THE COPPERBELT UNIVERSITY

Directorate of Distance Education and Open Learning

Msc in Project Management

Master Thesis- GBS800

Final Research Report

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Research Topic

The Impact of Moderated Whatsapp Text Messaging Group for Improving Maternal and New Born Referral Outcomes among Health Facilities: A case study of Mansa General Hospital, Luapula Province, Zambia.

DECLARATION

I declare that this thesis is my own, unaided work. It is being submitted for the Degree of Master of Project Management in the Directorate of Distance Education and Open Learning at the Copperbelt University, Kitwe. It has not been submitted before for any degree or any other examination in any other University.

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8st day of August2023 in Kitwe

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Signature

Reuben Kambani

DEDICATION

I dedicate this work to Dr. Nilanjana Kumari from the directorate of distant and open learning at the Copperbelt University for mentoring me and giving me the platform to pursue and excel in my postgraduate studies at the Copperbelt University. I also dedicate this work to my husband and children for the support and giving me a conducive environment to pursue my career.

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CHAPTER ONE

1.1. Introduction

In recent years, advancements in communication technology have revolutionized the way healthcare services are delivered and coordinated. Among these technologies, mobile messaging applications have emerged as powerful tools with the potential to bridge the gaps in maternal and new born healthcare, particularly in resource-limited settings. Luapula province faces numerous challenges in delivering efficient and timely maternal and new born health care services due to its rural and underserved nature. Access to quality health care facilities, especially during pregnancy, childbirth and the early postnatal period, remains limited for many expectant mothers and new born, leading to increased risks of maternal and neonatal morbidity and mortality.

Hospitals have continued using the paper based communication channels for patient referrals, however, many studies have shown that the use of such channels have compromised the care of patients due to delayed communication, potential for errors, coordination challenges and lack of real-time updates among others. This has contributed to the increase of maternal and neonatal deaths as the cases are referred late and often time there is not prior and proper communication between the sending and receiving facilities.

Zambia realised the potential that mobile health platforms have in improving health outcomes on the 25th Conference of maternal health held on 25th September, 2019 in Lusaka (MOH, 2019). This realization prompted Luapula Provincial Health Office (LPHO) on 25th December 2019 to start implementing the recommendations of the 25th National Conference by embarking on strengthening the referral system by use of mobile telecommunication applications, using WhatsApp groups as a means of arresting the rising maternal mortalities (MOH, 2019). An agreement was made that each district within the province creates a linked WhatsApp group with Mansa General Hospital (MGH) for the purpose of posting in detail all cases being referred to MGH prior to referring so that MGH prepares adequately for both the mother and her unborn child.

1.2.<u>Background of the Study</u>

Over the past several decades, the world has recorded significant global health success stories like the reduction in incidence of small pox, (Hill, 2007). However, despite the discrete and sustained progress in many other issues that are key in global health, the world Health Organization (2010) argued that there has been a startling number of girls and women dying each year from pregnancy and child birth. Further, Maternal and Neonatal Index (2012) estimated that over 500,000 women die while giving birth every year worldwide. Majority of these deaths are said to occur in developing countries. According to Prata, 2010 over 99% of these deaths occur in developing countries, where 50% of the maternal deaths globally happening in Sub Saharan Africa. Green, 2022 further stated that approximately 70% of all maternal deaths occur in Sub Saharan Africa. Central Statistics Office, 2018, states that Zambia a country in Sub Saharan Africa has maternal mortality estimated at 285/100,000 live births, while over 1,000 girls and women suffer pregnancy and child birth related complications each year. Therefore, in Zambia, maternal mortality is a key global health issue.

Despite the world making significant progress globally in maternal and child health (MCH), over a quarter of healthy years of lives lost are accounted for by poor maternal and new-born health (Melissa, 2020). Pauline, 2017; UNICEF, 2017, states that over 300,000 women worldwide die from maternal causes, 3.3 million are stillborn and an additional 3.3 million mortalities within the first month of life every year, with Sub Saharan Africa and South Asia contributing to the vast majority of these deaths. According to World Health Organization (WHO) maternal death in International Classification of Diseases version-10 (ICD-10) is defined as; the death of a woman while pregnant or within 42 days of pregnancy termination, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by pregnancy or its management, but not from accidental or incidental causes (Ambareen, 2020). Additionally, the World Health Organization (WHO) affirms that, maternal deaths are subdivided into two groups: direct obstetric deaths and indirect obstetric deaths. The direct obstetric deaths are defined as those deaths that results from obstetric complications during pregnancy, labour and puerperium or from interventions, omissions and incorrect treatment. UNICEF, 2017, further classifies direct obstetric deaths as pregnancies with an outcome that is abortive, hypertensive disorders, obstetric haemorrhage, pregnancy related infection, obstructive labour and unanticipated complications.

Maternal mortality is high in low-income countries, accounting for 99% of deaths and Sub Saharan Africa alone accounts for two-thirds (WHO, 2019). There have been efforts globally to improve the maternal outcomes spearheaded by the United Nations, though there is limited success. While maternal deaths dropped by 45% between 1990 and 2015, this was short of the 75% target set through the Millennium Development Goals (MDGs), which has now been succeeded by the SDGs that are aimed at reducing mortalities in every country to <140 per100,000 live births by the end of the decade (Jean, 2020).

Zambia has a fertility rate of 4.98 births per woman aged 15-49 years ZNPHI, 2018 as the population continues to grow steadily, maternal deaths continue to a major cause of death for women. According to ZNPHI, 2018 maternal associated deaths were a 4th leading cause of deaths among women of childbearing age, accounting for 17.2% deaths in women aged 15-49 in Zambia. Rosa, 2019 observed that between 1990 and 2013, maternal mortality rate in Zambia declined by 0.56% per annum. The study further postulated that, Zambia is not likely to reach the third SDG goal of maternal ratio of less than 70 maternal deaths per 100,000 live births by 2030 at its current rate (MOH, 2019). Solutions to maternal and neonatal mortalities and digital technologies if aligned properly, can help in arresting the upward trend in mortalities (ZNPHI, 2018). This is because, there has been transforming in communication and provision of innovative strategies for information transfer on social media (Jean, 2020). In additional, quality and timely information is very crucial in management of patients and improving health outcomes (Ambareen, 2020).

Zambia realised the potential that mobile health platforms have in improving health outcomes on the 25th Conference of maternal health held on 25th September, 2019 in Lusaka (MOH, 2019). This realization prompted Luapula Provincial Health Office (LPHO) on 25th December 2019 to start implementing the recommendations of the 25th National Conference by embarking on strengthening the referral system by use of mobile telecommunication applications, using WhatsApp groups as a means of arresting the rising maternal mortalities (MOH, 20190. An agreement was made that each district within the province creates a linked WhatsApp group with Mansa General Hospital (MGH) (MGH, 2020).

