PRISMA Model for Improving Maternal-Child Healthcare Outcomes in Rivers State, Nigeria

A thesis submitted for the degree of Doctor of Philosophy

by

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Abstract

Using the PRISMA model, the research aims to improve maternal healthcare (MH) in Rivers State, Nigeria. The need to address the problem is due to the high rate of deaths in the region. The problem stems from complex clinical and non-clinical factors such as cultural and religious practices, accessibility, acceptability and affordability issues, poor healthcare management practices, weak infrastructures and a low level of education. The interrelations and complexity between factors make it extremely difficult to ascertain the most significant impacts on MH outcomes. The consequence of this is that the intervening strategies deployed to manage MH problems in Nigeria struggle to match the actual causes of the problem. Hence, PRISMA is adopted in this study to support the risk management and mitigation process.

The PRISMA provided a holistic and evidence-based approach for addressing the complexities of factors associated with the system. It investigated the root causes of mortality in four distinct categories: technical, organisational, human-behaviour, and patient-related factors. In an explanatory sequential mixed method design, first, a PRISMA-based questionnaire (PRMQ) was administered to clinicians, and the data were analysed using the exploratory factor analysis to investigate the significant factors contributing to poor outcomes in participating hospitals.

The quantitative study revealed two distinct categories of failures in their order of riskiness. The first category was mainly internal issues resulting from inadequate patient safety culture and practices, lack of clinical equipment and necessary infrastructure, leading to unsuccessful obstetrics interventions and failures associated with organisational, technical and human-behaviour factors. The second category was the patient-related factors such as medical conditions, poverty, illiteracy, traditional medicines, and women self-medicating. Based on the factor analysis result, the first category ranked highest in the order of riskiness. A further

examination of the risk categories suggests that the first category of failures was preventable and patient factors were unpreventable in most cases, which is consistent with findings from previous studies. However, since the factor analysis revealed that the most significant factors were internal failures, the research stresses the need first to manage preventable issues as it positions the organisation strategically to manage unpreventable patient-related issues.

Following the quantitative study, a complementary semi-structured interview was conducted with 12 health experts, which provided more insight into failures in the system. The interview was manually transcribed and thematically coded into the PRISMA categories of risks, which provided holistic recommendations for improving MH in Rivers State. The recommendation includes internal and external actions for addressing the problem and, therefore, has implications for policies and clinical practice. Internal actions needed to improve MH in Rivers State are strategic human resource management, management oversight, regular internal audit, standard operating procedures, and information communication technology to coordinate clinical practices. Externally, the government is responsible for providing necessary infrastructure, healthcare funding, strengthening the insurance system, and instigating policies favourable to MH. The research recommends collaborations with diverse groups such as the traditional birth attendants, non-government organisations, community and spiritual leaders, educationalists, private investors and external regulatory bodies to strengthen healthcare practices. The healthcare providers' key role is to provide effective leadership, facilitate these relationships, and engage with multiple stakeholders.

Therefore, the study addressed the three research problems: lack of risk management and evidence-based practices in low-resource healthcare settings. Secondly, there is a lack of an integrated and holistic approach to improving MH delivery in Nigeria. Thirdly, intervention

employed in Nigeria to improve MH outcomes fails to progress into responsive actions involving multiple stakeholders

Theoretically, the PRISMA model is modified to include socio-economic factors, direct and indirect medical factors contributing to failures in the system, including factors relating to gross misconduct within the organisation as the research findings reveal implications of these factors in the Nigerian context. Also, the PRMQ designed by the researcher is a clinical tool that can support risk investigation and management. The research adds a new perspective to risk management in low-income countries and provides valuable insight into MH organisational governance literature.

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List of Abbreviations

AMO	Ability –Motivation-Opportunity
ANA	Antenatal Care Attendance
ART	Antiretroviral Treatment
BMSH	Braithwaite Memorial Teaching Hospital
COMAH	Control of Major Accidents Hazards Regulations
E-Health	Electronic Health System
ECM	Eindhoven Classification Model
EFA	Exploratory Factors Analysis
FMEA	Failure Mode and Effect Analysis
FMOH	Federal Ministry of Health
HRM	Human Resources Management
ICT	Information and Communication Technology
IPU	Integrated Practice Unit
M-Health	Mobile Healthcare
MH	Maternal Health
MM	Maternal Mortality
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MSS	Midwives Service Scheme
NDHS	National Demographic Health Survey
NGO	Non-Governmental Organization
NPC	National Population Commission
OBGYN	Obstetrics and Gynaecology
PPP	Public-Private Partnership
PRISMA	Prevention and Recovery Information System for Monitoring and Analysis

PRMQ	PRISMA-Based Questionnaire
RCA	Root Cause Analysis
SHRM	Strategic Human Resource Management
SOP	Standard Operating Procedure
STAMP	Systematic Theoretical Accident Model Process
TBA	Traditional Birth Attendants
UN	United Nations
UNICEF	United Nations International Children Emergency Fund
UNFPA	United Nations Population Fund
UPTH	University of Port Harcourt Teaching Hospital
WHO	World Health Organization
CTG	Cardiotocography
NHS	National Health System

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I dedicate this project to my parents, Late Hon (Chief) George Lenata Ngbor and Mrs Victoria Pobia Ngbor, for their fervent prayers and encouragement throughout the high and low periods of undertaking this study. They laid a strong foundation for my educational achievements and instilled discipline, perseverance, and hard work culture.

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Declaration

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DECLARATION

This Work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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Date 09/08/22

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This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used, the extent and nature of the correction is clearly marked in a footnote(s).

Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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Chapter One: Introduction

1.1 Background and Context

The high rate of maternal mortality (MM) is not just a female issue but a global problem that has attracted several international organisations such as the World Health Organisation (WHO), the United Nations (UN), the United Nations International Children Emergency Fund (UNICEF) and National Healthcare Systems around the world. In 2000, at the United Nation's summit, 189 world leaders, including the Federal Government of Nigeria, initiated the Millennium Development Goal (MDG) to reduce the under-five mortality rate by two-thirds (MDG-4) and three-quarters of maternal mortality rate (MDG-5) between 1990 and 2015 globally (MDG Endpoint Report, 2015). As a result, the MDG brought maternal-child healthcare (MH) to the forefront of national agendas.

For several decades, policymakers and stakeholders in Nigeria have developed numerous policies to reduce MM in Nigeria (FMOH, 2002). Following the MDG, policies developed in Nigeria focused on promoting health utilisation by creating public awareness and curbing financial constraints to healthcare accessibility. For example, the National Economic Empowerment Development Strategy for poverty alleviation (FGN, 2004). Public health education programs and the sexual and reproductive health policy were formulated to improve family planning and healthcare utilisation (FMOH, 2003; FMOH, 2006). Since Nigeria was ranked 187th out of 192 countries globally in 2002 (WHO, 2008b), the healthcare system became the focus of the national agenda. As such, quality improvement measures were adopted. For example, the Health System Development Project (World Bank, 2002); to improve quality of antenatal care and obstetrics emergencies and the Integrated Maternal, New-Born and Child Health (IMNCH); to facilitate service coordination across all levels of care from pregnancy through to the infancy stages (FMOH, 2007).

Regrettably, current research shows Nigeria made little or no significant progress towards achieving the MDG (Alkema et al., 2016). The maternal mortality rate in Nigeria is still very high, based on the most recent estimates of 917 per 100000 lives and contributes to 23% of the global deaths rate (WHO et al., 2019). The worrying mortality ratios in many African and Asian countries caused the United Nations to launch a new Sustainable Development Goal (3.1) and reduce maternal mortality ratios to 70 deaths per 100000 live births by 2030 (Alkema et al., 2016). While the new target might compel the healthcare institutions in developing countries to improve healthcare practices, the root causes of maternal death and their complex interrelations require a thorough examination to provide successful interventions.

Several researchers have attempted to investigate the clinical and non-clinical factors contributing to high maternal mortality in Nigeria and proffer solutions to the problem. Ntoimo et al (2018) identified complex institutional or clinical factors associated with maternal mortality across eight referral hospitals and six geopolitical zones in Nigeria, such as the low presence of the skilled birth attendance, poor management of obstetric emergencies and a weak referral system between the healthcare providers, as well as, interference from non-orthodox care providers (traditional and spiritual care homes). In Cross Rivers State, Nigeria, the inadequacy of health workers and lack of public funds resulted in poor health outcomes (Eno, 2010). Similarly, Okonofua et al (2018) revealed the alarming provider-patient ratio of 1343:1 for doctors and 222:1 for midwives in referral hospitals in Nigeria which has a significant negative correlation with maternal deaths. Including the appalling state of clinical infrastructure indicated in many research (Okonofua et al., 2017; Izugbara & Wekesah, 2018; Ntoimo et al., 2019) and the lack of comprehensive or integrated obstetrics care services (Erim et al., 2012). Consequently, poor access to healthcare prevents timely intervention during obstetrics intervention and the inability to manage chronic conditions before and during

pregnancy (Mackintosh & Sandall, 2016). Barker & Mate (2012) indicated that poor access to care contributes to three times more HIV transmission from mother to unborn child.

