally defined, the percentage number of women who survives between pregnancy and child birth.

Sustainability of maternal health services: For the purpose of this study, maintaining well-being of women during pregnancy and after child birth.

LIST OF ABBREVIATIONS AND ACRONYMS

APHA : American Public Health Association

IFRC: International Federation of the Red Cross

MBTS : Malawi Blood Transfusion Services

MDGs : Millennium Development Goals

QECH: Queen Elizabeth Central Hospital

SD: Standard Deviation

SDGs: Sustainable Development Goals

SPSS: Statistical Package for the Social Sciences

UN: United Nations

UNFPA: The United Nations Fund for Population

UNICEF: United Nations Children's Fund

WHO: World Health Organization

CHAPTER ONE:

INTRODUCTION

1.1 Introduction

This research was carried out to assess monitoring availability of blood on sustainability of maternal health services at Queen Elizabeth central hospital in Malawi. The dependent variable of this study was sustainability of maternal health. While the independent variable was monitoring availability of blood and was defined by availability of blood, rate of maternal survival and blood data management. This chapter covered on the background of the study, statement of the problem, objective of the study, research question, significance of the study, scope of the study, delimitation of the study, assumptions, theoretical framework and conceptual framework.

1.2 Background of the study

Maternal health is the health of women during pregnancy, childbirth and postpartum period. Maternal health is important in avoiding preventable deaths among women and children. It also improves their health and wellbeing (APHA). Globally, someone in the world needs blood. In every country, surgery, trauma, severe anemia and complications of pregnancy are among the clinical conditions that demand blood transfusion (WHO, 2006). The pattern of blood usage is very different in countries where diagnostic and treatment options are more limited, with much greater proportion of transfusions being given to women with obstetric emergencies. Safe blood for saving mothers campaign increased awareness about the importance of timely access to blood is important to country's part approach for prevention of maternal death. World Health Organization (WHO) encourages all countries, national and international partners working on blood transfusion and maternal health to create activity plan about the need of timely access to safe blood in prevention of maternal death. (WHO, 2006).

The causes of maternal health problems that lead to maternal mortality and morbidity are hemorrhage, hypertension, abortion, embolism and sepsis. The main causes of maternal mortality are hemorrhage 27.1%

with confidence interval 19.9 to 36.2; more than 72.6% of death from hemorrhage was classified as postpartum hemorrhage. Hypertension consists of 14.0%. Abortion 7.9%, embolism 12.8% and sepsis 10.7% (Filippi et. al 2016). The global distribution of maternal deaths is influenced by the two regions, Sub-Saharan Africa and southern Asia. Hemorrhage accounted for 36.9% of death in northern Africa developed regions with 16.3 percent. Hypertensive disorders were the major cause of death in Latin America. Caribbean, accounting for 22.1 percent of all maternal death in the region. Postpartum hemorrhage is a major cause of maternal morbidity in the world. Postpartum hemorrhage is associated with anemia which can persist for several months after birth (Flippi et.al 2016).

About 295, 000 women died during and following pregnancy and childbirth in 2017. 94% of these death occurred in low resource setting and most could have been prevented. Maternal mortality rate was 11 per 100, 000 live birth in high income countries and while 462 per 100, 000 live birth in high income countries. Sub-Saharan Africa and southern Asia accounted for approximately 86% (254,000) of estimated global maternal death in 2017. Sub-Saharan Africa alone accounted for approximately two thirds (196,000) of maternal death, while southern Asia accounted for nearly on fifth (58,000). (WHO, 2017).

Access to timely delivery to safe and adequate blood available for transfusion was important in overcoming maternal health problems. In India, access to safe blood remains a major problem. Access to safe blood was one of the solutions to reduce maternal death (Sadasiven, 2017). Sub-Saharan Africa remained one of the regions with high maternal mortality rate. There were complications that occurred during pregnancy and child birth. Most of these deaths are preventable. One of the factors which contribute to these deaths were lack of adequate availability of blood supply (Henry et. al, 2018). Shortage of blood supply was the main cause of maternal death in Malawi. Maternal death would be avoided if health facilities were supplied with adequate blood supply which could save lives of mothers (Andsen, 2018).

Malawi was one of the countries that established a National Blood Transfusion Service according to WHO recommendations and guidelines (WHO, 1992). The Malawi Blood Transfusion Service (MBTS) was

established in 2003 and its head office is in Blantyre. The mandate of MBTS is to provide adequate supplies of safe blood and blood products to meet the needs of patients in all hospitals in Malawi. The MBTS works with all Central, District, and other hospitals in the public and private sector. The MBTS also works with College of Medicine, clinical laboratories, clinicians, and the Blood Donor Association of Malawi (BDAM). This MBTS works with various players in order to provide a safe and adequate blood supply to all those in need (MBTS, 2017).

Millions of people owe their lives to people who donate their blood freely and without any reward except the feeling of personal satisfaction about helping to save someone's life. Many die every day because they do not have access to safe blood when they need it. A significant number of deaths could be avoided if every hospital had access to a safe and adequate supply of this life saving resource (MBTS, 2017). In 2018, Mana news in Malawi stated that maternal death could be prevented if health facilities are supplied with enough blood which could save life. Total blood collected is not enough to meet the total need in Malawi. Several districts reported shortages of blood in 2013. There was an over-reliance on young blood donors and if many are not donating it means there would be more shortage of blood. Malawi lacked a robust policy to ensure sustainable availability of low risk blood donors and increased access to safe blood (Malawi Blood Services, 2016).

Malawi is divided into three regions; northern, southern and central. Malawi Blood Transfusion Service (MBTS) has three centers within those regions. Mzuzu Centre collects blood on its own and distributes blood to hospitals within Northern Region. Lilongwe Centre collects blood in the Central Region and distributes it to hospitals within Central Region. In the Southern Region there is O'dala Centre. The center collects blood and distributes it to hospitals within Southern Region. The study is about assessing blood availability at QECH in Blantyre, Malawi. QECH is located in southern region of Malawi and is the largest service and referral health facility in Malawi. It has more than 1,300 patients at any one time. According to 2008 population census, there are 5,876,84 in Southern Region (Benson & Todd, 2008).

1.2. 1 Sustainability of maternal health services

According to IFRC (2020) global agenda prioritizes to improve response to disaster and public global health security by promoting the establishment of safe and sustainable blood systems. Blood security is involved in delivery of one of the three UN millennium development goals to improve maternal health through national self-sufficiency in ensuring adequate supply of blood to meet domestic needs. (IFRC, 2020).

According to Grecuccioc (2017), world health organization promoted the development of National blood policy in 1975 to guarantee high standards of quality and safety in blood collection. Each country is responsible to ensure safe adequate and available blood supplies covering its national needs. Blood transfusion service is set up to manage and collect blood donations (Grecuccioc, 2017).

Smith (2014) in Sri lanka, world health organization suggested that there was need to involve, educate and empower communities to regularly and voluntarily donate blood to meet national need to save mothers.

UNFPA (2015) on a review of progress in maternal health in eastern countries, the counties were working on improving maternal health in line with millennium development goals. For a country to have improved maternal health, mothers had to attend antenatal care services, deliveries had to be attended by skilled professional, there had to be an emergency obstetric care to deal with complications, the service center had to be easily accessed, there had to be a good health care systems and financing maternal health as well as monitoring and evaluation of maternal health services (UNFPA, 2015).

Nimakoh et al (2016) in Ghana on progress and challenges in reducing maternal death, showed that Ghana had adopted various strategies in response to specific maternal health challenges. The national guidelines consist of strategies for the prevention and treatment of the major causes of maternal death in-line with internationally accepted standards. Ghana's ministry of health also actively promoted clinical and case audit of maternal deaths which helped to improve the quality of obstetric care and documentation (Nimakoh et al, 2016).

As the millennium development goals ended in 2015 with the coming up of Sustainable development goals (SDGs) for 2016-2030, there remains unfinished business for maternal health in sub-Saharan Africa. Statistics

from United Nations inter-agency estimates indicated that between 1990 to 2015, the global maternal mortality ratio declined by 44% from 385 deaths to 216 deaths per 100,000 live births. Although this was commendable, it was less than half the 5.5% annual rate that was needed to achieve the three quarters reduction in maternal mortality that was targeted for 2015 in millennium development goals (Lalipen et al, 2017). While every region in the world experienced declines in levels of maternal mortality between 1990-2015, levels in sub-Saharan Africa remains unacceptably high. According to world health organization in 2013, there were an estimated 289,000 deaths globally of which 62% occurred in sub-Saharan Africa had also the highest maternal mortality ratio of 510 deaths per 1,000 deaths (lalipen et al., 2017).

Maternal health is one of the major public health concerns in the world. In 2015, 303, 000 maternal death occurred worldwide and which it was avoidable. One of the major causes was lack of availability of blood for transfusion. So, in 2016, the global development community committed to the 2030 agenda for Sustainable Development Goal (SDG) number one on reducing maternal mortality (Yetmgeta et al., 2017).

Maternal mortality ratio was 634 maternal deaths per 100,000 live birth in 2015. These statistics showed that there is need for further reduction in maternal mortality in Malawi. Malawi is one of the poorest countries in sub-Saharan Africa and remains among worst in high maternal mortality rate despite the receipt of extensive amounts of overseas development funding (Kim et al., 2019).