The advancements in technology have significantly changed and continue to change the care of patient through progress in diagnostics and treatment (Mhealth, 2020). Nevertheless, according to Ambareen, 2020 the communication method among the healthcare providers has remained as before the advent of smartphones. Pauline, 2017 observed that hospitals have

continued to sue paper-based communication channels for referrals and general care of patients between and within the facilities. These channels of general patient care and referrals are not only inefficient but greatly contribute to compromise in patient care and general referral outcomes (Ambareen, 2020). Additionally, studies have shown that these types of communication hinder timely care of patients and that most of the hospitals are now adopting technologies of communication to enhance communication that is effective in the healthcare system (Ambareen, 2020).

Luapula Provincial Health Office concluded that the benefits that come with advancements in technology are an avenue of improving communication and maternal and referral health outcomes. This is as a result of the significant advancements in technology that has contributed greatly to improving communication between the initiating and receiving facilities (Mhealth, 2020). The most suggested and appropriate avenue for Obstetrics and Gynaecology (0BGYN) emergencies is through a moderated WhatsApp platform that is ideal in helping the receiving facility prepare adequately well in advance so as to improve maternal and neonatal outcomes (MOH, 2019). 2 years down the line, however, there has not been any study conducted at Mansa General Hospital, Luapula Province to assess the efficacy of moderated WhatsApp text messaging for improving maternal and new-born referral outcomes in the province (ZNPHI, 2021). The current study will therefore assess the impact and effectiveness of the intervention in improving maternal and neonatal outcomes.

1.3. Problem Statement

A major public health concern in Zambia is maternal and neonatal mortalities which contribute to an estimated 183 deaths per 100,000 live births (ZNPHI, 2021). Despite having a reduction of 50% and 40% in maternal and infant mortality between 2007 and 2018, neonatal mortality rate increased from 24 to 27 deaths per 1,000 births in the country (UNICEF, 2019). While evidence has revealed that innovative strategies using mobile health applications can significantly reduce and improve health outcomes, the innovation's practical and in use are unfortunately biased towards chronic conditions as opposed to emergencies and acute conditions (Tyler, 2021).

Moderated WhatsApp messaging groups for Obstetrics and Gynaecology emergencies have been implemented by Luapula Provincial Health Office since 2019 (MOH, 2019). This intervention was designed with the potential to manage the third delay in obstetric care; receiving care that is quality and appropriate, once a pregnant woman reaches the facilities

(UNICEF 2019). The referring facility will post a text to inform the receiving facility all the details critical to the patient prior to the patient reaching the facility (MGH, 2020). This was envisaged that it may aid in improving maternal outcomes between the referring and receiving facilities by making sure that the receiving facility prepares adequately before the pregnant woman arrives (MOH, 2019). Unfortunately, no study has been conducted to assess the efficacy of the intervention (MGH, 2020). Therefore, the current research aims to assess the effectiveness of moderated WhatsApp text messaging for improving maternal and new-born referral outcomes among health facilities in Luapula province.

1.4. Aim and Scope of the Study

This study aimed at determining the impact of moderated WhatsApp messaging application in improving maternal and neonatal referral health outcomes in Luapula province. It also aimed at exploring the factors contributing to the mother and her unborn child receiving adequate quality and appropriate care once they reach the receiving facility, Mansa General Hospital. Lastly the study also explored other factors affecting maternal health outcomes in respect to mortalities. The study was done at Mansa General Hospital which is a second level referral hospital. The study looked at the impact of utilizing moderated WhatsApp messaging groups for referrals. The effectiveness of moderated WhatsApp groups was explored to ascertain quality, cost effectiveness, efficaciousness in the provision of health services. According to Carneiro & Howard, 2011 advanced technology significantly contributes to quality health services which is the focus of this study.

1.5. Research Questions

1. What is the impact of moderated WhatsApp messaging group in improving maternal and neonatal referral outcomes in Luapula Province?

2. What factors contribute to maternal and neonatal patients receiving adequate and appropriate care when they reach receiving health facility?

3. What factors affect maternal health outcomes with respect to 3rd and 4th degree tear?

1.**6.**<u>**RESEARCH OBJECTIVES**</u>

- ▪ <u>**General Objective**</u>

To determine the impact of moderated WhatsApp messaging application in improving maternal and neonatal referral health outcomes in Luapula Province.

- ▪ <u>**Specific Objectives**</u>
1. To determine the impact of moderated WhatsApp messaging in improving maternal and neonatal referral health outcomes
2. To explore factors that contribute to the maternal and neonatal patient receiving adequate and appropriate care once they reach at the receiving facility.
3. To understand the factors that affect maternal health outcomes with respect to 3rd or 4th degree tear.

1.7. <u>**Significant of the Study**</u>

Firstly, the study was the first of its kind in assessing the impact of moderated WhatsApp group in contributing to improving maternal and neonatal health outcomes. Secondly, the results of this study was added to the existing body of knowledge and extend what is known about the application of the use of telecommunication technologies in improving the maternal and neonatal outcomes in Luapula Province and Zambia at large. Thirdly, it was worth exploring the inherent differences of the huge burden of the maternal deaths with the rest of the world with low levels of maternal deaths amplified by the use of moderated WhatsApp group. Furthermore, embarking interventions that are on-going like addressing maternal referral issues through a WhatsApp group was paramount in establishing long term child health mechanisms. Above all, this study was long overdue as it earmarked the basis for ascertaining interventions working for a rural province like Luapula, in improving maternal and neonatal referral outcomes.

CHAPTER TWO

2.0. <u>Literature Review</u>

2.1.<u>Introduction</u>

Maternal and new born healthcare stands as an essential cornerstone of public health, reflecting a society's commitment to safe guarding the well-being of its mothers and infants. Yet, even as healthcare system continually evolves, challenges persist, particularly in the realm of maternal and new born referrals. In the vast landscape of regions like Luapula Province, Zambia, where access to healthcare facilities can be arduous, efficient referral systems are paramount to ensure timely and appropriate care.

This study embarks on an exploration of a novel approach to addressing these challenges, leveraging the power of modern communication technology in the form of moderated whatsapp text messaging groups. Specifically, I will delve into the intricate dynamics and outcomes of using whatsapp as a tool for facilitating communication and coordination among healthcare providers within the maternal and new born care network of Mansa General Hospital, Luapula Province.

Within our study, a robust conceptual framework is designed to guide our exploration. At its core, this framework envisions the interplay of critical components. Central to this framework is the notion that a moderated whatsapp messaging group can serve as a catalyst for improved communication among healthcare providers. Enhanced communication, in turn holds the potential to expedite the process of referrals, with a primary focus on maternal and new born cases. Consequently, this streamlined referral process has the potential to yield better maternal and neonatal health outcomes.

Drawing from established theories of technology adoption and communication, we apply a theoretical lens to our study. The diffusion of Innovation Theory by Rogers, 1962 serves as a foundational perspective, shedding light on the adoption process of whatsapp as an innovative communication tool within the healthcare context. Additionally, communication theory provides insights into the dynamics of information exchange and the influence of communication channels on outcomes. The integration of these theories guides our understanding of the impact of moderated whatsapp messaging groups.

As I embark on this journey of investigation, it is my goal to uncover insights that not only contribute to the burgeoning field of healthcare technology adoption but also hold the potential to enhance maternal and new born care in underserved regions. The outcomes of this study could inform healthcare practices, policies and interventions, ultimately leading to improved healthcare access, timely referrals and most importantly healthier mothers and new born.