The relationship between MM ratios and non-clinical factors or socio-economic factors is well established and documented in several studies: illiteracy (Adjiwanou et al., 2018; Adedini et al., 2014); harmful religious and cultural practices (Yarney, 2019; Aborigo et al., 2015); poverty (Ezeh et al., 2014; Sunkanmi & Abayomi, 2014); and the lack of women's autonomy in their homes (Pratley, 2016; Kaiser et al., 2019). It is evident, as discussed above, that there are many factors associated with MM, which makes it difficult to manage patient safety risks. More so, identifying the most significant risk factors is equally very challenging. Bankole et al (2009) indicated that the main reason for the failed MH policies in Nigeria is the lack of effective implementation and monitoring process. There is a lack of healthcare accountability and political will towards improving MH outcomes in Nigeria (Shiftman, 2007).

Secondly, there is a need for a context-specific strategy for reducing MM based on regional disparities associated with MH outcomes in Nigeria (Adeyanju et al., 2017; Ushie et al., 2019). The North West and North East regions have higher mortality rates than the South-East, South-West and South-South regions (Ononokpono et al., 2014; Bankole et al., 2009). Wealth-related inequalities, illiteracy, cultural and religious preferences influenced healthcare choices across regions, implying that one policy does not fit all regions (National Population Commission-NPC & ICF Macro, 2009). Say & Raine (2007) suggests an interventive strategy that reflects the needs of the people in a specific geographic region.

Thirdly, the complexities of factors associated with the MM calls for a holistic and integrated approach to reducing MM. Gil-Gonzalez et al (2006) stated that an integrated approach must

address both clinical and non-clinical causes of MM in this context. In agreement, Kuruvilla et al (2014) stressed the need for an integrative and cross-sectional approach post-2015 for sustainable development goals aligned to good governance and evidence-based strategies.

However, some efforts to improve the delivery system was adopted: a large scale deployment of to rural areas (Abimbola et al., 2012), provision of National Health Insurance (Onoka et al., 2014), more transport services to hospitals and the use of mobile phones to support health utilisation (Obasola et al., 2015; Omole et al., 2018). Unfortunately, more access to healthcare does not guarantee a better outcome; instead, the quality of delivery (Porter & Lee, 2013). A holistic approach should improve the affordability and accessibility of healthcare concurrently (Erim et al., 2012, Porter & Lee, 2013). In Bolivia, which had one of the highest rates of maternal mortality in the Western Hemisphere of 190 per 10000livebirths, an integrated approach was employed (Shahriari, 2013). Hospitals were built with stoves for making tea and wooden floors, infusing traditional or inter-cultural practices, resulting in increased healthcare utilisation and better health outcomes.

Porter's Valued-Based Concept provides a blueprint for an integrated healthcare system that incorporates different facets of the critical clinical component such as an improved payment system, the Integrated Practice Unit for effective diseases management and proper healthcare coordination across geographic regions (Porter & Lee, 2013). However, to design and implement a holistic system, there ought to be an extensive investigation into the root causes of MM (Ginter et al., 2013). Therefore, an effective risk management process will support an extensive evaluation of patient safety risk and mitigate risk factors (Brewtster et al., 2015; Westgard, 2013). Unfortunately, there is a lack of evidence-based practices to guide health policy development and decision-making process in Nigeria (Callister & Edward, 2017; Uneke

et al., 2010; Enuku & Igbinosun, 2012). The lack of holistic approach results in partial mitigation of MM risks, which revealed a disconnect between clinicians, policymakers, researchers, and the healthcare recipients (Uneke et al., 2010).

The study aims to improve MH outcomes in Rivers State using the Prevention and Recovery Information System for Monitoring and Analysis (PRISMA) model. The PRISMA is a holistic framework for investigating risk under four broad categories; organisational, technical, human behaviour and patient-related factors (van der Schaaf & Habraken, 2005; Habraken & van der Schaaf, 2010). This is different from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) which is often used to synthesize the literature. The PRISMA was adopted to investigate the root causes of MM in three major hospitals; the University of Port Harcourt Teaching Hospital (UPTH), Braithwaite Memorial Specialist Hospital (BMSH) and the Military Hospital. The research provides further recommendations to address problems identified from the health expert's perspective, which has implications for clinical practices and policy development,

Hence, this research provides a context-specific, evidence-based and integrated approach for improving outcomes in Rivers State, Nigeria, adding a new dimension to risk management and healthcare organisational governance. The following subsections present the geographical background of the study, the justification for the study and the original contribution to research.

1.2 Geographical Background and Justification for Study.

Nigeria is diverse, with thirty-six states and five hundred (500) ethnic groups with several languages. As of 2020, the country's population is over 204 million (World Population Review, 2020). Forty-nine per cent of the population are Christians, 48.8% Muslim, while 2% practised

no or other religion as shown in the Nigeria 2018 International Religious Freedom Report by the United States Department of State-USDOS (2019). This report is indicative of a highly religious country, and religion influences healthcare choices (Denis, 2013; Dotsey & Kumi, 2019). River State is located in the South-South region of Nigeria, with its capital in Port Harcourt, which is the research area, as shown in Figure 1.1. It is commonly known as the oil-rich state but suffered many political setbacks over the years and is among minority groups in Nigeria. There are thirty-one million people with 40 ethnic groups in the South-South region. The cultural diversity of Rivers State is due to multinational companies attracting people from all over the country and internationally.

Figure 1.1: Map of Nigeria

Three major hospitals in Rivers State include the UPTH, BMSH and the Military hospital. These are the leading government specialist hospitals and attract patients from the Niger Delta regions with a catchment population of 10 million people (Brisibe et al., 2014). The unique position of hospitals in the state and the growing demand for quality care by patients put excessive pressure on staff and the hospitals.

The Nigeria Demographic and Health Survey (NDHS) report for 2008 and 2018 gives an overall description of maternal health indicators of the women in Rivers State in comparison with other regions (NPC & ICF, 2009; 2019). This report shows that women in South-South were more likely to be overweight than in the Northern states, which is indicative of the overall health of women in this region. It is evident from previous studies that the woman's medical condition has a strong link with the well-being and survival of the child (Nasreen et al., 2013; Lin et al., 2017; Souter et al., 2017). Other inferences drawn from the NDHS findings are the high unmet need for family planning, the absence of skilled birth attendance, and health facility deliveries contributing to the MM.

The report shows 84/1000births infant deaths and 138/1000births under-five deaths due to inadequate access to healthcare (NPC & ICF Macro, 2009). These figures are consistent with a retrospective review of maternal deaths at the Gynaecology and Obstetrics (OBGYN) Department UPTH from 1999-2004, which showed a significantly high MMR of 23124/100000deaths recorded from preeclampsia complication which was significantly higher for women that registered late for antenatal care compared to the 234/100000deaths for mothers that used the antenatal care services on time. However, Fubara et al (2007), after observing sixty retrospective autopsies of maternal deaths at the UPTH and concluded that maternal mortality in this region is an obstetric care problem. Fubara and colleagues identified serious

clinical issues influencing medical interventions and recommended an efficient referral system, obstetric emergency care, blood transfusions, an integrated approach to healthcare, and collaborations with traditional providers. In agreement, a recent evaluation of deaths in Rivers State by Orazulike et al (2017) showed the highest contributor to maternal deaths among women of reproductive age was due to chronic diseases, which stress the need for effective management of patient conditions. However, the poor state of clinical infrastructure is a significant challenge (Okonofua et al., 2017). Although, the presence of a health facility may not facilitate health utilisation as the perceived quality of care by women ultimately determines health utilisation (Lopes et al., 2015) as well as other socio-economic factors previously discussed. The APHRC report (2017) shows that only thirty-six per cent of women in Nigeria used facility-based delivery during childbirth, and forty-two per cent utilise antenatal care services. These values are quite low, so attention is needed to promote health utilisation and reduce MM in Nigeria.

MM has negative social and economic implications, especially in developing countries (Kirigia et al., 2014). It affects the family finances, especially where the woman is the primary source of income or contributes to family bills (Yamin et al., 2013; Bazile et al., 2015). As a result, older siblings withdraw from school to support their families (Molla et al., 2015). In many cases, after the death of a mother, caregivers are unable to provide education, emotional and psychological support for children, which exposes them to sexual risks, especially in girls (Knight & Yamin 2015). Other consequences of maternal death are malnutrition, adult depression, poor healthcare access, and adolescent sexual risks (Pande et al., 2015). Also, research indicates that pregnancy complication is a leading cause of disability for women in their reproductive age and contributes significantly to infant mortality (Moucheraud et al., 2015; Houle et al., 2015), increased suicide and mortality risks in adulthood (Hollingshaus &

Smith, 2015) which relates to the claim that the survival of a child correlates with the survival of the mother (Scott et al., 2017).