1.2.2 Monitoring Availability of blood

According to Ruman et. al (2009) on maternal situation in India, shortfalls in supply of blood had an impact on women with pregnancy and delivery-related complications and with severe life threatening anemia. Worldwide, more than half a million women die each year during child birth or in the postpartum period. Over 90% of maternal deaths occurred in Asia and sub-Saharan Africa. Severe bleeding during delivery or after childbirth was the most common cause of maternal mortality. Therefore because of the unpredictable nature of postpartum bleeding, blood transfusion had been identified as one of the eight key-life saving functions that should be available in health care facilities providing comprehensive emergency obstetric care. Access to a safe and sufficient blood supply could help prevent deaths of significant number of mothers. As per estimates,

globally each year up to 150, 0000 pregnancy related deaths could be avoided through access to safe blood (Rumen et. al, 2009).

According to Sonoo et al. (2017), in Mauritius, there was successful in blood transfusion as a result of strong political commitment leading to an adequate investment and good governance. The government adhere to world health organization principles and priorities for keeping blood related issues among its health strategic goals.

Mbuthia et al (2017) in Kenya concluded that the implementation of quality management systems in hospital blood transfusion service can be improved through commitment from senior management. The senior management teams provide the necessary resources for employing key staff and establish and empower hospital transfusion committees to guide the blood transfusion services. This helped in reducing blood wastage and maximizes available blood components to benefit patients.

Dhingra (2016) in Switzerland stated that availability of blood remains a major concern in many countries ensuring sufficient blood. The challenges were lack of clear national policy and government commitment, increasing needs and demand of blood due to change in population demographics. Inadequate supply of blood, decreasing donor base data and failure to identify blood as national systems (Dhingra et al, 2013).

Monitoring availability of blood supply is there to minimize blood shortages. Monitoring determine whether the current blood supply is sufficient to meet the demand. So, this helps in planning for success depending on adequacy of blood supply when defined and measured (Wallace, 2003).

1.2.3 Availability of blood

Blood availability is an important resource for every health care system with often limited supply in low income and middle-income countries (Custer et al, 2017). Africa accounted more maternal death globally in 2013. About 289, 000 women died worldwide during pregnancy and child birth due to lack of blood availability and of those death 62% occurred in sub-Saharan Africa. Therefore, African leaders placed maternal health on front burner to reduce maternal health (Ighobor., 2014).

According to Kamwaza (2019), health system in Malawi was facing 50% blood deficit in Malawi. Malawi blood transfusion service in conjunction with Malawi Red Cross, they only collected 60,000 units of blood instead of 120000 pints of blood per year which did not meet the need for hospital supply. Low blood banks affect health delivery; women also are in need of blood during child birth because of blood loss (Kamwaza, 2019).

1.2.4 Rate of maternal survival

In Sub-Saharan Africa the lifetime risk of a woman dying in labour is 1 in 39; in the developed world it is around 1 in 5,000. 300,000 women die each year during pregnancy. In the most affected countries, it is estimated that up to a third or more of these deaths result from severe bleeding for which blood transfusion could be an effective intervention (WHO, 2014). Mgawadere et al (2017) on factors associated with maternal mortality in Malawi, the most cause of maternal death in Malawi was haemorrhage. There was a lack of blood in blood bank to treat haemorrhage. 96.8% of all maternal death was associated with lack of supplies like availability of blood supply for transfusion. The researcher suggested that there was need in improving availability and quality of emergency for maternal health care services to prevent maternal death.

1.2.5 Blood Data management

Blood data management is designed to improve the management and usage of blood in hospitals. It provides stock management aspects of a hospital blood bank laboratory (Yuan et.al, 2018). Using hospital blood data, it helps to come up with the results on presenting the blood management situation (Clark et.al.2010).

According to Mpuntsha & Reddy (2013) on blood supply management experience and recommendation from Africa, there was a need for Africa to understand challenges of achieving adequate supply of blood. This could be achieved with good system and adequate resources. Blood supply data system reports were used to analyze and manage blood collection and distribution in South Africa blood service. The results showed that data systems in hospitals are not well established accessible to share with the blood services. The conclusion shows

that there is need to share information across Africa in order to have a good system (Mpuntsha & Reddy ,2013).

1.3 Statement of the problem

According to Malawi Blood policy, Malawi Blood transfusion service (MBTS) is responsible to provide adequate blood supplies for all patients (Malawi ministry of health, 2012). But MBTS has not been able to supply adequate blood to hospitals. Patients at QECH worry that not all of them are receiving blood due to inadequate blood supply. QECH is a big referral hospital in Malawi; it accommodates a large number of patients from all over Malawi. QECH has 1200 beds and sometimes hospital ward floors are used to accommodate patients (Meki, 2018). According to the study conducted by Machira & Pamuleni (2017), the maternal mortality in Malawi remains major public challenge and inadequate blood supply was one of the elements that contribute to maternal mortality. The study on maternal mortality by Andie (2011) showed that lack of enough blood supplies causes maternal death. Despite the Malawi blood policy, MBTS has not been able to supply adequate blood as patients worry that not all of them receives blood when in need. Therefore, this study aimed to seek to identify the gaps in blood availability to ensure sustainability of maternal health at QECH in Blantyre, Malawi.

1.4 Objective of the study

The main objective of this study was to investigate blood availability at Queen Elizabeth Central Hospital (QECH) in Blantyre Malawi.

1.4.1 General objective

The general objective of the study was to assess blood availability at Queen Elizabeth Central Hospital in Blantyre, Malawi.

1.4.1 Specific objective

The study addressed the following specific objective;

1. To examine the extent to which blood availability influence sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi

2. To assess how maternal survival rate influence sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi
3. To establish the extent to which blood data management influence sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi

1.5 Research Question

1. To what extent does blood availability influence sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi?
2. How does maternal survival rate influence sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi?
3. To what extent does maternal survival rate influence sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi?

1.6 Significance of the study

It was hoped for that the results of this study would give enough information to Queen Elizabeth Central Hospital (QECH) and Malawi Ministry of Health towards maternal health. Malawi Blood Transfusion Service will also benefit from the results of this research. The gaps in this research would be of help to other researchers or scholars who are interested in this area to do additional research. The results of this research would also be of help to QECH on how to manage blood supplies of the hospital blood bank.

1.7 Scope of the study

This study covered the hospital in Blantyre limited to QECH only. The aim of the study was to monitor availability of blood on sustainability of maternal health services at QECH in Blantyre Malawi. The data was gathered based on availability of blood, maternal survival rate and blood data management. The reason for not exceeding to all hospitals in Blantyre was that it is the biggest referral hospital in Malawi and it accommodates

a large number of patients from all over Malawi. The researcher also considered the resources in terms of time and budget constraints.

1.8 Delimitation of the study

Delimitation of the study is characteristics that limit the scope and describe the boundaries of the study (Suresh, 2015). This study was delimited to QECH in Blantyre, Malawi only. QECH is the largest referral hospital in Malawi and receives many patients. The study only focused on the laboratory staff at QECH because they are the ones involved in collecting blood from Malawi Blood transfusion service and issuing of blood to various departmental wards in the hospital.

1.9 Limitation of the study

This study encountered some challenges. The respondents to questionnaires were not available in time of data collection because of working shift hours but the researcher scheduled different days in order to reach all respondents. Some of the respondents were not willing to give out information but the researcher went through the lab manager to seek permission in order to be allowed to collect data.

1.10 Assumptions

The researcher assumed that the respondents will answer all the questions truthfully. The researcher also assumed that the questionnaire to be used for data collection was valid and also the respondents would trust the researcher that information would be confidential. During data collection, each respondent was given the questionnaire and after responding they were given back to the researcher and were kept confidentially. After the research project, the researcher destroyed the questioners.

2.2. Theoretical Review

A theoretical review contains concepts and with their definitions and reference to relevant existing theory that is used for a specific study (Trochim & William, 2006).

1.11 Theory of change

The evaluation theorist Carol Weiss (1995) defined theory of change as the set of assumptions and steps in program activities and outcomes that occur. He declared that stakeholders should be specific about the theory of change to be guided by their work and she suggested that this would improve their plans and the ability to claim credit for outcomes that were predicted in their theory. The use of planning and evaluation using theory of change had increased among government agencies, international non-governmental organisations, the United Nations and philanthropists (Weiss, 1995). The program theory can be represented graphically in the form of a logic model that starts from inputs, outputs and outcomes.

Dubrino (2012) described a logic model in terms of causation, which presents what the program will do and should accomplish. From this background of project theories is where project specifications lie to ensure that all components are well implemented to facilitate project performance. Some of the gains used from theory of change include; development of mutual understanding of the work, strengthening clarity, effectiveness and focus on the programs, providing an outline for monitoring and evaluation and leaning throughout the program cycle. Additional gains include, identifying strategic partners and supporting organizational development in line with core priorities by using theory to communicate task clearly to others.

This research will be guided by theory of change. The theory of change was relevant to this study because it brought together different variables that were investigated during the study. The theory of change brought out the causal relationship in a logical manner in order on sustainability of maternal health services. In particular, the theory of change was used to monitor availability of blood to ensure sustainability of maternal health services at QECH, IN Blantyre, Malawi.

1.12 Conceptual framework

A conceptual framework is used to illustrate what you expect to find through your research, including how the variables you are considering might relate to each other (Swaen, 2015). The Independent variable was

monitoring availability of blood supply and was defined by availability of blood, rate of maternal survival and blood data management. The dependent variable was sustainability of maternal health services.