2.2 Mechanisms to address maternal deaths

Maternal deaths in Zambia are a global challenge, however, the country recognizes maternal health as a priority sector contributing to national development (MOH, 2019). Despite the challenges, Zambia remains committed to provision of services that are aimed at targeting maternal mortality highlighted in documents like the vision 2030, the United Party for National Development Manifesto and the National Health Strategic Plan 2022-2026 and the 8th National Development Plan (GRZ, 2022). The following details highlight a number of maternal health interventions put in place:

(a) Antenatal care services (ANC): The country supports ANC services recognizing that these services detect and manage conditions during pregnancy that can adversely lead to maternal outcomes (Shanton, 2000). According to Mwanza, 2019 programmes aimed at preventing maternal deaths are supported to a lesser extent. Organizations such as Saving Mothers Giving Lives with support from the government have a program of educating women to respond and recognize danger signs during pregnancy (MOH, 2019). According to WHO, 2019 WHO aside provision of incentives called "recommended package" of antenatal services rewarded to mothers in four antenatal visits throughout pregnancy.

(b) Family Planning Services: The country has acknowledged that programs on effective family planning provides information on contraception, eliminating risks from unwanted pregnancies thereby reducing maternal mortality (Shiffman, 2004). However, Mwanza, 2019 noted that though family planning services in Zambia are culturally and religiously unacceptable, the government has increased access and shown support for these services. Society for Family health (SFH) for example, provide family planning services to all the 10 provinces of Zambia though the policy does not work effectively in the country (GRZ, 2010).

(c) Maternal Death Review Strategy: Priority has been given to surveillance and assessment of maternal deaths in various regions by Ministry of health (MOH, 2019). The government of Zambia has identified this strategy as the best way of understanding the

medical and social factors contributing to pregnancy related deaths (Mac Donalds and Starrs, 2002). Therefore, immediate strategies are usually devised to address the identified short comings so as to improve the access to quality and equitable healthcare in maternal health delivery. For example, according to MOH (2019), it is the mandate of the nation for all health management teams to meet annually at district and provincial level for maternal death reviews.

(d) Training of Safe Motherhood Action Groups (SMAGS): WHO, 2019 noted that Skilled Safe Motherhood Action Groups (SMAGS) play a critical role in the reduction of incidence of maternal mortality. However, the country faces challenges of human resource of both midwives and doctors. The government with support from partners like Care International have resorted to training of traditional birth attendants (TBAs) in managing pregnancies and childbirth (Graham, 2000). According to GRZ, 2019 training these TBAs make them acquire skills through experience and apprenticeship thereby assisting Skilled Birth Attendants (SBAs) in childbirth management (GRZ, 2019). According to safe motherhood, 2019 the country supports TBA programs in rural areas to offer technical support and intensifying community awareness sensitization programs needed for pregnant women. Nevertheless, lack of formal education among the SMAGs make such trainings insufficient to give them the skills in live saving interventions (MOH, 2019).

(e) Skilled Delivery Care: When skilled birth attendants handle pregnancy and childbirth related complications, maternal deaths reduce (WHO, 2019). Zambia has put emphasis on delivery as it is a critical time in which decisions are made. Doctors and midwives can recognize complications and refer women to higher level hospitals (Mwanza, 1995). However, according to Makasa, 2019 Zambia with a population of over 18 million people has the current doctor and midwife population ratios standing at 1 to 15,000 and 1 to 1,500 respectively. According to Lusale (2007), government can address this problem by increasing salaries for all the health workers as staff motivation ultimately discourages brain drain. This policy is working well for the country though poor road network still remains a challenged GRZ, (2013).

(f) Moderated WhatsApp Messaging Groups: Zambia as country continues to put a lot of importance on WhatsApp messaging group as avenues where physicians can significantly contribute to improving the continuum of care. Studies have shown that such social groups

can improve communication between the referring and receiving health facilities and ultimately contributes to improving maternal health referral outcomes (MOH, 2019).

2.3 Global Perspective of Moderated WhatsApp Groups in Improving Maternal Health and Referral Outcomes (Mhealth- WhatsApp)

Mobile phones have progressed from being single communication devices to smart platforms with internet access and capabilities for data storage that have generally been adopted in the healthcare and fall under an inclusive term mobile health (Mhealth, 2020). Researched has shown that mobile health advances have enabled cutting edge health care in traditionally resource limited environments (Tyler, 2021). Studies have shown an increase in mobile health interventions in improving health outcomes (Rosa, 2019). Mellisa, 2020 argued that engagement of pregnant women through message and voice calls for health promotion improved maternal outcomes. In the same vain, a study conducted in Turkey on maternal/paternal attachment revealed that the parenting education intervention conducted through WhatsApp, significantly increased the levels of maternal attachment (Ayse M, et al. 2021). Furthermore, a study done by Trude, 2021 showed that whatasapp based maternal support intervention improved maternal and child health outcomes in a middle income country like Southern Brazil. While the three studies had objectives that were different, it is vital to note that WhatsApp is the platform that was used to affect the health interventions. In addition, the three studies reported an outcome that was positive despite using different methodologies, the former used a systematic review while the latter used Randomized-Controlled Experiments. Another study conducted in Saudi Arabia showed that WhatsApp was a useful and beneficial tool for mothers of children with autism spectrum disorder (ASD) (Hemdi, 2017). Chan, 2019conducted a study on effects of social media and mobile apps on pregnancy care and it showed that social media and mHealth apps have the potential to significantly improve maternal well-being. Additionally, Patel, 2018 added that the use of moderated whatsapp messaging groups help to reduce anxiety in mothers thereby improving the maternal and new mothers'referral outcomes.While mobile health interventions have been in use for some time now, it was very difficult to find literature on WhatsApp interventions specific to the referral system aimed at improving maternal and neonatal outcomes. Most of the reported studies focused on other related areas of concern.

2.4 Sub-Saharan Africa Perspective on mHealth (WhatsApp)

In 2019, a study was conducted in South Africa on platforms to improve medical engagement in management of chronic conditions showed that; the use of WhatsApp platform in medical settings was an effective means of communication, long distance learning and support between peers and specialists (Joana, et al. 2017). This study further revealed that the majority of the participants accredited the new clinical confidence gain, new clinical insights and a better patient management to active participation on the WhatsApp group (Ibid). This review was affected by the inadequacy of studies that have used WhatsApp platform as a referral intervention in improving maternal and neonatal outcomes (Gulacti, 2016). Aboye, 2023, conducted a systematic review where he was comparing the use and availability of mhealth approaches in Sub-Saharan Africa and Europe and the study showed that more efforts should be made to use the mhealth system to improve health outcomes especially in the sub-Saharan region. Furthermore, Stevens, 2019 reviewed that not only can mHealth improve the current healthcare system, but it can provide healthcare to those populations living in remote areas across the Sub-Saharan region. He further reviewed that increasing mobile access coupled with better quality networks and the introduction of healthcare apps and other mobile healthcare services are set to make remarkable improvements on the road to achieving the SDGs in Sub-Saharan Africa. Additionally, less than half of the sub-Saharan African countries incorporate mHealth platforms as reviewed by Aboye (2023). He highlighted the need for further development, integrating wearable based platforms for real-time monitoring of physiological parameters in the healthcare system. Furthermore, he highlighted that with the fast adoption of mobile phones and the internet in the Sub-Saharan African region, mHealth technologies are projected to make a substantial contribution to the highly challenged Sub-Saharan healthcare sector.