MM infringes on human and reproductive rights, and it is an injustice to women in this region (Smith & Shiftman, 2016). Therefore, there is a need to improve MH outcomes of women in Rivers State. This research is specific to the South-South region, and it will provide insight into socio-political factors, the prevalent state of women's health and the current condition of the healthcare system in Rivers State. It investigates the root causes of the problems and makes recommendations for improvements. The research findings can be generalised to other regions in Nigeria and Sub-Sahara Africa with similar MH characteristics.

1.3 Research Intention

1.3.1 Research Problem and Rationale for Study.

This research started with an extensive literature review on MH in Sub-Saharan Africa and interventions adopted in Nigeria to improve MH outcomes. Also, risk management approaches utilised in developed countries to improve clinical practices are reviewed and their suitability in this context. There are three main research problems identified in the process. First, there is a lack of risk management and evidence-based practices applied in low resource healthcare settings (Enuku & Igbinosun, 2012; Callister & Edward, 2017). Secondly, there is a lack of an integrated and holistic approach to improving MH delivery in Nigeria (Erim et al., 2012). Thirdly, the current intervention employed in Nigeria to improve MH outcomes fails to progress into responsive actions involving multiple stakeholders (Hofman & Mohammed, 2014; Obasola et al., 2015). Hence, the risk management approaches adopted to improve outcomes in Nigeria are inadequate and consequently ineffective.

Several approaches are implemented in Nigeria, including the popular Abiye project, where call centres enable women to access support remotely during emergencies and transportation made available to convey patients to hospital centres. ICT infrastructure such as the Malahfiya Project, Mobile Community Based Surveillance (mCBS) and the Open Medical Record System (OpenMRS) is designed to support medical diagnosis and facilitate prompt referrals (Obasola et al., 2015) and the Midwives Service Schemes (MSS) to promote large scale deployment of clinicians to remote areas (Abimbola et al., 2012). Strategies such as the Maternal Death Review, a retrospective review of deaths (Bandali et al., 2016) and WHO Safe Child Checklist used to manage obstetrics emergencies (Spector et al., 2012, Dohbit et al., 2019). In this context, the Safe Child Checklist required clinical training, leadership involvement to facilitate its use and wider acceptability (Perry et al., 2017). Further actions were not implemented to prevent re-occurrences of mishaps with the Maternal Death Review (Hofman & Mohammed, 2014). ICT platforms were relegated to a data collection tool and did proceed to patient safety strategies or initiatives (Obasola et al., 2015). Although some patient-related problems, the use of ICT improved health utilisation, especially with the Abiye project (Love, 2013), other failures in the system such as improved coordination among clinicians, availability or preparedness to tackle obstetrics emergencies, and blood supply issues must be addressed (Abimbola et al., 2012; Love, 2013). Technical issues like support with the use of specialised equipment, reading of cardiotocography (CTG) (Bervella & Al-Samarraieb, 2019) and effective writing of clinical reports could further enhance the efficiency of existing intervention strategies (Hofman & Mohammed, 2014).

Current strategies lack a holistic approach towards mitigating risks and do not integrate multiple stakeholders required for a successful outcome (Hofman & Mohammed, 2014; Millard et al., 2015; Obasola et al., 2015; Perry et al., 2017). Previous strategies failed to tackle

active and latent failures in the system, such as organisational or management problems, technical issues, human behaviour issues. Hence, the rationale for the study is to employ an appropriate risk management method such as the PRISMA that incorporates all aspects of healthcare, including patient-related problems (Martijn et al., 2012; van Galen et al., 2016) and to promote evidence-based research in maternal care (Enuku & Igbinosun, 2012; Callister & Edward, 2017).

1.3.2 Research Questions

i. What are the main clinical and non-clinical risk factors contributing to MM in Nigeria?

ii. What are the relationships that exist between risk factors?

iii. What are the health professionals' perceptions of risk factors?

iv. How can the quality of MH outcomes be improved in Nigeria?

1.3.3 Research Aim

The research aim is to improve MH outcomes in Rivers State, Nigeria, using the PRISMA model.

1.3.4 Research Objectives

1. To investigate and analyse clinical and non-clinical risk factors contributing to MM using the PRISMA Model.
2. To investigate the relationship between risk factors and their order of riskiness using Exploratory Factor Analysis (EFA).
3. To coordinate health experts' perceptions of clinical and non-clinical risks and discuss how the MH delivery system can be improved in Nigeria.

4. To make practical recommendations for improving MH outcomes in Rivers State, Nigeria.

1.4 Research Methodology Overview

This research utilises a mixed-method approach, and the philosophical perspective for the research design is pragmatism (Johnson & Onwuegbuzie, 2004). Pragmatism enables suitable methods to achieve the research objectives (Creswell, 2014). The study commenced with a quantitative inquiry, then the qualitative method in an explanatory sequential mixed method design (Creswell, 2005). Both methods are complementary and provide cross-validation for the study (Greene et al., 1989; Johnson et al., 2007). Below is an overview of research methodology linked to the research objectives:

To achieve Objective 1, which is to investigate and analyse clinical and non-clinical factors contributing to MM, a PRISMA based questionnaire (PRMQ) will be administered to 250 clinical and managerial staff at three hospitals UPTH BMSH and the Military Hospital in Rivers State. Survey data will be analysed with the SPSS tool to obtain descriptive statistics of risk factors; technical, organisational, human behaviour and patient-related factors. By so doing, valuable insight into the healthcare delivery system in participating hospitals. Then, a follow-up EFA using Principal Axis Factoring with oblique rotation (Costello & Osborne, 2005) will be employed to ascertain the most significant factors influencing MH outcomes and the relationship between these factors to achieve Objective 2 (Phase 2). The EFA interprets the most difficult interpretable correlation between variables (Reio & Shuck, 2015).

In order to have a heightened understanding of the quantitative findings derived from Objectives 1 and 2, the third phase of the research employed a follow-up qualitative approach

using a semi-structured interview with Twelve (12) health experts. These were mainly very senior consultants and researchers in the MH field, and their perceptions of clinical and non-clinical MM risks provided insight into how the quality of service delivery can be improved. The transcribed semi-structured interview is thematically coded into PRISMA themes to achieve Objective 3. Finally, the health experts suggested recommendations for improvements MH (Phase 4). The improvement recommendations for reducing MM in Rivers State, Nigeria, achieved Objective 4. Chapter Four presents the justification for the chosen research design, methodology, philosophies and triangulation for the study.

1.5 Research Contribution

This research identifies MH risk factors and prioritises their management in Nigeria using the PRISMA model, which contributes MH studies (Mackintosh & Sandall, 2016; Callister & Edward, 2016; Izugbara & Wekesah, 2018; Okonofua et al., 2017) and PRISMA operationalisation (Fluitman et al., 2016; De Vries et al., 2015; van Galen et al., 2016; Martijn et al., 2012). Thereby introduced a new dimension to MH management through our PRISMA based questionnaire (PRMQ) that provides a holistic clinical data collection instrument for managing patient safety and a semi-structured interview with heath experts, which informed the development of the improvement measures. The PRMQ is an original contribution to healthcare studies, and to the researcher's knowledge, this is the first application of the PRISMA model to MH study in Nigeria and Sub-Sharan Africa regions. The researcher further provides insights on the theoretical efficacy of the PRISMA model in the developing countries context as the model was applied majorly in the Netherlands (Habraken & van der Schaaf, 2010; van Galen et al., 2016). The PRISMA is modified to include failures due to socio-economic factors, medical factors and gross misconduct. It adds a new perspective to risk

management in low-income countries and provides valuable insight into healthcare organisational governance literature in MH.