Independent Variable (IV)

Dependent Variable (DV)

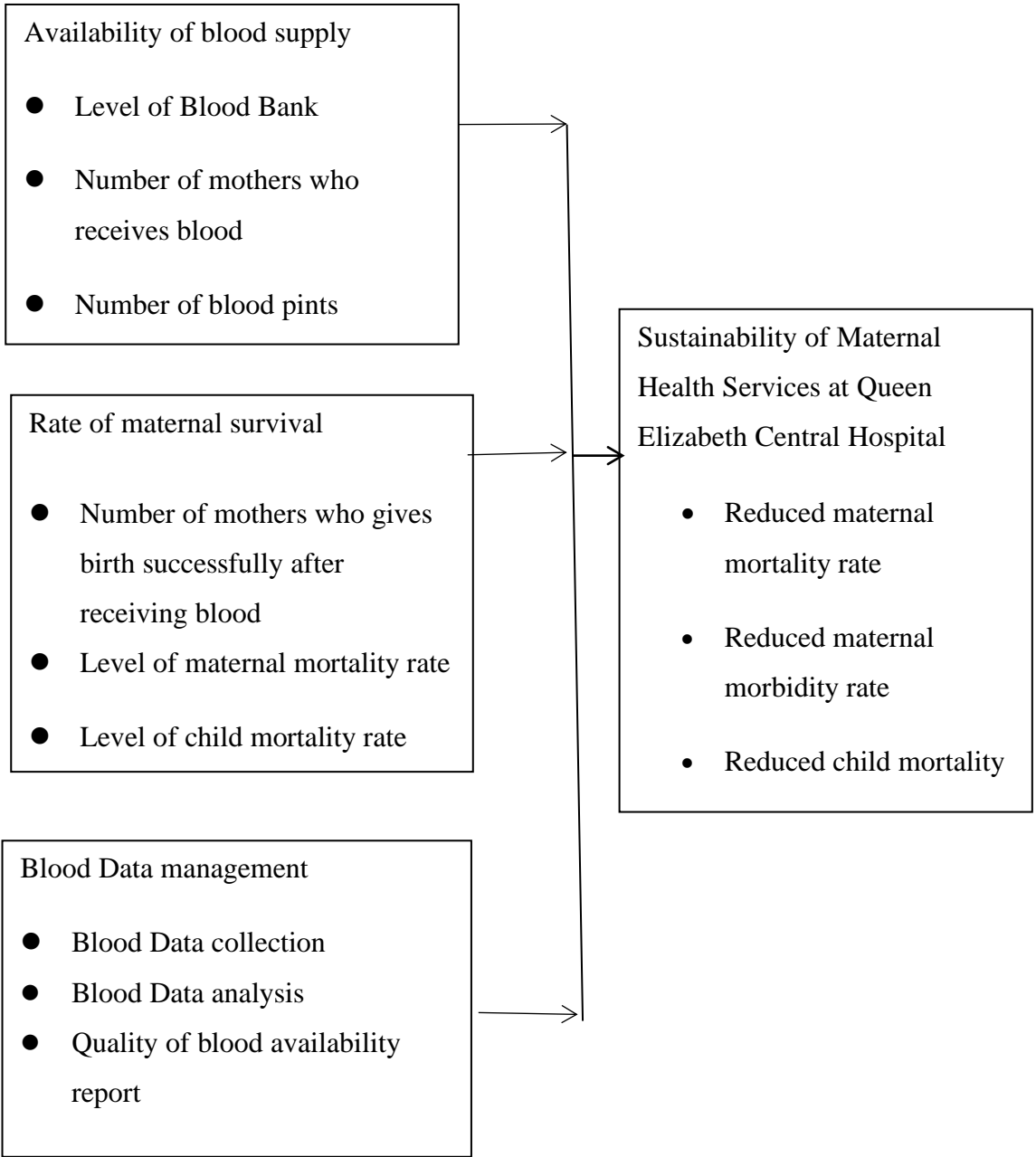


Figure 1.1 Conceptual Framework: Source Researcher (2020)

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

Literature review is a search and evaluation of the available literature in chosen topic area (Bolderston, 2008). The aim of the study was to assess monitoring availability of blood on sustainability of maternal health services at Queen Elizabeth Central hospital in Blantyre, Malawi. This chapter consists of theoretical review, empirical review, summary of literature review and knowledge gap.

2.2 Empirical Review

Empirical review consists of results of other studies concerning a research topic (Trochim, 2006). It is based on actual experience rather than from a theory or belief.

2.2.1 Sustainability of Maternal Health Services

Maternal health refers to the health of women during pregnancy, childbirth and the first six weeks after child birth (WHO, 2018). Globally, counties are working out to improve the health of mothers. According to the study conducted by Chapotera et al (2008) is stated that in sub-Saharan Africa, where blood supply is critically inadequate, severe hemorrhage is a leading cause of maternal deaths. The aim of this study was to estimate the impact of lack of blood shortage maternal deaths and identifying reasons and potential solutions. Reasons included no affordable ability of blood, lack of blood donors, unwillingness of relatives to donate and inadequate supplies and transport. Data was obtained from MEDLINE and African Index Medicus electronic databases, and maternal health and blood transfusion websites of the world health organization.

Ighober, (2013) on improving maternal health in Africa says women died due to shortage of blood during child birth. African leaders protested maternal health on millennium development goal number 5 in reduction of maternal mortality by 75%.

UNICEF (2006) research on combating maternal mortality in India, says in India women died every four and a half minutes during child birth. UNICEF introduced a strategy to save mothers lives which was called

MAPEDIR (Maternal and Perinatal Death Inquiry and Response). The project was funded by British government and it was developed and implemented with technical assistance from Johns Hopkins University. Interviews were conducted with family members in high mortality districts in India to gain firsthand information with the tragedy of maternal death. The results showed that one causes of maternal death in India was lack of availability of blood. The aim of MADIR was not only to identify causes of maternal death but to act upon them and to empower local communities to examine quality of care they obtain and seek for good quality services.

Even though there have been efforts to improve maternal health in Malawi, maternal mortality rates remain very high. Therefore, all United Nations member states, including Malawi, have agreed to aim for universal health coverage by year 2030 in line with sustainable development goals. Malawi is a leader in Sub-Saharan Africa on implementation of evidence-based policies to support maternal health even though there is significant improvement; there maternal mortality is still high in Malawi. One of the targets for SDG goal number 3 is to decrease the global maternal mortality ratio to below 70 per 100 000 live births. Estimated maternal mortality ratios globally is at 439 maternal deaths per 100000 live births. However, there is need to improve maternal health barriers that limit access to quality maternal health services and must be identified and addressed at all levels of health system (Kazanga et al. 2018).

2.2.2 Availability of Blood on Sustainability of Maternal Health Services

According to the research on reducing maternal mortality by Yetmgeta et al (2018) in Netherlands the results showed that one quarter of all maternal deaths could be avoided by provision of safe blood. Data collected indicated that access and availability to safe blood remained a challenge. Global development community's agenda for sustainable development goals set a target of reducing maternal mortality towards improving timely access and availability. It is important to encourage ministry of health in countries with high rates of maternal mortality to be serious with improving timely availability and access to blood transfusion by strengthening partnerships between maternal health programs and blood transfusion services in contributing to achieve Sustainable developing goals in reducing maternal mortality (Yetmgeta et al. 2018).

A study of blood transfusion services in Maharashtra and Gajarat states, India (Mvalankar et al, 2018), says the existing blood banking in Maharashtra and Gajarat states was poor because possible estimates for the need supply of blood for emergencies in maternal health was poor. Data was collected on reports and other literature were analyzed of the organizational structure and process of blood banking services at state blood transfusion council in Maharashtra and Gajarat. Interviews with officials of the council were also conducted. Schlein (2014) says that to make blood supplies available will avoid maternal deaths. In developing countries especially sub-Saharan African and closely one third in south Asia about 800 women die each day from complications related to child birth. Urgent access to safe blood supplies for transfusion is crucial to saving the lives of women when they have severe bleeding during pregnancy, delivery and after child birth (Schlein, 2014).

According to Pitma et al. (2004) on Investments in blood improve availability of blood to underserved areas in sub-Saharan African country; there was support from PEPFAR (President's Emergency Plan for AIDS Relief) in collection of blood and the results showed that there was an improvement. Data was collected on all blood units collected in Namibia and was issued to the hospitals from January, 2003 to December, 2011 were analyzed. The study conducted by Andrea (2011) on maternal mortality at Muhimbili national hospital in Dar-e-salaam, Tanzania showed that one of the causes of maternal death was lack of enough blood supplies. It was a retrospective review of all maternal death records from January to December, 2011.

A research on availability and quality of emergency obstetric care in Gambia's main referral hospital: women user's testimonies (Cham et al.2009). Data was collected on group of 30 women on hospital admission with different obstetric conditions. Interviews with women were carried out after two weeks of discharge in their homes. The results showed that health system had inadequacy of lack of blood for transfusion. This was because of inadequate services funding for maternal health services. Lack of blood in Malawi contributes to maternal death. The number of maternal deaths was estimated using hospital-based surveys and population surveys for 18 hospitals in southern region of Malawi (Geubbels, 2006).

2.2.3 Rate of maternal survival on sustainability of maternal health services

Research on maternal Health in India: A case study (Khati et al.2018) says India accounted about a quarter of maternal death in the world. The aim of India was to lower maternal mortality to less than 100 per 100,000 live births. Different methods were used in collecting important information like review of literature from published and unpublished reports of government and nongovernmental agencies, secondary analysed data from management information system of national programmes and from states, interviews with stakeholders. Data was also obtained from national family health services and district level household surveys. Haemorrhage due to shortage of availability of blood was one of major causes of maternal death.