2.5 Local Perspective and limitations of the Study

A number of studies have shown the use of technologies for information transfer among students, clinical bedside teaching and patient care (Gulacti, 2016). Mwanahamuntu conducted a study on the importance of WhatsApp messaging groups in ascertaining the impact of such groups among HIV positive women in derived communities of Zambia, the study showed that such groups are very effected in contributing to an improvement in health outcomes (Mwanahamuntu, 2017). However, Gulacti, 2016 noted that there are limited studies on the utility of moderated WhatsApp as a referral platform in remote-poor areas where there is unavailability of consultants and this can cause a delay in management of patients. The observation made by Gulacti, 2016 resonates well with Zambia, in the sense that there is inadequate data to show which provinces are making use of WhatsApp as an effective communication tool in improving OBS/GYN referral maternal outcomes as well as in clinical learning improvements. This proved a challenge to conduct a thorough review of literature on this subject.

2.6. Conceptual Framework

2.6.1 Definition of key concepts

(a) Maternal and New born referral outcomes: Maternal and new born referral outcomes refer to the results or consequences of the process of referring pregnant women or new born from one healthcare facility or provider to another. These outcomes encompass the health status and well-being of both the mother and her new born after the referral, including any changes in their medical condition, treatment received and overall healthcare experiences. Positive referral outcomes often involve timely and appropriate care leading to improved health, while negative outcomes may result from delays or inadequacies in the referral process.

(b) Moderated whatsapp messaging: A moderated Whatsapp Text Messaging Group is a digital communication platform on the whatsapp application that is overseen and managed by a designated moderator or administrators. In this context, it involves a group chat where healthcare professionals or stakeholders exchange messages related to maternal and new born care. The moderation aspect implies that the group's activities, discussions and content are supervised to ensure relevant and appropriate communication among participants. Such groups can be used for sharing medical information, coordinating care and facilitating discussions among healthcare providers.

(c) Health facilities: Health facilities encompass a broad range of physical locations or institutions where healthcare services are provided. These facilities can vary widely in terms of size, capabilities and services. They include hospitals, clinics, health centres, maternity wards and other healthcare settings where medical professionals diagnose, treat and care for patients. In the context of this study, health facilities specifically pertain to the institutions or locations involved in maternal and new born healthcare within Luapula Province, Zambia, with a focus on Mansa General Hospital.

2.6.2. Visual representation of how maternal and newborn referral outcomes are affected by effective use of moderated whatsapp text messaging group.
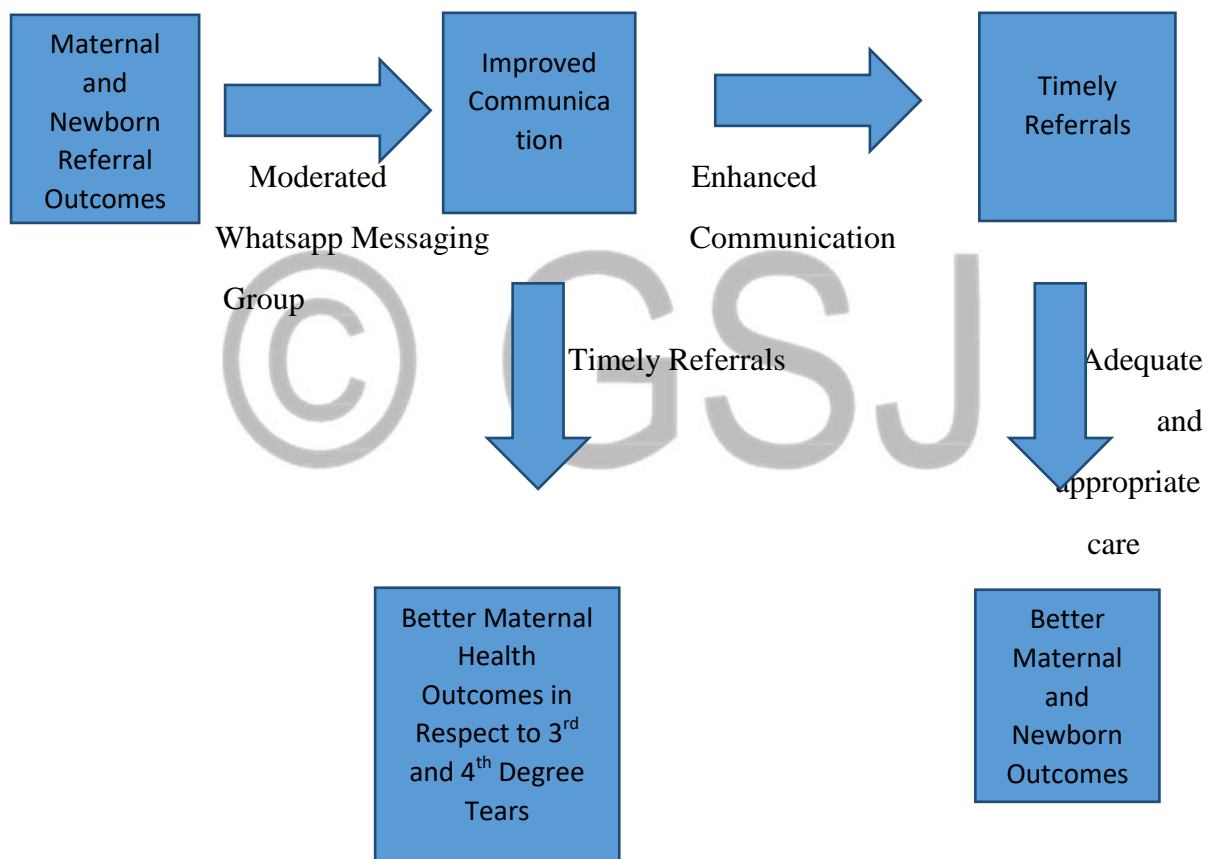
Health Information Systems, Luapula. (2022).

2.7 Theoretical Framework

2.7.1. Diffusion of Innovation Theory

The diffusion of Innovation Theory, developed by Everett M. Rogers in 1962, provides a robust theoretical lens through which to examine the adoption and impact of moderated whatsapp text messaging groups in the context of maternal and new born referral outcomes.

(a) Key Concepts

1. Innovation: In this context, the innovation refers to the use of moderated whatsapp messaging groups as a novel communication tool within the healthcare settings.

2. Adoption: Adoption represents the process by which the healthcare providers and facilities decide to integrate and use moderated whatsapp text messaging groups for communication and coordination in maternal and new born care.

3. Communication: Roger's theory emphasizes the role of communication channels in spreading innovations. Whatsapp serves as a modern communication channel that may influence the diffusion process.

4. Social System: The healthcare ecosystem at Mansa General Hospital and in Luapula Province constitutes the social system within which the diffusion of this innovation occurs.