1.6 Outline of the Thesis/Outcome of Chapters

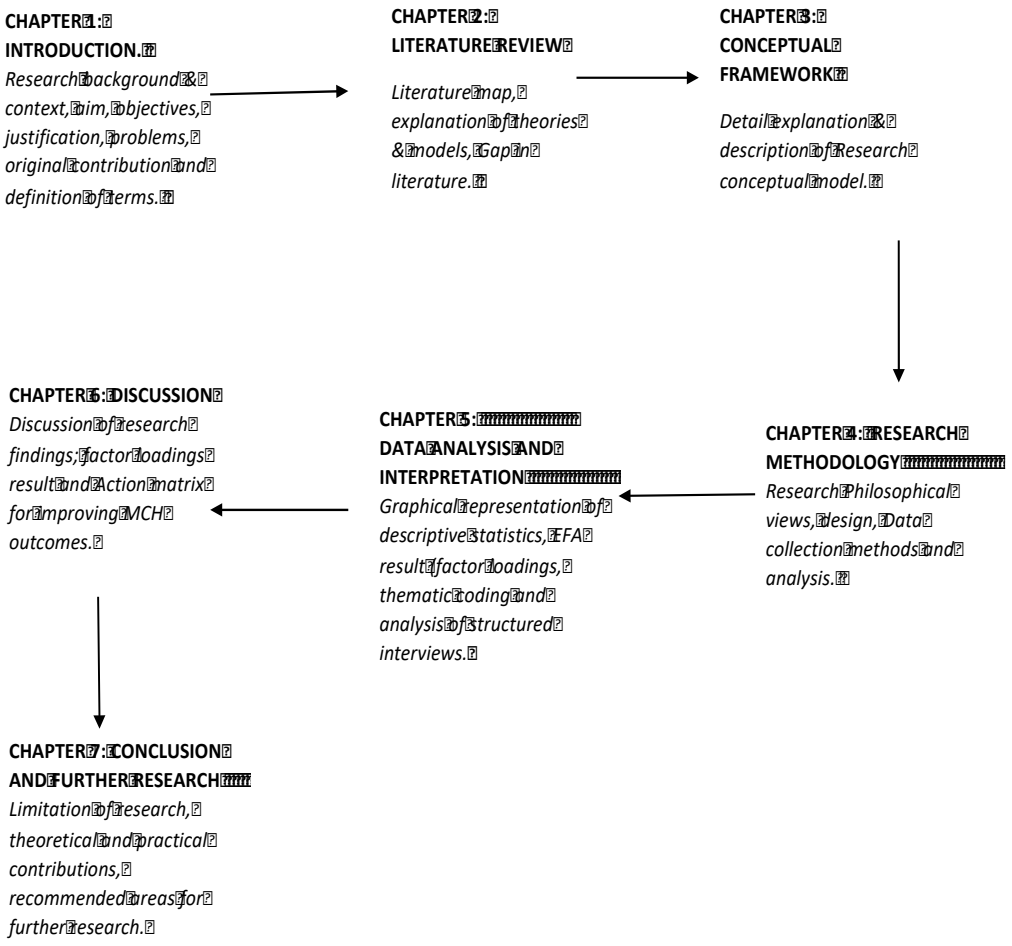


Figure 1.2: Outline of the Thesis

This current Chapter presents a detailed description and explanation of the background and context of the study, an overview of the geographical location of the study, the general health status of women in Rivers State, Nigeria and the justification for context-specific research in

MH. The chapter future highlights, the research gap, intentions and the original contributions. The rest of the thesis is presented in the subsequent six chapters, as shown in Figure 1.2.

Chapter 2 presents a detailed literature map of clinical and non-clinical factors contributing to MM in Sub-Sharan Africa and the complex inter-relationship between these factors, as well as the implications of the high mortality rate in low-income countries. This Chapter gives an extensive review of the intervention strategy adopted in Nigeria for improving MH outcomes and critic of the existing risk management approach, which revealed the research problem. It was, therefore, necessary to examine the risk management process used in developed countries to enhance patient safety. The Chapter further reviewed Porter's value-based theory, value chain analysis in health care, safety-quality concept, and root cause analysis techniques used in healthcare. The PRISMA model emerged as the most viable method for investigating and analysis risk in healthcare and the Nigeria context.

Chapter 3 presents the conceptual framework or model for improving MH outcome using the PRISMA-medical version. It begins by discussing the current application of the PRISMA in clinical settings. Also, it provides a detailed description of its three core components of the model; the Causal Tree Incident Description, Eindhoven Classification Model (ECM) of failures and the Action Matrix to improve patient outcomes. The Chapter further elaborates on the PRISMA categories of failures such as, the technical, organisational, human behaviour and patient-related factors as it is evident from previous studies that these factors have a significant impact on clinical outcomes. The PRISMA informed the conceptual design for this study as mitigating these risk factors using this model will ensure patient safety, improve quality of MH delivery and ultimately, healthcare outcomes.

Chapter 4 contributes to the use of pragmatism in clinical studies which supports the argument that neither qualitative nor quantitative approach is sufficient by itself, but when complementary the integrity of both methods is preserved. Therefore, the research adopts an explanatory sequential mixed method design because it protects the authenticity of the naturalist method while strengthening the quantitative findings. The Chapter further aligns the research objectives to data collection and analysis methods in four phases: Phase 1: Quantitative Inquiry using PRISMA-based Questionnaire (PRMQ); Phase 2: Exploratory Fcator Analyis; Phase 3: Follow–up qualitative inquiry, using semi-structured interviews with health experts and; Phase 4: recommend improvement measures for improving MH in Rivers State. The Chapter provides justifications for chosen data collection methods and analysis.

Chapter 5 presents a graphical representation of research findings in two parts. Part A findings show a descriptive analysis of participant's demographics and risks factors in the different categories: technical, organisational, human behaviour and patient-related factors. It also shows the most significant contributors to poor outcomes from EFA results. On the other hand, Part B presents a qualitative result. The thematic coding of the semi-structured interview with health experts includes which includes; Theme 1: Root causes of maternal mortality, Theme 2: Health experts' proposed plan of action for improving outcomes and Theme 3: Strategic approach for implementing the action plan and the responsible authorities.

Chapter 6 revisits the research questions and objectives and discuss the quantitative and qualitative findings extensively. The Chapter discusses the most significant clinical and non-clinical risk factors identified from EFA. The Chapter will also describe and explained the structural improvement measures and responsible individuals to facilitate the change process in the MH delivery system.

Chapter 7 re-evaluates the entire research, the research aims, intentions, limitations and generalisability. This Chapter further highlights the practical and theoretical contribution of this study to the MH delivery system. It also summarises the recommended internal improvement measures, highlights the network of relationships for sustainable change and explains the modifications of the PRISMA in the Nigeria context. Also, providing a further recommendation for an alternative risk investigation method such as the use of the incident report for future studies, provided the accuracy of health records can be guaranteed.

1.7 Underlying Definitions

Maternal Mortality: The International Statistical Classification of Diseases, 10th revision (ICD-10), defines maternal death as: "The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (WHO 2011, p.156).

Child or Infant Mortality: is defined as "the number of children that die under one year of age in a given year, per 1,000 live births" (OECD 2019, p.80)

Maternal Mortality Ratio (MMR): is defined as "the number of maternal deaths during a given time period per 100 000 live births during the same time period". (WHO et al., 2019, p.11)

Service Integration: is defined as “the management and delivery of health services so that clients receive a continuum of preventive and curative services, according to their needs over time and across different levels of the health system.” (WHO 2008a, p.4)

Chapter Two: Literature Review

2.1 Introduction

This research is on MH in Rivers State, Nigeria, and the focus on maternal outcomes is because a mother's health directly impacts neonatal outcomes (Scott et al., 2017). So, infant or neonatal care by itself is not within the scope of this study but has a link to maternal outcomes (Houle et al., 2015; Scott et al., 2017; Chorchia et al., 2013; Kertz et al., 2008). Specifically, in low-income countries, a child's survival is hugely dependant on the quality of maternal care and infant death following the death of a mother is typical (Clark et al., 2013; Chorchia et al., 2013). A study conducted by Scott et al (2017) in West Africa using a Cox Proportional Hazard Model revealed that children were more likely to die if their mother died than those with living mothers. There is also a correlation between maternal death, HIV/AIDS pandemic and child survival in low-income countries (Houle et al., 2015).

Masho & Archer (2011) indicated that maternal characteristics such as low birth weight and gestational age contributed to preterm births and infant deaths. Similarly, maternal sensitivity and anxiety could affect child outcomes (Kertz et al., 2008), and depression affects infant growth (Nasreen et al., 2013). Prenatal and postnatal emotional stress impacts a child's cognitive and temperamental developments, respectively (Lin et al., 2017). Also, chronic conditions such as diabetes, hypertension, asphyxia, and respiratory infection significantly impact infant outcomes (Lassi et al., 2014). A quality outcome should go beyond just having a healthy baby to enhancing the quality of care and the overall experience for women (Simelela, 2018). Achieving the best possible outcomes is not besieged with challenges. Say and Raine (2007) revealed complex clinical and non-clinical factors associated with undesirable outcomes for women (Say & Raine, 2007). As such, to tackle MM, a holistic evaluation of the problem is required and an appropriate intervention strategy that considers the complexity of the

problem (Gil-Gonzalez et al., 2006; Callister & Edward, 2017; Erim et al., 2012). Hence, a comprehensive literature review is adopted.