According to the study conducted by Flippi, (2014) on causes of maternal mortality says also that one causes the death of women is insufficient blood supply for transfusion. Data was collected using database on world health organisation. Sub-Saharan African countries account 66% of maternal death in the world. In 2015, Lilongwe news stated that nurses working at Kamuzu central hospital in Malawi confessed that there as a crisis for lack of blood for transfusion to give patients in need and some of them died due to shortage of blood.

Malawi Blood Transfusion Service (MBTS) has been there to provide adequate supply of blood since 2004. But the study conducted by Kongnyuy et.al (2008) showed that MBTS was not able to provide total amount of required by hospitals. Another study conducted by Andsen (2018) showed that most maternal death in Malawi is due to lack of adequate blood supplies in most health facilities. But according to Mana news (2018) there has been a problem about maternal death due to lack of adequate blood supplies in most health facilities. Therefore, this study assessed if there was enough blood supply for childbearing women which affects maternal health at QECH, Malawi (Mana,2018).

2.2.4 Blood data management on sustainability of maternal health services

Blood information management helped in reducing delays in blood transfusion for emergency obstetric women in Bangladesh. Blood data management is important in improving and managing of usage of blood. It

comprises of stock management aspects of hospital laboratory blood bank. There was effectiveness of blood information management. Using this system, it helped to minimize delays in time requested for blood collection and time of receiving blood in the ward (Rahnan et. al, 2017).

The research on data driven approach to patient blood management., the results showed blood data management helps in monitoring up to date blood usage in hospital. Auditing the data helped to analyse and track usage. With this data management, it helped in improving the hospital performance (Cohn et.al,2014). A study conducted by Brensnick (2017) on big data analytic reduce hospital blood usage in Ubana, the researcher observed that the use of data is important in assessing blood utilization as well as transfusion rates. Data can be used in evaluating utilization and outcome performance. It was recommended to use data which can provide comparative benchmarks that systems cause user to evaluate blood utilization outcomes

2.5 Summary of the reviewed literature

This chapter discussed on the theory of change and the evaluation theorists such as Michael Quinn Patton and Carol Weiss. The theory does define the components required to achieve change in the long-term such as outcomes, results and accomplishments. In the application to this theory, stakeholders valued it because they were able to comprehend the vision of the long-term goals, how they were reached and the measurement of progress along the way. In implementing theory of change, these stakeholders gathered together and shares solutions involving consultancies and expertise to help implement policies and strategies to reach out the outcome goal

The variables had also been discussed in this chapter which included; availability of blood, rate of maternal survival and blood data management. Each plays a role to ensure sustainability of maternal health at QECH in Blantyre, Malawi.

2.6 Knowledge Gap

From literature review, it has been clear that Malawi faced with challenges in maternal health due to shortage of blood supply. In Malawi there has been shortage of blood. Women are vulnerable to death due to shortage of blood (Mgawadere et al. (2017).

Countries are working out towards improvement of maternal health and blood transfusion is another key in improvement of maternal health. Some research has shown that blood supply has improved maternal health in some countries. Blood availability has an impact in improvement of maternal health, but there are challenges in accessing blood. Blood availability is very important and there is a challenge in African countries about blood availability.

With reference to WHO fact sheet, 2017, it stated that, Blood transfusion saves lives and improves health, but many patients requiring transfusion do not have timely access to safe blood. There is a problem that Malawi Blood Transfusion Service lack up-to-date and publicly available information on the amount of blood units required to meet the total need (Malawi Blood Service, 2016). Studies in Malawi on maternal health, shows that literature gap on monitoring availability of blood supply on sustainability of maternal health. Therefore, this study focused on monitoring availability of blood on sustainability of maternal health services at Queen Elizabeth Central in Blantyre, Malawi.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter briefly explains on Research design, Research site and rationale, target population, determination of study sample, data collection procedure, research instruments, data analysis and presentation as well as ethical consideration.

3.2 Research Design

Research design involves set of methods and procedures for collecting and analysing measures of the variables specified in research problem. This study used descriptive survey research design that employed quantitative approaches. Descriptive survey research design is a method involves observing and describing behaviour of a subject without influencing it in anyway (Trochim,2006). The descriptive survey research design was used to establish the assessment of monitoring and evaluation practice to ensure blood availability for maternal health service at Queen Elizabeth Central Hospital in Blantyre, Malawi.

3.3 Research Site and Rationale

This study was conducted at Queen Elizabeth Central Hospital in Blantyre, Malawi (QECH). QECH is a referral hospital in Malawi and it consists of patients from every region of Malawi. According to Malawi blood transfusion, QECH has the highest demand for blood for transfusion.

3.4 Target Population

The population is the total group of individuals from which the sample might be drawn (Saul, 2014). The target population of this study were all laboratory staff at Queen Elizabeth Central Hospital because they all deal with blood management. The population size for the laboratory staff at QECH was 45.

3.5. Sampling Procedure

The researcher used purposive sampling method for selecting participants. Purposive sampling method was preferred because it is less time consuming and more economical. The participants were laboratory staff at QECH in Blantyre, Malawi.

3.6 Sample Size

A sample is a percentage of the total population in statistics (Bartlett et al, 2001). This study will use census approach because the population size is small. Census approach is the method where by all members of the population are studied (Behrisch, 2016). This research used census approach in selecting sample size because the population size was too small. Therefore, 45 laboratory staff at Queen Elizabeth Central Hospital were targeted answer the questionnaires regarding to blood availability for maternal health at Queen Elizabeth Central Hospital, but only 39 participated in this study.

3.7 Data Collection Procedure

The study used closed ended questionnaires as instrument of data collection. The respondents were required to fill in questionnaire on their own without the researcher's help. The respondents were all laboratory staff at QECH IN Blantyre Malawi because all Laboratory staff are engaged in blood data management.

3.8 Research Instruments

These are fact finding strategies. They are tools for data collection. This study used closed ended questionnaire to collect data. The questionnaires administered consisted of the following variables; availability of blood, rate of maternal survival and blood data management. The questionnaires were formulated in the form of Likert scales to systematically evaluate and interpret data (Rahi, 2017). So, the respondent's answered the questionnaire concerning the assessment of blood availability on maternal health at Queen Elizabeth central hospital.

3.8.1 Piloting of Research Instruments

The questionnaires were piloted at Zomba central hospital in Laboratory department. The questionnaires were tested to check if they are able to capture the required information on blood availability. The respondents were 10% of sample size of the research study. Therefore, five Laboratory staff at Zomba central hospital respond the questionnaire to assess if they are relevant to the study.

3.8.2 Reliability of Research Instruments

Reliability is the degree of the consistency of an instrument in providing the same results when used the same conditions and similar subjects (Shuttle worth, 2008). Cronbach's α of 0.70 was used to measure the reliability of the questionnaire. The reliability testing was done using SPSS and the results are presented below.

Table 3.1 Shows the Reliability Testing of the Research Questionnaire

| Variable | No. of items | Cronbach's Alpha Coefficient (α) |
|-----------------------------------|--------------|---|
| Availability of blood | 5 | 0.236 |
| Rate of maternal survival | 5 | 0.928 |
| Blood data management | 5 | 0.872 |
| Sustainability of maternal health | 5 | 0.957 |
| | 20 | 0.748 |

The results for the reliability testing from the table above shows that Cronbach alpha was 0.0748 which was higher than the recommended 0.70. Therefore, the research questionnaire was reliable for the study.

3.8.3 Validity of Findings

Validity determines the strength of the conclusion or whether the research truly measures what it was intended to measure (Long & Rigour, 2000). The researcher used content validity where by the research instrument was questionnaire, which was presented to the supervisor and other expertise within monitoring and evaluation department of the university to check whether the questionnaire was aligned to the objective of the study.

3.9 Data Analysis and Presentation

Data collected went through coding, cleaning, verifying then ready for analysis. Statistical package for social sciences (SPSS) was used as software to lay in numerical data collected from research findings for analysis and the findings were presented in tables. SPSS software was used because it is user friendly and analyses multi-response data in a questionnaire. The researcher used Pearson correlation coefficient to determine distribution relationship between the independent variables and the dependent variable.

3.10 Ethical Consideration

Permission to conduct the study was issued from Africa Nazarene University to QECH to allow the researcher to collect data for the study. Confidentiality was being maintained in-order to get accurate and reliable information. The findings would not be used anywhere without the concept of involved institution.

CHAPTER FOUR:

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1. Introduction

This chapter summaries results of findings based on data collected and is organized into variables based on objectives of the study. The objectives of the study were to assess blood availability at Queen Elizabeth Central Hospital in Blantyre, Malawi. To examine on the availability of blood to ensure sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi. To assess the maternal survival rate to ensure sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi. To establish on blood data management to ensure sustainability of maternal health services at Queen Elizabeth central hospital, Blantyre, Malawi. In addition, 39 respondents were able to participate in this study. The researcher used purposive sampling to select the sample population of the respondents.

4.2. The Response Rate

In evaluating the response rate, the findings showed that 39 respondents were able to participate and were issued with questionnaires using purposive sampling method. The response rate was 80% because out of 45 laboratory staff, only 39 were able to fill the questionnaires.