(b) Key Elements of the Diffusion of Innovation Theory

The diffusion of Innovation Theory outlines several key elements that are applicable to this study:

1. Innovators and Early Adopters: These categories of individuals are likely to be the first to embrace the use of moderated whatsapp text messaging groups for healthcare communication. They are often open to new ideas and technologies.

2. Early Majority and Late Majority: As the innovation gains acceptance among innovators and early adopters, it begins to spread to the broader healthcare community, including the early and late majority.

3. Communication and Media Channels: Rogers' theory underscores the role of communication channels, including interpersonal communication, in disseminating information about innovations. Whatsapp serves as a contemporary medium for such communication.

4. Relative Advantage: The theory suggests that innovations perceived as offering a relative advantage over existing practices are more likely to be adopted. The study can explore the perceived advantages of using whatsapp in maternal and new born referrals.

5. Compatibility: The compatibility of the innovation with existing healthcare practices and values is another key factor influencing adoption. Investigating how whatsapp aligns with the healthcare system in Luapula Province is essential.

(c) Application to the Study

Utilizing the Diffusion of Innovation Theory as a theoretical framework, this study will examine the stages of innovation adoption, the factors influencing adoption decisions and the ultimate impact on maternal and new born referral outcomes within the healthcare system at Mansa General Hospital in Luapula Province.

By employing this theoretical lens, the study aims to provide valuable insights into the diffusion process of moderated whatsapp text messaging groups in healthcare, shedding light on the dynamics of technology adoption, communication patterns and their effects on maternal and new born outcomes.

2.7.2. Health Belief Model

The Health Belief Model (HBM), developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels, provides a valuable perspective for understanding how individuals perceive health risks, make healthcare decisions and subsequently engage in health-promoting behaviors. In the context of this study, the HBM can illuminate the factors that influence healthcare providers' and patients' decisions related to the adaptation of moderated whatapp text messaging groups and their impact on maternal and new born outcomes.

(a) Key Concepts

1. Perceived susceptibility: This concept relates to individuals' perceptions of their vulnerability to a health condition or problem. In this study, it pertains to how healthcare providers and patients perceive the susceptibility of maternal and new born health issues and whether using whatsapp group can address these concerns.

2. Perceived severity: Perceived severity refers to individuals' assessments of the seriousness of a health condition. In this context, it involves understanding how healthcare providers and patients perceive the severity of maternal and new born health challenges and whether whatsapp group usage can mitigate these concerns.

3. Perceived benefits: The model emphasizes the importance of individuals perceiving the benefits of taking health-promoting actions. For this study, this concept is relevant to how healthcare providers and patients perceive the benefits of using whatsapp group for communication and coordination in maternal and new born care.

4. Perceived barriers: Perceived barriers encompass the obstacles individuals identify in taking health-promoting actions. Investigating the barriers to using whatsapp group in healthcare settings, such as concerns about data security or training requirements, can be pertinent.

5. Cues to action: Cues to action are external or internal triggers that prompt individuals to take action. Within the study, this can encompass the factors or events that encourage healthcare providers to adopt whatsapp messaging groups.

(b) Application to the Study

By integrating the Health Belief Model into the theoretical framework, this study seeks to explore how healthcare providers and patients perceive maternal and new born health risks and the benefits of using the moderated whatsapp messaging group as a means to address them. Additionally, it aims to identify the barriers that may hinder adoption and the cues to action that may encourage its use.

The Health Belief Model serves as a lens to understand the decision-making processes surrounding the adoption of whatsapp messaging groups, shedding light on the motivations, perceptions and external factors influencing healthcare providers and patients in the context of maternal and new born care. This dual theoretical framework, combining the Diffusion of Innovation Theory and the Health Belief Model, enriches the study's analysis by examining both the diffusion process and the individual-level decision-making processes within the healthcare system.

CHAPTER THREE

3.0. Research Methodology

3.1 Introduction

The methodology employed in this study represented a comprehensive and multifaceted approach design to investigate critical facets of maternal and new born healthcare in Luapula Province, Zambia. The research aimed at shedding light on the impact of a moderated whatsapp messaging group, factors contributing to the delivery of adequate and appropriate care and factors influencing maternal and health outcomes concerning 3rd and 4th degree tears.

To achieve a holistic understanding of these complex issues, a mixed methods research design was adopted, integrating both quantitative and qualitative data collection and analysis techniques. This methodological choice allowed for a nuanced exploration of the research questions, combining statistical rigor with the richness of qualitative insights.

The quantitative aspects of the research involved the use of surveys and statistical analysis, including methods such as ANOVA, to examine the potential impact of the moderated whatsapp messaging group on maternal and neonatal referral outcomes, addressing the first research question.

In parallel, the qualitative component employed interviews and focus group discussions, enabling a deep exploration of the second and third research questions. Framework analysis and thematic analysis was instrumental in identifying factors contributing to adequate and appropriate care and understanding the intricate outcomes in cases of 3rd and 4th degree tears.

This methodological fusion ensured a comprehensive examination of the maternal and new born healthcare landscape in Luapula Province, offering valuable insights for healthcare practitioners, policy makers and researchers alike. The following sections of this study delved into the specific details of data collection, analysis and findings for each research question.

3.2 Research Design

The research question was answered using both quantitative and qualitative methods, known as mixed methods (Carneiro & Howard, 2011). A household survey was conducted in order to collect quantitative data (Walters, 2009). Thereafter, qualitative data on how Health Care Workers (HCWs) and policy makers perceived moderated WhatsApp groups in addressing maternal and referral health outcomes and how this was perceived from the perspective of public health was collected using interviews and Focus Group Discussions (FGDs) (Preston, 1997).

3.3 Population

Mansa General Hospital (MGH) was selected for the study because it was one of the hospitals in Luapula province with a huge burden of maternal deaths; a maternal death prone zone. It had a fairly large population of 1,430,321 people with 530,978 women of child bearing age ideal for the study (MOH, 2019).

3.4 Sample size

This study used an estimated sample size of 384 women of reproductive age referred to MGH as the population at MGH is large. The Raosoft tool was used to come up with the sample size. This was a standard sample size ideal for such a large population.

3.5 Sampling technique

Simple random sampling was employed to identify approximately 100 households that led to the identification of the 384 women of reproductive age referred to MGH to take part in the study. The next household was selected when participants refuse to take part in a research so that a desired sample size was obtained (Green, 2009).

3.6 Source of data

Data collection was done from 4 districts within Luapula province and MGH for the period from 2018 to 2021. The four districts were selected based on the best performing district and worst performing district in terms of maternal and neonatal deaths, one district closest to MGH and the one furthest away. To obtain the best and worst performing districts, data was collected from Luapula provincial health office data base.

Permission was obtained from the Provincial Permanent Secretary, Provincial Health Director, District Health Directors, health officials from the nearest health centres and traditional leaders. The health officials assisted in sensitising the SMAGs in the affected zones on the objectives and benefits of the research. Participants were followed in the community and appointments were made a day prior to taking part in the research as suggested by Mann (2000).