The rationale for a comprehensive literature review is to gather a broader knowledge of the root causes of MM in Sub Saharan Africa and Nigeria. A comprehensive literature review is distinguished from a systematic literature review, which seeks to answer a clinical question using pre-specified eligibility criteria. In studies where there are highly complex clinical and non-clinical factors contribute to the high rate of MM, a comprehensive literature provides s holistic overview of the subject. It will also enable the researcher to identify research gaps, particularly in the area of risk management or mitigation processes employed in Nigeria, which provides an insight into why there is a lack of progress in improving health outcomes for women in these regions. The literature review commences with exploring the state of the MH globally, in low-income countries, Sub-saharan African areas, and Nigeria (Section 2.2). Secondly, comprehensive literature allows for a detailed enquiry of clinical and non-clinical factors contributing to MM from published sources of information and global health management literature search using search engines such as ProQuest, Science Direct, PubMed, Ovid, EBSCO. Figure 2.1 shows these factors contributing to MM from existing literature. Thirdly, it allows for an in-depth analysis of Nigeria's interventions or strategies to improve MH and reasons for failures with current risk management strategies (Section 2.5). Fourthly, through a comprehensive literature review, risk management strategies adopted in developed countries can be explored and a justification drawn for using PRISMA as the most effective tool in improving MH in Nigeria. The limitations and assumptions with PRISMA in the Nigerian context are discussed in detail (Section 2.7).

2.2 Overview of Global MH outcomes

Despite many decades of international efforts towards improving MH indicators, several countries, especially in Sub-Saharan Africa, are still experiencing high rates of deaths. In 2015, more than 300,000 women lost their lives due to pregnancy-related complications, and the highest contributors to these figures were from low-income settings (Alkema et al., 2016). In most cases, the causes of MM are preventable as the direct causes of deaths are known, and medical interventions are required to improve MH outcomes (Spector et al., 2012; Ronsmans & Graham, 2006).

The legalisation of abortions and safe practices for terminating pregnancies and providing quality care during childbirth are needed to prevent maternal mortality and morbidity (Campbell et al., 2016; Awoyemi & Novignon, 2014). Access to skilled birth attendance has been promoted as one of the primary strategies for improving MH outcomes globally (Storeng & Behague, 2017), as it enables skilled professionals to identify complications and make prompt referrals to higher levels of care (WHO, 2004). However, skilled birth attendance is not a guarantee for a successful MH outcome as hospitals in low-income countries do not have the necessary human capability and infrastructures to deliver quality care (Okonofua et al., 2017, Izugbara & Wekesah, 2018). Clinicians are untrained, and there is a weak referral system across hospitals for effective diagnosis and treatment (Ntoimo et al., 2018). Consequently, many deaths occur in hospital facilities despite skilled birth attendance (Mbachu et al., 2017; Lange et al., 2016). The global community is a burden to improve MH outcomes, channelled through the Safe Motherhood Initiative launched in 1987, followed by MDG for reducing maternal mortality between 1990 and 2015 and now through the Sustainable Development Goal (SDG) 3.1 (WHO et al., 2019).

Although, globally, MM reduced from 342 deaths to 211 deaths per 100,000 live births and 878 deaths to 542 deaths per 100,000 live births in Sub-Saharan Africa between 2000-2017 (WHO et al., 2019). On the other hand, Say et al (2018) expressed concerns about neglecting MH maternal morbidity issues. Morbidity is an overarching term that refers to mental or physical illness or disability relating to pregnancy and childbirth, which might not be life-threatening but affects the quality of life (Koblinsky et al., 2012). Under the sustainable development agenda for improving maternal health, the emphasis is now on morbidity issues due to their importance and impact on the quality of life (Say et al., 2018). For many women, especially in low-income countries, childbirth has led to preventable illnesses and life-changing issues, and these morbidity records are inaccurate due to a lack of standardised reporting system globally and inadequate health information system (Firoz et al., 2013; Koblinsky et al., 2012).

Maternal morbidity statistics reveal that for everyone maternal death due to pregnancy-related issues, twenty to thirty other women experience chronic morbidity, which changes their ability to function normally (Firoz et al., 2013; Chou et al., 2016). Women who developed obstetrics fistula, an uncontrollable flow of urine from the genitals, were abandoned by their partners and faced with social problems (Widmer et al., 2018). In many cases, this condition is preventable if there is access to modern obstetrics or maternal care (Widmer et al., 2018).

The American College of Obstertics and Gynaecology-ACOG (2015) refers to maternal care as all stages of care during pregnancy trajectory; antepartum, intrapartum and postpartum periods. However, Damayanti et al (2019) included the pre-pregnancy or marriage stage in the pregnancy trajectory because, during this period, women utilising healthcare can get helpful support and advice before embarking on their childbearing journey. In essence, mortality and

morbidity issues are manageable with effective maternal care, such as proper treatment and management of chronic diseases throughout pregnancy (Lassi et al., 2014; Damayanti et al., 2019), including health promotion and preventive intervention (Suthar & Patel, 2017).

Antenatal or antepartum care is an essential phase of maternal care, and it requires a holistic and coordinated approach to MH, continuous risk assessment and psychological support for pregnant women (Sreelatha et al., 2015). The United Nations Population Fund-UNFPA (2017) states That women have at least four (4) antenatal care visits as it provides an opportunity for early and detailed health assessment and management of unmet health needs. During this period, women can get advice on nutrition, weight, blood pressure, glucose level, and birthing plan. Globally, while 86 per cent of pregnant women access antenatal care with skilled health personnel at least once, only three in five (62 per cent) receive the recommended four antenatal visits (UNICEF, 2019). In regions with the highest rates of maternal mortality, such as sub-Saharan Africa and South Asia, even fewer women received at least four antenatal visits based on estimates from UNICEF (2019). These were fifty-two per cent and forty-six per cent, respectively.

The objective of antepartum care is to ensure a healthy child is born without any harm to the mother in the process (Sreelatha et al., 2015). Antenatal care ensures early diagnosis of complications and appropriate intervention is initiated. For example, the use of antenatal steroids in late preterm periods prevents infections and respiratory deaths (Souter et al., 2017). Antenatal care screening helps to prevent transmission of HIV from mother to child through the use of antepartum antiretroviral therapy (ART), intrapartum and postpartum prophylaxis (Patricio et al., 2015). Also, an antenatal care management program that allowed women with complicated obstetrics cases such as fetal abnormalities, hypertensive disorder, preterm labour,

and other conditions to be managed effectively in a tertiary hospital within proximity to their homes resulted in better outcomes for the patients (Hughes et al., 2015).

Say et al (2014) analysed the leading causes of maternal deaths worldwide using Bayesian Hierarchical Model Analysis of data from the WHO database of vital registration between 2003 to 2012, and findings reveal the leading causes of more than half of maternal deaths globally were obstetric haemorrhage, sepsis and hypertensive disorder, others include abortion and embolism. In most cases, these conditions are unpredictable until the onset of labour (Faye et al., 2014). Quality intrapartum care is associated with improved detectability of problems associated with child delivery; this is the period from the start of actual labour, throughout all the stages of labour to one to two hours after delivery of the placenta (Lowdermilk et al., 2012). Direct observation during intrapartum care is crucial as complications could set very quickly at this stage (Faye et al., 2014). Souza et al. (2018) stressed that intrapartum and fetal monitoring allows for early identification and appropriate response to complications during delivery. So, proper risk assessment and maternal care from labour to child delivery are essential. Although, this duration differs from one woman to another. So, rigid timelines for cervix dilations before the obstetric emergency intervention requires proper review within clinical practices (Abalos et al., 2018).

Similarly, the postnatal period is crucial as a high percentage of maternal and infant death occurs one to four weeks after childbirth (WHO et al., 2019; ACOG, 2018). The postpartum or postnatal period is the days and weeks following the childbirth; this is when the woman's body, including hormones and uterus size, returns to a non-pregnant state (WHO et al., 2019; WHO, 2014). The UNFPA (2017) report states that postnatal care during the first 24 hours and the sixth week following birth is as critical as antenatal care because women could develop

life-threatening conditions such as sepsis, haemorrhage and hypertensive disorder this period. Due to the high deaths of mothers in this period, WHO (2014) sets out guidelines to support postpartum care for mothers and newborns, covering hospital discharge timelines, the number of postnatal contacts, and home visits. In consensus, evidenced-based studies indicate that timely and adequate access to quality maternal care is critical for reducing MM and morbidity (Mackintosh & Sandall, 2016). For example, to deal with postpartum haemorrhage, one of the leading causes of maternal mortality, the WHO recommends the appropriate use of intravenous tranexamic acid within three hours of giving birth (Vogel et al., 2019).