4.3. Demographic Characteristics

Demographic information was important for the researcher to understand how respondents were affected by gender age group. Such description was considered important in providing a better understanding of the respondents included in this study. Therefore, the demographic characteristics gave a good foundation for detailed discussions of the results towards sustainability of maternal health.

4.3.1 Gender of the Respondents

The respondents at QECH in Blantyre, Malawi who participated in the research study consisted of both female and male respondents.

Table 4.1 Gender of the Respondents

| Gender | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------|-----------|---------|---------------|--------------------|
| Male | | 76.9 | 76.9 | 76.9 |
| Female | | 23.1 | 23.1 | 100.0 |
| Total | | 100.0 | 100.0 | |

From the findings in table 4.1 displayed above, it was established that 76.9% of the respondents were male and 23.1% were female. Therefore, the results show that majority of the laboratory staff at QECH were male who are energetic to work towards sustainability of maternal health services at QECH, Blantyre, Malawi.

4.3.2 Age Group of the Respondents

According to the findings, the respondents at QECH laboratory who participated in the research study consisted of female and male respondents. The table 4.2 below indicated the percentages of the female and male respondents by age group.

Table 4.2 The Percentages of Female and Male Respondents by Age Group

| Age Group | Frequency | Percent | Valid Percent | Cumulative Percent |
|-----------|-----------|---------|---------------|--------------------|
| Below 20 | 2 | 5.1 | 5.1 | 5.1 |
| 20-30 | 23 | 59.0 | 59.0 | 64.1 |
| 31-35 | 9 | 23.1 | 23.1 | 87.2 |
| Above 35 | 5 | 12.8 | 12.8 | 100.0 |
| Total | 39 | 100.0 | 100.0 | |

Table 4.2, based on age group of the respondents, 20-30 years presented 59%, followed by 31-35, presenting 23.1%. above 35 years presented 12.8 and below 20 presenting 5.1%. this shows that most of the respondents were fresh and active to work towards sustainability of maternal health services at QECH, Blantyre, Malawi.

4.4. Data Analysis and Presentation

4.4.1. The Influence of Availability of Blood on Maternal Health Services at QECH, Blantyre, Malawi

The first objective sought to answer the first question how does availability of blood influences sustainability of maternal health services at QECH, Blantyre, Malawi. Table 4.4 below shows that the questionnaire illustrates the responses in terms of Likert scale of agreement in form of percentages. The findings from the table are explained below.

Table 4.3 shows the influence of availability of blood on maternal health services.

| Statement | SD | D | N | A | SA | Mean | SD | |
|--|-----------|----------|----------|----------|-----------|-------------|--------------|--|
| Hospital blood bank have sufficient blood supply | 1(2.6) | | 1(2.60) | 36(92.3) | 1(2.6) | 3.92 | 0.532 | |
| Mothers receives blood when needed | 2 (5.10) | 3(7.7) | 14(35.9) | 12(30.8) | 8(20.5) | 3.54 | 1.072 | |
| There are blood pints available for emergencies | 1 (2.60) | 1(2.60) | 7(17.9) | 29(14.4) | 1(2.6) | 3.72 | 0.686 | |
| Satisfied with number of blood pints collected from MBTS | 1 (2.60) | 2(5.1) | | 35(89.7) | 1(2.6) | 3.85 | 0.67 | |
| Have a large storage capacity for storing blood pints | | | | 3 (7.7) | 36(92.30) | 4.92 | 0.27 | |
| Composite Mean and Standard | | | | | | | | |
| Deviation | | | | | | 3.99 | 0.646 | |

Five statements were developed to measure the extent to which blood availability influence sustainability of maternal health services at QECH, Blantyre, Malawi. Statement (1) hospital blood bank that have a sufficient blood supply, out of 39 respondents, 1(2.6%) strongly agreed, 36(92.3%) agreed, 1 (2.6%) neutral while 1(2.6%) strongly disagreed. This finding shows that 37(94.9%) of the respondents agreed with the statement, 1(2.6%) disagreed with the statement, while 1(2.6%) were neutral.

This item had a mean of 3.92 and a standard deviation of 0.532 which is lower than composite mean of 3.99 with standard deviation 0.646, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (2) mothers receives blood when needed, 8(20.50% strongly agreed, 12(30.8%) agreed, 14(35.90%) were neutral, 3 (7.70%) disagreed and 2(5.10%) strongly disagreed. This finding shows that 20(51.3%) agreed with the statement, 5(12.8%) disagreed and 14(35.90%) were neutral. This item had a mean of 3.54 and a standard deviation of 1.072 which is lower than composite mean of 3.99 with standard deviation 0.646, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (3) there are blood pints available for emergencies, 1(2.60%) strongly agreed, 29(14.4%) agreed, 7(17.90%) were neutral, 1(2.6%), disagreed and 1(2.6%) strongly disagreed. This finding shows that 30(32.30%) agreed with the statement, 5(6.2%) disagreed and 7(17.90%) were neutral. This item had a mean of 3.72 and a standard deviation of 0.686 which is lower than composite mean of 3.99 with standard deviation 0.646, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (4) satisfied with blood pints collected from MBTS, 1(2.60) strongly agreed, 35(89.7%) agreed, 2(5.10%) disagreed and 2(2.6%) strongly disagreed. This result shows that 36(92.30%) agreed and 3(7.70%) disagreed with the statement. This item had a mean of 3.85 and a standard deviation of 0.67 which is lower than composite mean of 3.99 with standard deviation 0.646, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (5) have a large capacity of storing blood pints, 36(92.3%) strongly agreed and 3(7.7%) agreed. This shows that 39(100%) of all the respondents agreed to the statement. This item had a mean of 4.92 and a standard deviation of 0.27 which is higher than composite mean of 3.99 with standard deviation 0.646, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

4.4.2. The Influence of Rate of Maternal Survival on Maternal Health Services at QECH, Blantyre, Malawi

The second objective sought to answer the question of how does rate of maternal survival influences sustainability of maternal health services at QECH, Blantyre, Malawi. Table 4.4 shows the questionnaire that explains the response in terms of Likert scale of agreement in form of percentages. The findings from the table illustrated below

Table 4.4 Shows *The Influence of rate of maternal survival on maternal health*

| Statement | SD | D | N | A | SA | Mean | SD |
|---|----|---|----------|----------|---------|-------------|-------------|
| Mothers give birth successfully after receiving blood | | | 1(2.6) | 37(94.8) | 1(2.6) | 4.00 | 0.229 |
| Level of maternal mortality is low | | | 3(7.7) | 33(84.6) | 3(7.7) | 4.00 | 0.397 |
| Level of child mortality is low | | | 2 (5.1) | 31(79.5) | 6(15.4) | 4.10 | 0.447 |
| Emergencies are treated within time | | | 2 (5.1) | 36(92.3) | 1(2.6) | 3.97 | 0.28 |
| There are enough staff in ward | | | 12(30.8) | 27(69.2) | | 3.69 | 0.468 |
| Composite mean and standard deviation | | | | | | 3.95 | 0.36 |

Five statements were developed to measure the extent to which rate of maternal survival influence sustainability of maternal health services at QECH, Blantyre, Malawi. Statement (1) mothers give birth successfully after receiving blood, out of 39 respondents, 1(2.6%) strongly agreed, 37(94.8%) agreed and 1 (2.6%) were neutral. This finding shows that 38(97.8%) of the respondents agreed with the statement while 1(2.6%) were neutral. This item had a mean of 4.0 and a standard deviation of 0.229 which is higher than

mean of 3.99 with standard deviation 0.646, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (2) level of maternal mortality is low, 3(7.7%) strongly agreed, 33(84.6%) agreed and 3(7.7%) held a neutral opinion. This finding shows that 36(92.3%) agreed with the statement and 3(7.7%) were neutral. This item had a mean of 4.0 and a standard deviation of 0.397 which is higher than composite mean of 3.99 with standard deviation 0.646, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (3) child mortality is low, 6(15.5%) strongly agreed, 31(79.5%) agreed and 2(5.1%) held a neutral opinion. This finding shows that 37(95.0%) agreed with the statement and 2(5.1%) were neutral. This item had a mean of 4.10 and a standard deviation of 0.447 which is higher than composite mean of 3.99 with standard deviation 0.646, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (4) emergencies are treated within time, 1(2.6%) strongly agreed, 36(92.3%) agreed and 2(5.1%) were neutral. This finding shows that 36(92.3%) agreed with the statement and 3(7.7%) were neutral. This finding shows that 37(94.9%) agreed with the statement and 3(7.7%) were neutral. This item had a mean of 3.97 and a standard deviation of 0.28 which is higher than composite mean of 3.99 with standard deviation 0.646, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (5) there are enough staff in wards, 27(69.2%) agreed and 12(30.8%) held a neutral opinion. This item had a mean of 3.69 and a standard deviation of 0.468 which is lower than composite mean of 3.99 with standard deviation 0.646, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi.

4.4.3. The Influence of Blood data management on Maternal Health Services at QECH, Blantyre, Malawi

The third objective sought to answer the question of how does blood data management influence sustainability of maternal health at QECH, Blantyre, Malawi. Table 4.4 below shows the questionnaire that illustrates the response in terms of the Likert scale of agreement in the form of percentages. The findings from the table are explained below.