3.7 Method of data collection

Quantitative data was obtained through door to door surveys. Though surveys were time consuming and expensive, Green, 2009 argued that if administered by trained personnel, detailed information from the respondents was obtained. Hence, the trained assistants who were conversant with the local language took part in the survey. Information was recorded on a piece of paper at a time the respondents were answering the questions. To obtain quantitative data, a survey was conducted. A list of households was sought from Zambia Bureau of statistics. Qualitative data was collected through in-depth interviews consisting of open ended questions lasting 30-40 minutes and through FGDs. This was appropriate for allowing discussants to develop new ideas and speak freely on the topic (Frey, 1995). Interviews were carried out by trained assistants to minimise bias. To avoid missing important points and misquoting, a tape recorder was used. Information on tape recorders was transcribed promptly to avoid distortions and misplacement of ideas during analysis (Petrie and Sabin, 2013). Critical case purposive sampling was used to select participants so as to achieve a diverse sample in terms of social roles (Frey, 1995).

Four (4) zones were selected, 2 zones where community volunteers also known as SMAGs were performing well and 2 zones where they were not performing well were compared. Only two districts that were performing well and were referring to MGH in Luapula province out of the 12 were selected. For the two districts not performing well, 1 nearest and another furthest from the provincial administrative centre was selected (Preston, 1995). Preference was given to 1 community volunteer and 1 administrator so as to obtain diverse information.

A total of 8 FGDs each consisting of 10 participants were conducted. These FGDs were done differently between the males and females as to allow the discussion to flow (Preston, 1997). Health workers in the rural health centres were recruited as participants for the FGDs to give a perspective that was general on the beginning point of how WhatsApp text messaging on groups normally starts. The participants in FGDs were to be SMAGs who were not be involved in an in-depth interview and were given a general perspective on how maternal cases were picked from the community and how the communication between health centres and receiving hospital is done. The age range of members was preferably 20 to 50 years (Green, 2009).

For all participants who took part in the study, an informed consent was sought after explaining the aim of the research. To ensure the study was appropriate for the setting, a pilot study was conducted (Chitah, 2001).

3.8 Data analysis

Data from the household survey was analysed using a software called ANOVA.

Framework analysis approach was employed in analysing qualitative data. The approach was appropriate, analytical and explicit because it was used in an organized structure that enabled the analyst to check raw data (Mann, 2000). The process was done as follows:

Thematic analysis of data from audio recordings making reference to research objectives was done immediately after each interview and FGDs. Data was organized, coded and then generated into categories or themes. Then, a thematic framework with numerical and textural codes was developed. Data from each interview and FDGs was arranged in charts aligned to a thematic framework to which they were related. The charts were then used to describe the findings of the study (Marshall and Rossman, 1999).

3.9 Reliability

Reliability refers to how consistent a method measures something. If results are consistently achieved using the same procedure under the same circumcises, the measurement is considered reliable (Middleton 2019). In this study, a questionnaire was designed by the researcher to establish reliability of the study that was conducted at MGH. The study used the Raosoft tool to come up with the estimated sample size of 384 women of reproductive age referred to Mansa General Hospital as the population is large.

3.10 Validity

Validity is an expression of the degree to which a test can measure something. Validity refers to how well a scientific test or piece of research actually measures what it sets out to or how well it reflects the reality it claims to represent (Duke, Hamidi & Ewing, 2020). Before the actual study, a pilot study using a closed ended questionnaire was used to ascertainthe Impact of Moderated Whatsapp Text Messaging Group for Improving Maternal and New Born Referral Outcomes among health facilities: A case study of MGH, Luapula Province, Zambia. Therefore, validity of these instruments was evaluated. To maximize on validity, questions were designed to suit the understanding of the participants.

3.11. Ethical Consideration

The study involved human subjects to generate data, therefore, deliberate measures to avoid causing harm were put in place. The study was approved by the ethics committee before implementation. Objectives and significance of the study were explained to the participants. The following were the expected ethical issues; privacy, informed consent and confidentiality. To ensure privacy, interviews were conducted in a place selected by respondents and in the absence of other community members. Before consent forms are signed, an information sheet was given to the respondent to read. An interpreter was engaged to assist in translating to participants who could not read. Respondents were informed that they were free to withdraw at any time without being disadvantaged. Participants were made aware that data to be collected will be stored in a secure place (Peterson, 2004).

3.12 Conclusion

This study employed a mixed methods approach to investigate key aspects of maternal and neonatal healthcare in Luapula Province, Zambia. Through a combination of quantitative analysis and qualitative exploration, the research questions were addressed. Incorporating both quantitative and qualitative methodologies enriched the understanding of the intricate dynamics within maternal and new born healthcare. The findings held significant implications for healthcare practitioners, policy makers and researchers in Luapula Province, Zambia. By leveraging technology and addressing the multifaceted factors identified, it was possible to enhance the quality of care and improve maternal and new born health outcomes, ultimately advancing healthcare in this region.

CHAPTER FOUR

4.0. Results

4.1. Socio-demographic traits

The social-demographic traits had shown that out of the four districts sampled, Mansa district (n=787) had the highest number of referrals to MGH from 2018 to 2021 while Nchelenge district (n=261) had the lowest number of referrals to MGH during the same period. Furthermore, the results had shown that Mansa district(n=180) had more prior communication using the moderated whatsapp messaging group while Nchelenge district (n=47) had the least prior communication using the moderated whatsapp text messaging group. Of the four sampled districts, it had been observed that more maternal and new born mortalities were recorded from 2018 to 2021 that were sent to MGH without prior communication as opposed to those that occurred with prior communication during the same period.

Table 1: Number of referrals made to MGH against those posted on the moderated whatsapp text messaging group

District	Referral year	Referrals made to MGH	Referrals posted on moderated whatsapp messaging group
Mansa	2018	186	8
	2019	209	40
	2020	176	86

	2021	216	112
Total		787	246
Chipili	2018	130	9
	2019	105	8
	2020	128	57
	2021	150	106
Total		513	180
Chembe	2018	99	12
	2019	102	24
	2020	189	50
	2021	145	117
Total		535	203
Nchelenge	2018	60	2
	2019	56	3
	2020	67	19
	2021	78	23
Total		261	47

Table 2: Outcome of the cases posted on the moderated whatsapp text messaging group

District	Year of referral	Maternal	Newborn
Mansa	2018	Alive 6, Dead 2	Alive6, Dead 2
	2019	Alive39, Dead 1	Alive39, Dead 1
	2020	Alive 86, Dead 0	Alive 86, Dead 0
	2021	Alive 112, Dead 0	Alive 112, Dead 0
Chipili	2018	Alive 9, Dead 0	Alive8, Dead 1
	2019	Alive 8, Dead 0	Alive 8, Dead 0
	2020	Alive 57, Dead 0	Alive 56, Dead 1
	2021	Alive 105, Dead 1	Alive 106, Dead 0
Chembe	2018	Alive12, Dead 0	Alive 11, Dead 1
	2019	Alive 24, Dead 0	Alive 23, Dead 1
	2020	Alive50,Dead 0	Alive49, Dead 1
	2021	Alive117, Dead 0	Alive 117, Dead 0
Nchelenge	2018	Alive 1, Dead 1	Alive2, Dead 0
	2019	Alive 2, Dead 1	Alive3, Dead 0
	2020	Alive19, Dead 0	Alive 19, Dead 0
	2021	Alive23, Dead 0	Alive 23, Dead 0
Total		Alive 670, Dead 6	Alive 668, Dead 8

4.2. Impact of Moderated Whatsapp Text Messaging Group in Improving Maternal and Newborn Referral Outcome at MGH

Figure 1 below had depicted the maternal mortalities that happened at MGH with and without prior communication on the moderated whatsapp text messaging group by the referring districts from 2018 to 2021. It had been observed that more mortalities were recorded when no prior communication was done with 2021 (n=14) being the highest. It however, also had shown that less mortalities were recorded during the same period when communication was done prior to sending the referral cases with 2020 (n=0) recording no maternal death.