It is also evident from several studies that proper management of patients through the maternal care trajectory, antepartum, intrapartum and postpartum stages can improve MH outcomes for high-risk obstetrics cases (Anstey Watkins et al., 2018; Damayanti et al., 2019; Mhyre et al., 2011; Erim et al., 2012). However, other non-clinical factors can influence the outcome of medical intervention, such as religious, cultural practices and other socioeconomic factors. Therefore, it is crucial to incorporate women's needs, values, and beliefs into MH delivery as this promotes individualised care (Downe et al., 2018). The following subsection presents an in-depth description of the clinical and non-clinical factors contributing to MH outcomes in low-income countries.

2.3 Clinical and Non-Clinical Risks Contributing to Maternal and Reproductive Health Issues in low-income Countries.

An extensive literature review identified five major interrelated factors influencing obstetrics care in Sub-Saharan Africa: politics and decision making, reproductive health, health

utilisation, existing or developed medical conditions during pregnancies and access to health. The following subsection presents discussions on these broad factors.

2.3.1 Politics and Decision Making

Research on maternal mortality based on clinical factors alone is insufficient to reduce mortality ratios, and there is a lack of political and cultural determinants of high MMR in developing countries (Gill-Gonzalez et al., 2006). According to Madore et al. (2017), political leadership can promote or hinder the implementation of evidence-based practices within the healthcare system, and the politics of health promotes policy formulation and promotion. Shiftman (2007) stated that the level of political priority given to reducing maternal mortality in five different countries, Nigeria, Guatemala, Honduras, India, and Indonesia, is low considering the MM rate in these countries. Further analysis by Shiffman revealed that the political priority to reduce maternal mortality ratio was lowest in Nigeria and Guatemala (Shiftman, 2007). Policies and laws developed in Nigeria have not resulted in improvement in maternal health all through the country due to lack of implementation, weak infrastructure, lack of access to skilled healthcare and poor accountability within the tiers of government responsible for healthcare, the Federal, State and Local Governments (Bankole et al., 2009; CRR & WARDC, 2008).

In Brazil, the political agenda through the implementation of the cash transfer program helped reduce poverty by providing a source of income for women, increased women's bargaining power, and contributed significantly to reducing the infant mortality rate (Shei, 2013). Likewise, the development of the midwives' schemes in Nigeria led to the massive deployment of midwives to rural areas and an increase in skilled birth attendance in regions that implemented the approach (Abimbola et al., 2012; Adeyemo & Enuku, 2014). However, the

sustainability of such an approach is greatly influenced by political interference, especially with changes in government like the reforms in the Netherland to protect the fiscal sustainability of long-term care (Maarse & Jeurissen, 2016).

The government decision-making process must find common ground between patients' and medical experts views on the perceived quality of healthcare, thereby involving patients in the decision-making process (Lopes et al., 2015). Smith & Hunsmann (2019) recommended political coalition or bipartisan support to reduce maternal mortality. There is a need for a diverse network of interested groups such as activists, politicians, and technicians are crucial for developing political priority in MM reduction efforts which enhances a broader commitment towards MH agendas (Smith & Rodriguez, 2016; Smith & Shiffman, 2016). For instance, in Tanzania, there was a broader commitment to the reduction of maternal mortality than in Ghana, where there was a lack of political and civil engagement (activism) on the issue, which left the improvement agenda to mainly clinicians and development partners (Smith & Hunsmann, 2019).

In essence, power dynamics between key actors influence the development of MH policies (Lopes et al., 2015; Walt & Gilson, 2014) and the political priority given to improving MH outcomes by stakeholders is crucial in Sub-Sahara Africa (Shifman, 2007). However, in many cases, the decisions of actors such as health ministers are restricted to their ideologies, political affiliations, history and organisational culture (Buse et al., 2012). As a result, health directors and managers must address continuous changes in health policies when a new government takes office, often influencing hospital decision-making. Regulatory authorities must operate independently (bipartisan) to prevent any conflict of interest (Osemeke & Osemeke, 2017; Smith & Hunsmann, 2019). Onoka (2016) recommended the introduction of independent

organisations to minimise conflict of interests with the current National Insurance System in Nigeria, which has led to inflation and a lack of control over pricing strategy. Also, a decentralised healthcare system will foster a more significant commitment toward healthcare policies at the Local and State governments as this will eradicate the bureaucratic process involved in health expenditure budgetary and financial autonomy from the central government (Bustamante, 2016). It is, therefore, vital to include contextual factors in health policy reform.

The classic policy analysis triangle by Walt & Gilson (1994) highlights four inter-related and complex factors such as context, content, process, and actors which affect policy formulation or decision making in healthcare. For example, in the American Healthcare System, liberals believe the government can improve the health system through universal health coverage, while the conservatives disagree that the government is not fit and too bureaucratic in its process (Aaron & Lucida, 2013). Ideologies influence health policy formulation, and contextual factors such as situational, structural, cultural, and international factors are essential in policy formation (Buse et al., 2012). In terms of maternal care, these factors are:

The current situational factor¾the high rate of MM in Sub-Sahara Africa (Alkema et al., 2016; WHO et al., 2019), the significant impact of HIV/AIDS on MH outcome (Houle et al., 2015; Say et al., 2014), the outbreak of Ebola in Africa (Murphy, 2014) and the most recent outbreak of COVID- 19 (Centre for Disease Control & Protection-CDC, 2019). The situation report revealed that all progress made towards the reduction of MMR returned to the previous status of 1,165 per 100000 live births due to the Ebola outbreak in Sierra Leone (Figueroa, 2018; Evans et al., 2015) and 60% of Ebola fatalities in West Africa have been women (Kamara, 2014). On the COVID-19 pandemic, the impact on MH outcomes is undergoing studies as there are concerns over the transmission of the virus to the unborn child (Yang et al., 2020).

Situational factors call for national healthcare systems to adapt their MH policies to address prevalent public health issues. However, a successful response to situational factors requires funding and structural or systematic cooperation.

In Nigeria, the funding goes through highly complex and bureaucratic structures and channels from the Federal, State, and Local Governments with poor accountability or stewardship (FMOH, 2010). Interactions between the levels of government are very dysfunctional, and their role is not well-defined, contributing to deals in tackling pressing public health issues (FMOH, 2010). Onoka et al (2014) indicated that the lack of collaboration between Federal and State governments resulted in the weak implementation of the National Health Insurance System in the grassroots. The inability to access universal coverage is a significant setback to improving MH, especially grassroots (Onoka, 2016). The scope of insurance coverage must accommodate local and unskilled workers (Awosika, 2012) as the impact of sociocultural factors on MH outcomes is critical.

Sociocultural factor: Hunter & Murray (2017) stated that policy formulated to improve universal health coverage should address sustainability issues and understand how it fits within the communities, such as socioeconomic barriers and availability of quality care (Say & Raine, 2007). Cultural practices and social constructs influence MH outcomes, like policies that support giving women rights to husband's assets and properties when he is dead and giving women more high-profile positions in the government to enable them to make decisions on women issues (Pratley, 2016). It is evident in several studies that women empowerment will enable them to decide on their care in a patriarchal society and facilitate health utilisation (Ganle et al., 2016; Atkins et al., 2015).

International factors¾It is crucial to align MH policies to international agendas such as the MDG and recent SDG to reduce the MM ratios (WHO et al., 2019), international guidelines for managing pregnant women with COVID-19 (CDC, 2019; Yang et al., 2020). All four contextual factors discussed above is essential for policy formulation and decision making as recommended by Buse et al (2012). However, the process of policy formulation includes data collection methods, the interest of individuals, their knowledge of the subject, and accountability (Smith & Hunsmann, 2019; Smith & Shiftman, 2018). Hunter (2008) considers stewardship an essential function in health policy formulation characterised by strategic healthcare planning, resource allocation, and an effective regulatory and implementation system guided by performance standards or indicators. However, Bankole et al (2009) indicated that several policies developed lacked proper monitoring, stewardship, or accountability in Nigeria.

Research has shown that poorly implemented policies directly impact healthcare practices. For example, the inability of the government to commercialise essential drugs like magnesium sulphate (MgSO4) for the treatment of Preeclampsia (Tukur et al., 2013); and the lack of antiretroviral drugs for HIV AIDS in Nigeria (Hill, 2012). Also, government schemes to mobilise trained birth assistants to rural areas, as seen in the massive deployment of midwives through the Midwives Service Scheme in Nigeria, improved skilled birth attendants in participating regions and provided links for better antenatal care attendance (Azuogu et al., 2011). However, inadequate infrastructure and lack of availability of required resources hinder quality delivery (Ugal et al., 2012), and this can be improved through a practical and strategic health reform to provide better access to healthcare (Say & Raine, 2007).