Table 4.5 Shows the influence of blood data management on sustainability of maternal health services at QECH, Blantyre Malawi

| Statement | SD | D | N | A | SA | Mean | SD |
|--|----|--------|---------|----------|----------|-------------|-------------|
| Data for blood pints in stock and issued in ward is recorded | | | 3(7.7) | 22(56.4) | 14(35.9) | 4.28 | 0.605 |
| Recorded data is analysed | | | 8(20.5) | 17(43.6) | 14(35.9) | 4.15 | 0.745 |
| Reports for blood data analysed are stored | | | 7(17.9) | 17(43.6) | 15(38.5) | 4.21 | 0.732 |
| Reports for blood data helps in decision making | | 1(2.6) | 2(5.1) | 32(82.1) | 4(10.2) | 4.00 | 0.513 |
| Strategies set helps in improving availability of blood | | | 1(2.6) | 37(94.8) | 1(2.6) | 4.00 | 0.229 |
| Overall Mean and Standard deviation | | | | | | 4.13 | 0.56 |

The table 4.5 above indicates the response given by respondents in assessing the influence of blood data management on maternal health services at QECH, Blantyre Malawi. Five statements were developed to measure the extent to which blood data influence sustainability of maternal health services at QECH, Blantyre, Malawi. Statement (1) data for blood pints in stock and issued in ward is recorded, out of 39 respondents, 14(35.9%) strongly agreed, 22(56.4%) agreed and 3(7.7%) were neutral. This finding shows that 36(92.3%) of the respondents agreed with the statement while 3(7.7%) were neutral. This item had a mean of 4.28 and a standard deviation of 0.605 which is higher than composite mean of 4.13 with standard deviation 0.56, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (2) recorded data is analysed, 14(35.9%) strongly agreed, 17(43.6) and 8(20.5%) held a neutral opinion. This finding shows that 31(79.5%) of the respondents agreed with the statement while 8(20.5%) were neutral. This item had a mean of 4.15 and a standard deviation of 0.745 which is higher than composite mean of 4.13 with standard deviation 0.56, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (3) reports for data analysed are stored, 15(38.5%) strongly agreed, 17(43.6) agreed, while 7(17.9%) held a neutral opinion. This finding shows that 32(82.1%) of the respondents agreed with the statement while 7(17.9%) were neutral. This item had a mean of 4.21 and a standard deviation of 0.732 which is higher than composite mean of 4.13 with standard deviation 0.56, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (4) reports for blood data helps in decision making, 4(10.2%) strongly agreed, 32(82.1%) agreed, 2(5.1%) were neutral and 1(2.6%) strongly disagreed. This finding shows that 36(92.3%) of the respondents agreed with the statement while 2(5.1%) were neutral and 1(2.6%) strongly disagreed. This item had a mean of 4.00 and a standard deviation of 0.513 which is lower than composite mean of 4.13 with standard deviation 0.56, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi.

Statement (5) strategies set helps in improving availability of blood, 1(2.6%) strongly agreed, 37(94.8) agreed and 1(2.6 %) of the respondents were neutral. This finding shows that 38(97.4%) of the respondents agreed with the statement while 1(2.6%) were neutral and 1(2.6%) strongly disagreed. This item had a mean of 4.00 and a standard deviation of 0.229 which is lower than composite mean of 4.13 with standard deviation 0.56, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi.

4.4.4. Sustainability of Maternal Health Services

Sustainability of maternal health services is considered as an important factor globally. The important components that enhance sustainability of maternal health services as indicated in the questionnaire are, maternal mortality rate, maternal morbidity rate, child mortality rate, fully recovered and antenatal visits. Table 4.5 below shows the questionnaire that illustrates the respondents in terms of likert scale of agreement in the form of percentages. The findings from the table are explained below.

Table 4.6 Shows on Sustainability of Maternal Health Services

| Statement | SD | D | N | A | SA | Mean | SD |
|---|-----------|----------|----------|----------|-----------|-------------|-------------|
| Maternal mortality rate is reduced | | | 3(7.7) | 34(87.2) | 2(5.1) | 3.97 | 0.362 |
| Maternal morbidity rate is reduced | | | 8(20.5) | 28(71.8) | 3(7.7) | 3.87 | 0.522 |
| Child mortality rate is reduced | | | 8(20.5) | 26(66.7) | 5(12.8) | 3.92 | 0.580 |
| Mothers are fully recovered when received blood | | | 18(46.2) | 18(46.1) | 3(7.7) | 3.62 | 0.633 |
| Increased number of antenatal visits | | | | 28(71.8) | 11(28.2) | 4.28 | 0.456 |
| Composite mean and standard deviation | | | | | | 3.95 | 0.51 |

The table 4.6 above indicates the responses given by respondents in assessing sustainability of maternal health services at QECH Blantyre, five statements were developed to measure sustainability of maternal health services at QECH, Blantyre, Malawi. Statement (1) maternal mortality rate is reduced, 2(5.1%) strongly agreed, 34(87.2%) agreed and 3(7.7%) were neutral. This finding shows that 36(92.3%) of the respondents agreed with the statement while 3(7.7%) were neutral. This item had a mean of 3.97 and a standard deviation of 0.362 which is higher than composite mean of 3.95 with standard deviation 0.51, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi

Statement (2) maternal morbidity is reduced, 3(7.7%) strongly agreed, 28(71.8%) agreed and 8(20.5%) were neutral. This finding shows that 31(79.5%) of the respondents agreed with the statement while 8(20.5%) were neutral. This item had a mean of 3.87 and a standard deviation of 0.522 which is lower than composite mean of 3.95 with standard deviation 0.51, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi

Statement (3) child mortality rate is reduced, 5(12.8%) strongly agreed, 26(66.7%) agreed and 8(20.5%) were neutral. This finding shows that 31(79.5%) of the respondents agreed with the statement while 8(20.5%) were neutral. This item had a mean of 3.87 and a standard deviation of 0.522 which is lower than composite mean of 3.95 with standard deviation 0.51, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi

Statement (4) mothers are fully recovered when received blood 3(7.7%) strongly agreed, 18(46.2%) agreed and 18(46.1%) were neutral. This finding shows that 21(53.8%) of the respondents agreed with the statement while 18(46.2%) were neutral. This item had a mean of 3.87 and a standard deviation of 0.522 which is lower than composite mean of 3.62 with standard deviation 0.633, implying that the statement does not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi

Statement (5) increased number of antenatal visits, 11(28.2%) strongly agreed and 28(71.8%) agreed. This finding shows that 39(100%) of the respondents agreed with the statement. This item had a mean of 4.28 and a standard deviation of 0.456 which is higher than composite mean of 3.95 with standard deviation 0.51, implying that the statement positively influences sustainability of maternal health services at QECH, Blantyre, Malawi

CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the discussion of the findings, summary of the main findings, the conclusion and recommendations.

5.1. Discussions

5.2.1. The Influence of Availability of Blood on Sustainability of Maternal Health Services, QECH, Blantyre, Malawi

The overall results of availability of blood on sustainability of maternal health services at QECH, Blantyre, Malawi, Statement (1) hospital blood bank have sufficient blood supply had no influence on sustainability of maternal health. Statement (2) mothers receives blood when needed had no influence on sustainability of maternal health. Statement (3) there are blood pints available for emergencies and statement (4) satisfied with number of blood pints collected from MBTS had no influence on sustainability of maternal health. These statements disagree with the study conducted by Pitma et al (2004) on Investments in blood improve availability of blood to underserved areas in sub-Saharan African country; there was support from PEPFAR (President's Emergency Plan for AIDS Relief) in collection of blood and the results showed that there was an improvement. Data was collected on all blood units collected in Namibia and was issued to the hospitals from January, 2003 to December, 2011 were analyzed (Pitma et al, 2004). These statements are in line with another study conducted by Cham et al (2009), a research on availability and quality of emergency obstetric care in Gambia's main referral hospital: women user's testimonies. Data was collected on group of 30 women on hospital admission with different obstetric conditions. Interviews with women were carried out after two weeks of discharge in their homes. The results showed that health system had inadequacy of lack of blood for transfusion. This was because of inadequate services funding for maternal health services (Cham et al.2009). These statements agree with the study conducted by Flippi, (2014) on causes of maternal mortality says also that one causes the death of women is insufficient blood supply for transfusion. Data was collected using

database on world health organisation. Sub-Saharan African countries account 66% of maternal death in the world. Another study conducted by Andsen (2018) showed that most maternal death in Malawi is due to lack of adequate blood supplies in most health facilities. The statements support the study's gap in monitoring availability of blood supply on sustainability of maternal health services at QECH, Blantyre, Malawi. Statement (5) the hospital blood bank have a large storage capacity for storing blood influenced sustainability of maternal health services at QECH, Blantyre, Malawi. This statement is in line with the study conducted by Ramani et al (2009) on blood transfusion services in Maharashtra and Gujarat states in India. This study stated that blood is urgently requirement for saving women's lives so they established blood storage unit as the requirement of first referral units (FRU) in India (Ramani et al, 2009).

5.2.2. The Influence of rate of maternal survival on Sustainability of Maternal Health Services, QECH, Blantyre, Malawi

The overall results on rate of maternal survival on sustainability of maternal health services at QECH, Blantyre, Malawi: statement (1) on mothers give birth successfully after receiving blood influenced sustainability of maternal health services at QECH, Blantyre Malawi, this statement agrees with an article by Partners in Health (2020) on the rise of a lifesaving blood bank in sierra Leone, it was stated that "blood is a life changer, when a woman starts bleeding, she needs blood for replacement if not she will die".