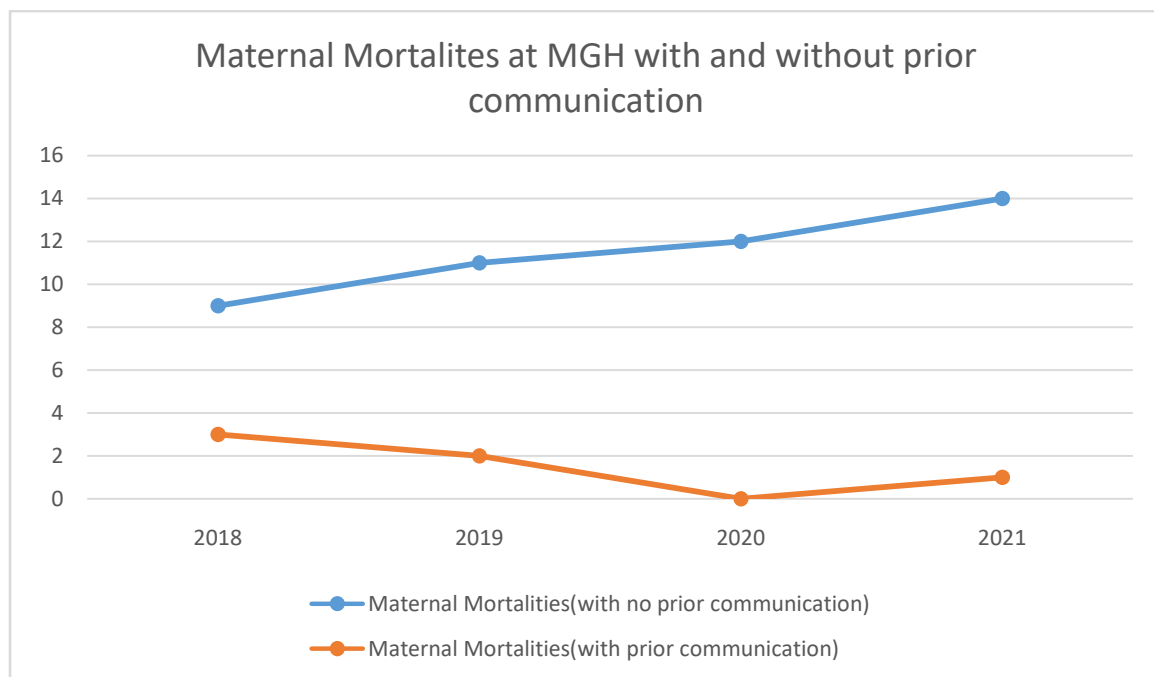Figure 1: showing maternal deaths from those posted on whatsapp vs those posted

Figure 2 below had depicted the new born mortalities recorded at MGH with or without prior communication on the moderated whatsapp text messaging group from 2018 to 2021. It had been observed that more new born mortalities were recorded with no prior communication with the highest being 2018 (n=60). It was further observed that less new born mortalities were recorded with prior communication during the same period with 2021 being the lowest (n=0).

Figure 2: showing new born mortalities at MGH with and without prior communication
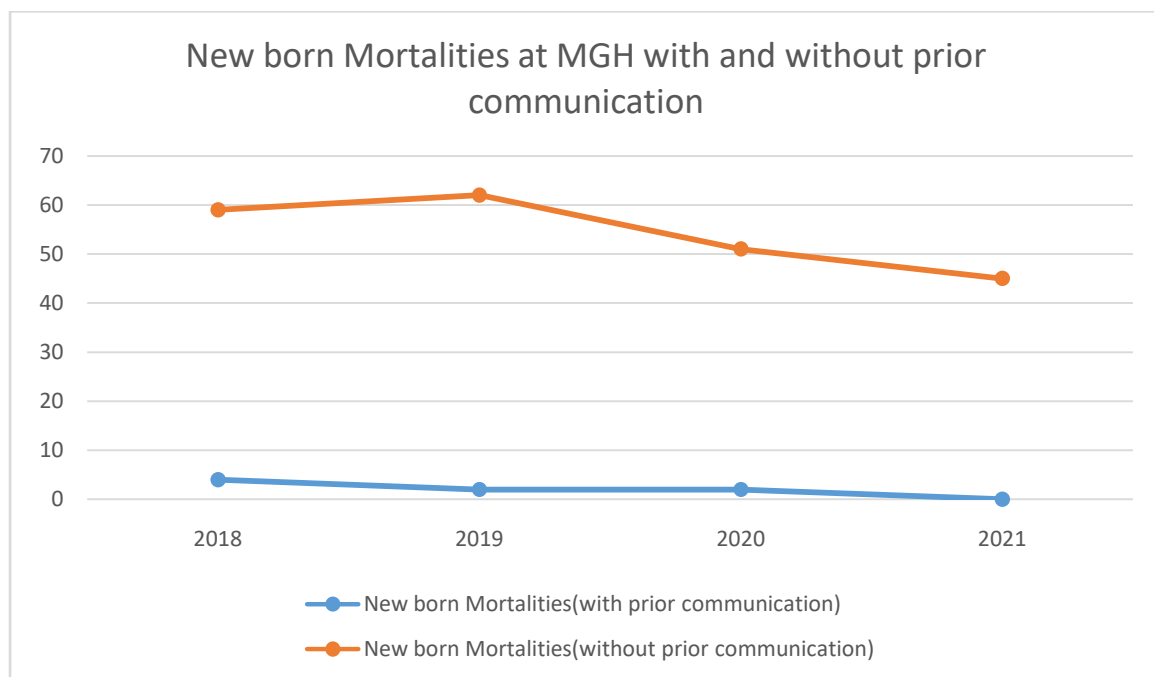
4.3. Factors affecting appropriate and adequate care of maternal referrals at MGH

It was observed by most of the FGD members that appropriate and adequate care of patients referred to MGH was heavily dependent on timely and prior communication via the moderated whatsapp text messaging group. Prior to the formation of this group, MGH was receiving a number of critical cases that they were not aware of and prepared for and this affected the outcome of those patients. FGD 2, 6 and 5 observed that the districts that only made phone calls had an impact on the level of appropriate and adequate care of the patients. This was attributed to the fact that due to MGH maternity ward being so busy, there was a tendency of not communicating with the team by the staff that received the call. Further, it was observed that, most details would have been forgotten thereby affecting the preparedness of the team for the referral cases. FGD 1, 3 and 4 stated that for the referrals that came with referral letters, there was still a level of compromise as they had challenges to read the

handwriting, some details were missing and in certain instances the referral nurse was not having full details on the patient. This compromised the level of care received by those patients as more time was wasted on taking history, cannulating and drawing samples from the patients. The members at MGH said that normally cases were referred with no prior communication and mostly they received patients without the referring nurse.