Similarly, politics influence clinical governance and the decision-making process in healthcare. For instance, politicians' drastic changes to healthcare policy to gain popularity or continuous policy changes with new governments could affect service delivery (Smith, 2014). A bi-partisan approach is for clinical governance, and it requires collaboration between the manager, physicians, directors and policymakers for continuity in care (Shiftman et al., 2016; Walt & Gilson, 2014). Managing power dynamics in the healthcare sector will improve clinical performance (Shearer et al., 2016). Furthermore, clinical performance is associated with a high level of accountability, as demonstrated in the Italian National Healthcare System (Lega & Vendramini, 2008) and necessary for improved patient outcomes (Lutwama et al., 2013). According to Lega & Vendramini (2008), performance management functions should include management control, performance control and process control. Management control systems align operating budget (cost) with set objectives, performance control allows for systematic review and appraisal of clinical staff performance in line with key objectives and financial incentives for an excellent performance.

In contrast, process management incorporates both management and performance functions. Lutwama and colleagues indicated that proper management of the healthcare system is associated with improved waiting times, patient satisfaction, the quality of obstetrics care, finance management (value for money), demand and supply of resources, effective control over performance indicators and better team coordination for competitive advantage. Although, training and development of healthcare professionals are essential for improving clinical performance such as skills appraisal system, evidenced-based research, reflective practices and management principles (Davies, 2006).

Improving the performance of a healthcare delivery system remains a daunting task for managers and policymakers, especially where the performance indicators and standards are not well defined or vague, unknown to healthcare workers, poorly communicated, and lack implementation capability (Lutwama et al., 2013). Many developed countries have resulted in business model tools for performance management to point managers to healthcare priorities. Several management tools include self-assessment and peer review deviating from the three core functions of performance management, such as guidance, monitoring, and response (Smith, 2002). These core functions allow for continuous improvement of the delivery system by ensuring healthcare framework and policies are communicated to healthcare workers, assessing performance indicators to ensure standards are met and responding promptly to performance issues (Smith, 2002). Hence, clinical governance is complicated, and its success is dependent on leadership and management oversight (Bryce et al., 2018) and power dynamics between actors or stakeholders (Shearer et al., 2016; Smith & Shiftman, 2018). Accessibility issues are a significant setback in low-income countries (Ntoimo et al., 2019; Okonofua et al., 2017).

2.3.2 Access to Healthcare

Access to healthcare is a complex notion as Evans et al (2013) stated that it has three dimensions; physical accessibility, financial affordability and acceptability. The physical accessibility component of access to health includes quality of care delivery, better equipment for hospitals, human resources development, enhanced infrastructure, and proximity of care based on patient needs (Ntoimo et al., 2019; Okonofua et al., 2017. Gulliford et al (2002) assert that if there is an adequate supply of resources and services, there is an opportunity to utilise care.

The dimensions of access to care relating to health utilisation include financial affordability and acceptability. Affordability is the cost of care although, resources and logistics required to access care such as transportation are just as necessary (Evans et al., 2013). Logistics issues should be considered a viable way to provide access to healthcare, especially in low-income areas. In terms of health utilisation, family income and other socioeconomic determinants such as culture, religion, education also influences access to healthcare (Evans et al., 2013). So, in many cases, the availability of resources does not equate to health utilisation automatically. Apart from the impact of socioeconomic factors on access to healthcare, the perceived quality of delivery can be a barrier to acceptability and healthcare-seeking behaviour (Evans et al., 2013; Ekkott et al., 2012). Efforts to facilitate access to obstetrics care must improve acceptability, physical accessibility and affordability dimensions in Sub- Saharan Africa.

Health utilisation alone is insufficient to reduce maternal mortality, and intervention strategies focused on expanding obstetrics care without addressing access constraints will not improve MH outcomes (Silal et al., 2012). As rightly stated by Porter & Lee (2013), "access to poor healthcare is neither the objective nor reducing cost at the expense of quality". Accessibility challenges result in poor quality of service delivery, lack of resources/ infrastructure, lack of adequate or capable human resources, affordability of care and inequality in the urban-rural healthcare distribution (Silal et al., 2012; Nabudere et al., 2011). Investing in training health professionals improves healthcare access (Okonofua et al., 2018; Ogu et al., 2017). Several studies suggest optimising the role of unskilled or lay workers like traditional doctors to provide accountability for the services they provide (WHO, 2012; Schack et al., 2014; Olusanya et al., 2011; Nabudere et al., 2011).

In Nigerian, most hospitals did not meet the Basic and Comprehensive Essential Obstetric Care, funding, poor management decision, and the culture of the people were significant culprits (Ugal et al., 2012). A study in the southeast of Nigeria by Emmanuel et al. (2013) reveals that women (consumers) in this region have a weak understanding of the maternal services (product) available to them, and an awareness programme targeted at the consumer is mandatory to achieve the MDG in 2015. The rate of deaths occurring during labour or a few weeks after birth emphasises emergency obstetrics care services, and shortage of service contributes significantly to MM (Girma et al., 2013; Storeng et al., 2012). Cross et al (2010) suggested that the best way to tackle medical causes of MM is to provide access to skilled birth attendance and emergency obstetrics services, and the availability of quality primary care will allow for early identification and management of diseases capable of influencing MH outcomes (Kruk, 2010; Mackintosh & Sandall, 2016). A study by Barker & Mate (2012) shows that access to quality healthcare is critical to prevent mother-child transmission of HIV/AIDS, and integrating antiretroviral therapy (ART) into antenatal care resulted in higher ART access (Suthar et al., 2013). Universal health coverage can promote timely access (Onoka, 2014) but requires extending services to the unreached rural and poor communities and integrating local primary healthcare services into the national healthcare system (Tulenko et al., 2013). To strengthen the delivery of primary healthcare, collaborations between the researcher and user of research such as clinical staff, policymakers, service providers and managers to provide evidence-based information on resources, strategic planning, performance and clinical controls required to improve the quality of service delivery (Smith & Rodriguez, 2016; Shearer et al., 2016; Smith & Huntsman, 2019; Tulenko et al., 2013).

2.3.3 Health Utilisation

Health utilisation has a significant impact on MH outcome, and several socioeconomic factors affect the ability of women to use health services in Sub-Saharan Africa. Barker & Mate (2012) established that reduced health utilisation are three times more likely to result in HIV transmission from mother to an unborn child. Health utilisation will enable preventive measures such as early identification and treatment of the condition (Ahmed et al., 2012). However, the community in which individuals' lives significantly impacts their beliefs, values, religion, and education influences health utilisation and the overall MH outcome (Adedini et al., 2014). This view is consistent with NDHS Report, 2008, for Nigeria's urban and rural child mortality rates. Child mortality is a hundred and six (106) per one thousand children aged 12-59 months in rural communities and fifty-eight for urban areas. Rural areas accounted for 64% of child mortality in Nigeria, and 40.5 % of women in the rural area had no antenatal care (Multiple Indicator Cluster Survey-MICS, 2011). Lalthapersad-Pillay & Udjo (2014) revealed that countries with low Human Development Index and Gross National Income per capita are more likely to have high MMR, and this is a direct impact of poverty on MH outcome in these regions.

Most research on MH in Sub-Sahara Africa has shown that illiteracy determines the birth outcome (Adjiwanoua et al., 2018; Adedini et al., 2014). Factors such as lack of academic attainment and economic status influence the woman's independence or ability to make a meaningful decision within her household, which is critical to MH outcomes (Adeyele & Ofoegbu, 2013). Arguably, there is a thin line between having an educational qualification and being aware of what is required to stay safe as a pregnant woman. The latter type of education and awareness of RH is vital for highly illiterate communities. A typical example of such an awareness programme in a rural community was demonstrated by Olaide (2002), using

theatrical performance to highlight poor practices in this community. This study shows that lack of knowledge and awareness on maternal issues caused by illiteracy, most women died in traditional homes during childbirth and most often, such cases of death were not reported or recorded by the health centre, which suggests that there are more cases of MM than was accounted for in this community and the causes of death unknown. Also, women have particular cultural believes that is potentially dangerous to their health, such as drinking locally mixed herbs without obtaining medical consent, the heavy pounding of food such as yam, terminating pregnancies by piercing the uterus with sticks and poor advice on family planning.

Both formal and informal education will improve MH and adequate publicity for public health practices (Sunkanmi & Abayomi, 2014). Also, considering environmental factors such as sanitation, drinking water, and nutrition significantly impact child mortality (Godson & Nnamdi, 2011). There are disparities in the use of MH services. The Multiple Indicator Cluster Survey (MICS, 2011) shows that 27% of young women between 20-34 years and 35-49% of older women had no antenatal care visits in Nigeria. Also, 1.1% of younger women were utilising traditional birth attendance more than 0.7% of older women and that some women are utilising both traditional and orthodox healthcare, which highlights age-related disparities associated with health utilisation.