Statement (2) level of maternal mortality is low influenced sustainability of maternal health services at QECH Blantyre Malawi, this statement agrees with the article by Pekular (2019) on efforts to improve the maternal mortality rate in Malawi, stated that maternal mortality rate in Malawi has decreased over the years but it is still a problem that Malawi is combating.

Statement (3) Level of child mortality is low influenced sustainability of maternal health services at QECH, Blantyre, Malawi, this statement agrees with the study conducted by Doherty et al (2015) on "assessment of Malawi's success in child mortality reduction through the lens of the Catalytic Initiative Integrated Health Systems Strengthening programme: Retrospective evaluation". The results showed that child mortality in Malawi decreased and Malawi has been on track to reach MDG4 on reduction of child mortality.

Statement (4) emergencies are treated within time influenced sustainability of maternal health services at QECH in Blantyre, Malawi influences sustainability of maternal health services at QECH, Blantyre, Malawi. This study disagrees with the study conducted by Kumbani et al (2012) on “Do Malawian women assess the quality of care? A qualitative study on women’s perceptions of perinatal care at a district hospital in Malawi”. The results showed that there was delay in providing care and inadequate care.

Statement (5) there are enough staff in ward did not positively influence sustainability of maternal health services at QECH, Blantyre, Malawi. This is in line with the study conducted by Bradley et al (2015) on too few staff, too many patients: a qualitative study of the impact on obstetric care providers and on quality of care in Malawi. The results showed that there were too few staff, too many patients, lack of clinical officers/doctors. But this statement supports the study’s gap in monitoring availability of blood on sustainability of maternal health services at QECH, Blantyre, Malawi.

5.2.3. The Influence of Blood Data Management on Sustainability of Maternal Health Services, QECH, Blantyre, Malawi

The overall results on blood data management on sustainability of maternal health at QECH, Blantyre Malawi, statement (1) data for blood pints in stock and issued in ward is recorded influenced sustainability of maternal health at QECH in Blantyre, Malawi. Statement (2) recorded data is analysed influenced sustainability of maternal health services at QECH, Blantyre, Malawi. Statement (3) reports for blood data are analysed influenced sustainability of maternal health services at QECH, Blantyre, Malawi. These statements agree with the research by Cohn et al (2014) on data driven approach to patient blood management. The result showed that blood data management helps in monitoring up to date blood usage in hospital. Auditing the data helped to analyse and track usage. With this data management, it helped in improving the hospital performance (Cohn et al,2014).

Statement (4) reports for blood data helps in decision making did not positively influenced sustainability of maternal health services at QECH, Blantyre, Malawi. Statement (5) strategies set helps in improving availability of blood did not positively influenced sustainability of maternal health services at QECH, Blantyre, Malawi. These statements disagree with the results on a study conducted by Brensnick (2017) on big data

analytics reduce hospital blood usage in Ubana, the researcher observed that the use of data is important in assessing blood utilization as well as transfusion rates. Data can be used in evaluating utilization and outcome performance. It was recommended to use data which can provide comparative benchmarks that systems cause user to evaluate blood utilization outcomes (Brensnick ,2017). These statements also disagree with the article by Rahnan et al (2017) on blood information management helped in reducing delays in blood transfusion for emergency obstetric women in Bangladesh. It was stated that blood data management is important in improving and managing of usage of blood. It comprises of stock management aspects of hospital laboratory blood bank. There was effectiveness of blood information management. Using this system, it helped to minimize delays in time requested for blood collection and time of receiving blood in the ward (Rahnan et al, 2017). These statements support the study gap on monitoring availability of blood supply at QECH, Blantyre, Malawi.

5.2.4. Sustainability of Maternal Health Services, QECH, Blantyre, Malawi

The overall results on sustainability of maternal health services at QECH, Blantyre, Malawi, statement (1) maternal mortality is reduced, this statement influenced sustainability of maternal health services at QECH, Blantyre, Malawi. This statement agrees with research by Kazanga et al (2018) on predictors of utilization of skilled Maternal health care in Malawi. It was stated that even though maternal health in Malawi is improved, maternal mortality remains high.

Statement (2) maternal morbidity rate is reduced, this statement did not positively influenced sustainability of maternal health at QECH, Blantyre, Malawi. This statement agrees with the article by Malawi Ministry of Health on safe motherhood which stated that Malawi has to reduce high morbidity rates. This statement supports the study gap on monitoring availability of blood supply at QECH, Blantyre, Malawi.

Statement (3) child mortality rate is reduced did not positively influenced sustainability of maternal health services at QECH, Blantyre, Malawi. This statement disagrees with the study conducted by Doherty et al (2015) on “assessment of Malawi’s success in child mortality reduction through the lens of the Catalytic Initiative Integrated Health Systems Strengthening programme: Retrospective evaluation”. The results showed

that child mortality in Malawi decreased and Malawi has been on track to reach MDG4 on reduction of child mortality. This statement supports the study gap on monitoring availability of blood supply at QECH, Blantyre, Malawi.

Statement (4) mothers are fully recovered did not positively influenced sustainability of maternal health services at QECH, Blantyre, Malawi. This statement disagrees with the article by Stephens (2019) on blood transfusion, it was stated that blood transfusion while pregnant could help to save a life. This statement supports the study gap on monitoring availability of blood supply at QECH, Blantyre, Malawi.

Statement (5) increased number of antenatal visits influenced sustainability of maternal health services at QECH, Blantyre, Malawi. This statement agrees with UNICEF (2015), for a country to have improved maternal health, mothers have to attend antenatal care services.

5.3. Summary of the Major findings

The purpose of the study was to assess the monitoring of availability blood to ensure sustainability of maternal health services at QECH, Blantyre, Malawi. Descriptive research was used, while purposive sampling was applied to select respondents who participated and answered the questionnaires. Based on the findings, some statements on availability of blood, rate of maternal survival and blood data management did not influenced sustainability of maternal health at QECH, Blantyre, Malawi while some statements influenced.

5.4. Conclusion

Based on collected, analysed and discussed data, this study draws the following conclusion. The evaluation theorists such as Michael Quinn Patton and Carol Weiss were considered as important in helping the researcher understand how the components to this theory can be applied and defined in order to achieve change in the long-term such as the outcome, the results, and accomplishments. In the application to this theory, there was a realization among the stakeholders who valued it because, they were able to comprehend the vision of the long-term goals, how they were reached and the measurement of progress along the way. In implementing the theory of change, these stakeholders gathered together and shared solutions involving consultancies and

expertise, to help implement policies and strategies that promoted sanitation projects in peri-urban settlements (Dubrino, 2012).

The variables that had been discussed in this research are availability of blood supply, rate of maternal survival and blood data management. Each variable played a role in influencing sustainability of maternal health services at QECH, Blantyre, Malawi. Based on the findings of this research on availability of blood supply QECH, mostly have sufficient blood supply. But even though they mostly do have sufficient blood supply, still they mostly lack blood especially for emergency need. This shows that the hospital does not keep adequate blood supply for emergencies. According to research conducted by Rahman et. al (2017) on “Can mHealth improve access to safe blood for transfusion during obstetric emergency? “in Bangladesh, the results showed that the intervention they used, there was reduction in time it took for the identified need for blood and time for blood transfusion for obstetric emergencies

According to the results on rate of maternal survival, most of the mothers give birth successfully after receiving blood. But it is important to improve number of staff in wards to treat emergency cases in order to increase the rate of maternal survival. According to research conducted by Bradley et al (2015), on ‘Too few staff, too many patients: a qualitative study of the impact on obstetric care providers and on quality care in Malawi’, the results showed that due to shortage of maternity staff and too many patients made it impossible to deliver quality care. This had a significant impact on maternal and neonatal outcomes.

Based on the blood data management results, it shows that QECH is trying best in managing of blood data. But it is important to use reports for blood data in decision making and to improve in strategies for increasing availability of blood supply in order to sustain maternal health services. A study conducted by Brennick (2017) on big data analytics reduce hospital blood usage in Ubana, the researcher observed that the use of data is important in assessing blood utilization as well as transfusion rates. Data can be used in evaluating utilization and outcome performance. It was recommended to use data which can provide comparative benchmarks that systems cause user to evaluate blood utilization outcomes

5.5. Recommendations

For improvement in sustainability of maternal health services, the management at QECH should put strategies for ensuring that there is enough blood for emergencies throughout and they should have more transfusion committee meetings with MBTS on ways that may help to ensure availability of blood. The government of Malawi through ministry of health should make sure that hospitals in Malawi like QECH to have more staff on duty and to recruit more staff in order to ensure sustainability of maternal health services. The management at QECH should also prioritize on data management which includes on coming up with strategies that will help in finding the gaps that are needed for improvement in availability of blood. Health regulatory authorities strengthen on monitoring and evaluation of blood, this will help in finding of the gaps and performance of hospital blood bank. The hospital management should come up with a proposal to ministry of health on the number of hospital staff to be that are needed to their hospital for recruitment and also to MBTS on the average number of blood pints that is needed for each and every month.

5.6. Area for Further Study

The project was limited to monitoring availability of blood supply and sustainability of maternal health services at QECH, Blantyre. There is need for further research to be carried out on the influence of factors that affect sustainability of maternal health services at QECH in Blantyre, Malawi. conclusively, further research would be recommended on the influence of partnership among stakeholders towards sustainability of maternal health services at QECH in Blantyre, Malawi.