With the introduction of the moderated whatsapp text messaging group, FGD 8 and 6observed that adequate care was given to patients who were posted on the moderated whatsapp text messaging group prior to being sent. This was attributed to preparedness level by the MGH obstetric team. The team was fully prepared for the referrals as all the details were posted on the group and clarifications were made. FGD 3, 5 and 1 further added that when a critical patient wasreferred to MGH and the case had been posted on the group, preparations were made prior to the arrival of the patient. The specialists in the maternal ward, NICU, theatre and ICU usually waited for the patients and blood was also arranged if there was need. It was said by FGD 2 and 4 that the intervention of creating a moderated whatsapp text messaging group was rated as good and has greatly contributed to the reduction of maternal and newborn mortalities as patients receive the appropriate and adequate care.

4.4. Factors affecting Maternal Health Outcomes with respect to 3rd and 4th Degree Tears

The submissions from all the 8 FDGs were analysed and they revealed that the factors affecting maternal health outcomes were delayed referrals, underestimation of fetal weight, severe episiotomies and certain interventions used in labour and birth such as instrumental deliveries. Participants had pointed out bad roads from referring facilities which was coupled with poor communication and led to maternal and new born deaths. Participants from FGDs stated that the intervention of creating a moderated whatsapp text messaging group was a very good innovation ideal in reducing maternal and newborn mortalities in resource constrained set-ups like MGH.

CHAPTER FIVE

5.0.<u>Discussion</u>

The Impact of Moderated Whatsapp Text Messaging Group for Improving maternal and New Born Referral Outcomes among health facilities: a case study of Mansa General Hospitalin Luapula Province, Zambia was assessed using mixed methods. Four Districts within Luapula province were sampled for the period between 2018 and 2021 on how the use of this text messaging group impacted the maternal and new born health outcomes at MGH. The maternal cases referred to MGH from all the four districts during that period both with and without prior communication via the moderated whatsapp text messaging group and their outcomes were noted.

The research findings showed that all the four districts referred maternal cases to MGH during that period with Mansa districts referring more patients while Nchelenge districts referring the least number of patients. However, more cases were referred without prior communication on the moderated whatsapp text messaging group. In 2021, Mansa districts referred 216 patients but only 112 were referred with prior communication. It was also noted that more maternal deaths were recorded on those cases that were referred without prior communication with the highest record being in 2021 (14). This was similar with the new born mortalities, as the highest record was in 2018 (55) and lowest in 2021 (45). Of the cases referred with prior communication, few maternal and new born mortalities were recorded with zero mortalities recorded in 2020 and 2021 respectively. A similar study was conducted by Lweendo and Nkandu (2019) on impact of whatsapp group in Luapula province and the study concluded that such a group provided avenues for curbing maternal deaths in delivery of quality health services. This resonated well with findings of this study because, both studies had highlighted the importance of maternal referral whatsapp groups in preventing maternal deaths due to timely communication.

Findings of the study had shown reduction in both maternal and new born mortalities among those referrals with prior communication via the moderated whatsapp text messaging group. This was greatly attributed to improved communication between the referring district and the receiving hospital (MGH). For all the cases with prior communication, there was improved

preparedness that resulted in improved care for the cases. This indicates that there is impact in the use of moderated whatsapp text messaging group in improving maternal and new born referral outcomes at MGH. A similar study was conducted by Mumba (2019) on saving mothers giving lives- reduction of maternal and perinatal deaths. The study recommended that through the use of whatsapp moderated groups, maternal deaths could be avoided particularly the third delay as communication between the referring and receiving facility was enhanced. Another study by Owen, 2022 supported the feasibility of using whatsapp mobile messaging technology to address communication and coordination along the referral pathway while highlighting that referral delays remain problematic. The three studies had pointed out one thing in common, and that was improved communication as a powerful avenue to reduce both maternal and perinatal deaths through moderated whatsapp groups. Therefore, it can be concluded that moderated whatsapp text messaging groups are powerful tools ideal in curbing maternal and new born deaths ultimately contributing to improved maternal and new born outcomes.

The study further investigated factors associated with 3rd and 4th degree tears. The study pointed out that delayed referrals, underestimation of fetal weight, severe episiotomies and certain interventions used in labour and birth such as instrumental deliveries significantly contributed to 3rd and 4th degree tears. Similar findings were observed by Cohen, 2022who concluded that under estimation of fetal weight was an independent risk factor for 3rd and 4th degree perineal lacerations. Gommesen, 2019 further observed similar findings, and concluded that severe episiotomies increased the risk of perineal wound complications, that could be avoided with timely referrals. The studies recommended that using moderated whatsapp text messaging groups could help bridge the gap and significantly contribute to better maternal and referral outcomes. Therefore, all studies had one thing in common and that was recognizing the positive impact of moderated whatsapp text messaging groups in improving maternal and new born health outcomes.

5.1. <u>Conclusion</u>

Moderated Whatsapp Messaging Group are powerful mechanisms for improving maternal and new born health outcomes. This is because, the groupenhances effective communication in the referral system between the referring and the receiving facility. Furthermore, such groups are avenues for improved and adequate care in delivering of health services leading to better health outcomes. In addition, moderated whatsapp groups are powerful engines for better health outcomes with respect to 3rd and 4th degree tears and how best they can be managed. It is therefore, worth noting that, the impact of moderated whatsapp text messaging groups apply to a greater extent in delivery of health services in resource constraint hospitals like MGH.

5.2. <u>Recommendations</u>

- **Scale Implementation:** Based on the positive impact observed in Mansa General Hospital, consider scaling up the moderated whatsapp text messaging group intervention to other health facilities in Luapula Province and beyond. This can enhance the reach and effectiveness of the communication strategy, potentially improving maternal and new born referral outcomes across a broader healthcare network.

- **Training and Guidelines:** Develop comprehensive training programs and guidelines for healthcare providers participating in the whatsapp text messaging groups. This should include proper usage of the platform, guidelines for timely and accurate information sharing and strategies for maintaining patient confidentiality. Well-trained staff can maximise the potential benefits of the intervention.

- **Integration with Existing Systems:** Explore opportunities to integrate the moderated whatsapp text messaging groups into the existing healthcare information systems. This integration can streamline communication processes, enhance data collection and analysis and facilitate a more cohesive approach to maternal and new born care referrals. Compatibility with existing systems can improve sustainability and long-term effectiveness.

- **Community Engagement and Awareness:** Launch community engagement initiatives to raise awareness about the moderated whatsapp text messaging groups

among pregnant women, families and community leaders. By fostering a better understanding of the benefits and purpose of these groups, there's a higher likelihood of increased participation and adherence to recommended healthcare practices, ultimately contributing to improved maternal and new born outcomes.

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