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APPENDIX I

QUESTIONNAIRE

My name is Monica Lukhere, I am studying post graduate diploma in monitoring and evaluation at Africa Nazarene University in Kenya. I am doing a research titled “Monitoring availability of blood on sustainability of maternal health services: A case of Queen Elizabeth Central Hospital, Blantyre, Malawi”.

You are therefore humbly requested to contribute for the success of the project by providing the best knowledge you have towards the questions you are to be asked. Some information is required from you. Your response will contribute a big effort to conduct this study. Your Participation will be kept confidential.

ID No. ____ / ____

SECTION A: SOCIAL AND DEMOGRAPHIC INFORMATION (tick in the appropriate box)

| | | |
|---|--------------------------------------|--|
| 1 | Age Group | 1.) Below 20 <input type="checkbox"/> 2.)20-30 <input type="checkbox"/> 3.)31-35 <input type="checkbox"/> 4.) above 35 <input type="checkbox"/> |
| 2 | Gender | 1 .Male <input type="checkbox"/> 2. Female <input type="checkbox"/> |
| 3 | Religion | 1. Christian <input type="checkbox"/> 2. Muslim <input type="checkbox"/> 3. Other religion (please specify): |
| 3 | Marital status | 1.single <input type="checkbox"/> 2.married <input type="checkbox"/> 3. living with a partner <input type="checkbox"/> 4. divorced <input type="checkbox"/> 5. Separated <input type="checkbox"/> 6. widow <input type="checkbox"/> |
| 4 | Kindly indicate your Level Education | 1.Certificate <input type="checkbox"/> 2.Diploma <input type="checkbox"/> |

| | | |
|---|---|--|
| | | 3. Undergraduate degree <input type="checkbox"/> 4. Post graduate Degree <input type="checkbox"/> |
| 5 | Country of birth | 1.Malawi <input type="checkbox"/> 2. Other <input type="checkbox"/> |
| 6 | Years you have worked with Queen Elizabeth Central Hospital | 1.(0-1) <input type="checkbox"/> 2.(1-2) <input type="checkbox"/> 3.(2-3) <input type="checkbox"/> 4.(3-4) <input type="checkbox"/> 5.(4-5) <input type="checkbox"/> 6.(5 and above) <input type="checkbox"/> |

Part B: Extent of availability of blood on Maternal Health

May you please indicate the degree to which you agree or disagree with the following statements in relation to extent to availability of blood on maternal health. May you please tick on the choices preferred from the scale given below: use the scale of 1-5 where; disagree.1=disagree 2=strongly disagree 3=neutral 4= agree 5=strongly Agree

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 7.Hospital blood bank have sufficient blood supply | | | | | |
| 8. Mothers who is in need receives blood | | | | | |
| 9. There are blood pints available for emergencies | | | | | |
| 10.Satisfied with number of blood pints collected from MBTS | | | | | |
| 11.Have a large storage capacity for storing blood pints | | | | | |

Part C: Extent of rate of maternal survival rate on maternal health.

May you please indicate the degree to which you agree or disagree with the following statements in relation to maternal survival rate on maternal health. May you please tick on the choices preferred from the scale given

below: use the scale of 1-5 where; disagree.1=disagree 2=strongly disagree 3=neutral 4= agree 5=strongly Agree

| Statement | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| 12. Mothers gives birth successfully after receiving blood | | | | | |
| 13. Level of maternal mortality is low | | | | | |
| 14. Level of child mortality is low | | | | | |
| 15. Emergencies are treated within time | | | | | |
| 16. There are enough staff in wards | | | | | |

Part D: Extent of blood data management on Maternal Health.

May you please indicate the degree to which you agree or disagree with the following statements in relation to extent of blood data management on maternal health. May you please tick on the choices preferred from the scale given below: use the scale of 1-5 where; disagree.1=disagree 2=strongly disagree 3=neutral 4= agree 5=strongly Agree

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 17. Data for blood pints in stock and issued to wards is recorded | | | | | |
| 18. Recorded data is analysed. | | | | | |
| 19. Reports for blood data analysed are stored | | | | | |
| 20. Reports for blood data used help in decision making | | | | | |
| 21. Strategies set help in improving availability of blood | | | | | |

Part E: Sustainability of Maternal Health.

May you please indicate the degree to which you agree or disagree with the following statements in relation to sustainability of maternal health. May you please tick on the choices preferred from the scale given below: use the scale of 1-5 where; disagree. 1=disagree 2=strongly disagree 3=neutral 4= agree 5=strongly Agree

| Statement | 1 | 2 | 3 | 4 | 5 |
|--|----------|----------|----------|----------|----------|
| 22. Maternal mortality rate is reduced | | | | | |
| 23. Maternal morbidity rate is reduced | | | | | |
| 24. Child mortality rate is reduced | | | | | |
| 25. Mothers are fully recovered | | | | | |
| 26. Increased number of antenatal visits | | | | | |

END OF QUESTIONARE

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY

APPENDIX II**REFERENCE LETTER****AFRICA NAZARENE
UNIVERSITY**

May 29, 2018

OUR REF: 17M03DTME007

TO WHOM IT MAY CONCERN

Dear Sir or Madam,

RE: MONICA LUKHERE

This is to confirm that the above named person is a bona fide of student of Africa Nazarene University.

She is pursuing a Post Graduate Diploma in Monitoring and Evaluation.

Please accord her any assistance required.

We appreciate your cooperation.

Yours faithfully,

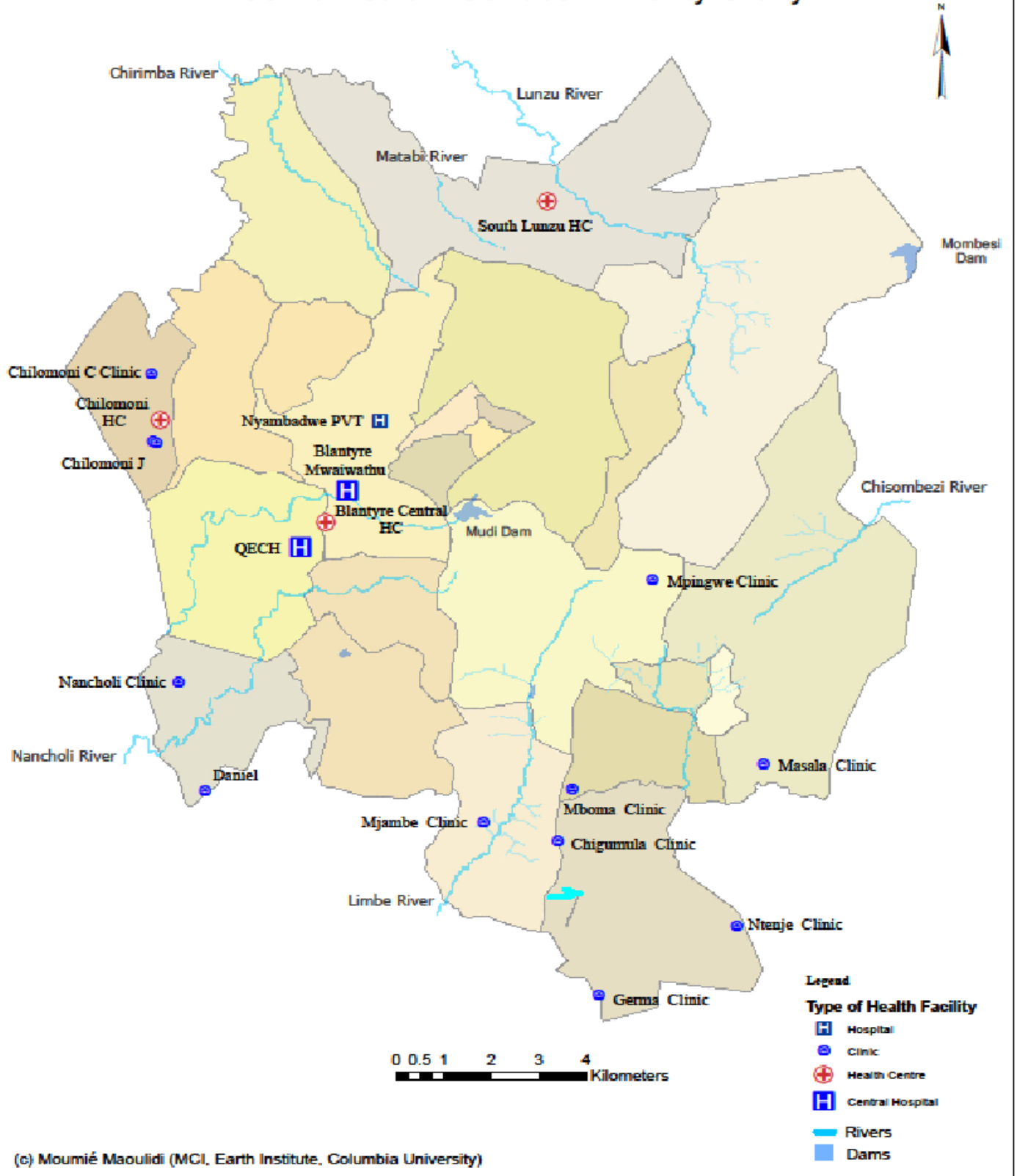
CHRISTINE KABELLE,

REGISTRAR'S OFFICE, NAIROBI CAMPUS.

APPENDIX III

MAP SHOWING QUEEN ELIZABETH CENTRAL HOSPITAL IN BLANTYRE MALAWI

Some Health Facilities in Blantyre City



(c) Moumié Maoulidi (MCI, Earth Institute, Columbia University)