Abor et al (2011) examined the socioeconomic determinants of healthcare utilisation. They revealed that the number of antenatal visits depends on the mother's age, religious affiliation, ethnicity, economic status, type of birth, and geographical location, not just the woman's medical condition. However, the perceived quality of service delivery in terms of competence of healthcare staff and available resources influences the decision to utilise healthcare service in two communities in Akwa Ibom State, Nigeria (Eno, 2010). Similarly, Ugal et al (2012)

established a relationship between the availability of resources, utilisation of healthcare to poor MH outcome in Obudu and Ogoja local government in Cross Rivers state Nigeria. Other factors that influence health utilisation are the distance to the health centre and the cost of healthcare (Parkhurst & Ssengooba, 2009; Ntoimo et al., 2019).

Research has shown that religion plays a vital role in utilising health services in the African context. As evident in Yarney (2019) study, some spiritual houses use prayer alone during childbirth, eliminating all forms of safe clinical practices as pregnancy complications are associated with witchcraft and adultery, which has severe consequences for women in these regions. Aborigo (2019) acknowledge that traditional healers play a critical role in delivering complex witchcraft-related care beyond medical practice expertise. Likewise, using contraceptives indicate that members are promiscuous and or sinful based on the biblical doctrine (Denis, 2013), although Christians are more likely to use contraceptives than Muslims (Pandey & Sharma, 2014).

There are also social norms or construct that influence health-seeking behaviour. For example, men are considered the family's breadwinners, and their involvement in maternal care tends to dominate women's healthcare choices (Ganle et al., 2016). Moreover, the lack of women's autonomy in homes, control over movement and decision making on healthcare matters could negatively impact MH outcomes (Pratley, 2016; Kaiser et al., 2019), although the higher the level of men's education determines the intensity of their interference. In some cases, a higher educational level helps enlighten women, shapes their health-seeking behaviour, promotes contraceptives, and contributes to MH outcomes (Adjiwanou et al., 2018; Oguntunde et al., 2019). For example, in their study, Draper & Ives (2013) showed that men's involvement led to better father-child engagement, positively impacting overall family dynamics and general

health. Likewise, male interference with antenatal care helped test and manage sickle cell disease (Atkins et al., 2015).

Also, poverty in Sub –Saharan Africa has a significant impact on healthcare utilisation, as many women result in more affordable traditional care at the expense of their health (Tukur et al., 2010). The Inequality in MH influences how women use healthcare and their nutritional status and correlates to poverty (Kusuma et al., 2016). Ahmed & Khan (2011) showed that indigent patients provided with cash incentives were four times more likely to deliver in health facilities. However, wealth-related inequalities mainly were associated with skill birth attendance and antenatal care provided than with immunisation and family planning (Hosseinpoor et al., 2011). Studies show that poverty is associated with malnutrition, and consequently, mortality is in poor regions in Nigeria (Ibeh, 2008; Olusegun et al., 2012). It is, therefore, imperative that low-income countries like Nigeria must invest in poverty eradication schemes. However, interventions to improve people's economic status alone are insufficient to minimise mortality rates.

In their study, Ahmed & Khan (2011) showed that cash transfer programs for women to facilitate healthcare access are insufficient to improve outcomes as other socioeconomic disparities influence the healthcare system. Researchers have advocated for building better infrastructure and strengthening the quality of the delivery system (Ntoimo et al., 2019; Mgawadere et al., 2017; Okonofua et al., 2017, Izugbara & Wekesah, 2018).

Some assumptions hold that building new healthcare facilities is associated with health utilisation and improved health outcome. However, this might not necessarily be the case in some contexts. A study by Kante & Pison (2010) is an example of a hospital built in Senegal

primarily to reduce high maternal mortality. Surprisingly, maternal mortality rates remained the same and no improvement for two years after the commissioning of the hospital. Reduced health utilisation and outcomes were due to a mismatch of services and facilities provided to the people's actual needs, which supports Porter & Lee (2013) argument that "better health is the goal, not more treatment". Therefore, building new hospitals alone is not sufficient to tackle healthcare issues, especially when individuals have a low perception of the quality of care. Providing patient value or services that meet patient needs (context-specific) at a reduced cost and measuring health outcomes that matter to the individual will improve health utilisation (Porter & Lee, 2013). Therefore, region-specific policies will enhance women's use of healthcare in a particular area. The measure includes: resolving transport-related issues such as building roads and providing vehicles to convey women to the hospital as these factors influence health utilisation (Fiagbe et al., 2012); proper education to demystify myths (Zanin et al., 2016); women and community empowerment programmes (Pratley, 2016); and siting hospitals close to high need areas in order to improve accessibility (Sharma & Seth, 2011).

2.3.4 Reproductive Health

Reproductive Health (RH) is defined as "a state of complete physical, mental and social wellbeing and merely the absence of disease or infirmity." (WHO 2010, p.3). Sexual and Reproductive Health (SRH) services include; family planning, sexual health, safe abortions, hygiene & sanitation, proper nutrition, and pregnancy. Women who use SRH services such as family planning are most likely to utilise healthcare when pregnant, and health utilisation increases the chances of a more favourable outcome (Ahmed & Mosley, 2002; Ahmed et al., 2012). Although, lack of knowledge on SRH, healthcare cost, language barriers could deter women from accessing SRH services (Betancourt et al., 2013).

The use of contraceptives reduces pregnancy-related risks such as unsafe abortions, unwanted pregnancies and the prevention of sexually transmitted diseases (Ahmed et al., 2012). Unfortunately, there is still a high unmet need for contraceptives in Nigeria (Erim et al., 2012). Abortions are illegal and not generally accepted, so women are less likely to seek post-abortion care (Awoyemi & Novignon, 2014). Also, access to sexual and reproductive healthcare due to the judgemental attitude of clinical staff in Nigeria towards adolescent girls are labelled promiscuous (Jonas et al., 2017). At the same time, studies show that access to family planning remains a primary intervention to reduce maternal death in many developing countries (Ahmed et al., 2012). However, Brunson (2019) argued that the use of contraceptives does not equate to good health; instead, informed access to its side effects (public education), provision of clean water, and quality medical care will lead to a more dignified life, which asserts women's reproductive rights and autonomy. Similarly, Corroon et al (2014) advocated for women's empowerment as a tool for influencing reproductive behaviour and using skilled birth attendance and contraceptives to improve MH outcomes in Nigeria.

However, the marginalisation of women affects their ability to take part in the decision about their RH, influencing the reproductive rights of women in sub-Saharan Africa. Underwood (2010) showed that men still control women's RH and often decide on family size and health utilisation. So, women hide contraceptives for fear of their husbands. However, men need to play an active role in family planning as research has identified a link between men's involvement in family planning and an increase in the use of contraceptives (Shattuck et al., 2011; Andersson et al., 2011). Due to restrictions in some countries in Africa, most women have resulted in unsafe abortions, and the quality of post-abortion care is inferior in these regions, contributing to 13 % of global maternal mortality (Paul et al., 2014).

Access to quality RH is crucial in safeguarding adolescents (15-19) from SRH issues (teenage pregnancies) and a significant contributor to reducing maternal mortality in sub-Sahara Africa (Feleke et al., 2013). Also, the provision of family planning has a long-term positive impact on women's reproductive health, morbidity ratios and nutritional benefits (Joshi & Schultz, 2013). However, women's health should not be limited to reproductive health but prioritised to accommodate all other chronic health conditions or epidemiological transition (Bustreo et al., 2012), as seen in the outbreak of Ebola and the stigmatisation of women living with HIV/ AIDS and their impact on RH (Colombini et al., 2014).

Furthermore, with the recent increase in women over thirties (30) having babies, there is a risk of a pre-existing health condition such as diabetes, hypertension, cancer and heart conditions, which have a significant fatal impact on maternal outcome (Saleem et al., 2013). However, despite the availability of SRH services in a suburban community, health utilisation remained low, and RH needs were unmet (Thin Zaw et al., 2012). The success of SRH for all women will require effective SRH implementation programs, political commitment, the involvement of actors such as researchers, practitioners, religious leaders and advocates through measurement of accountability, SRH success indicators and strategic resource allocation (Roseman & Reichenbach, 2010; Feleke et al., 2013). A typical example is the use of the maternal dashboard to measure clinical outcomes in a local health centre in Zimbabwe, which resulted in positive health outcomes and involved the active participation of clinical staff and management (Crofts et al., 2014).

The availability of doctors, management practices such as shorter waiting times, affordable healthcare cost, hygiene, quality of service delivery promotes health utilisation (Anand &

Sinha, 2010) and improve access to SRH services in low-income settings (Liu et al., 2014). Similarly, Azenha et al (2013) recommended an integrated approach to meet women's health needs for all ages and mobilising resources based on disease trends post -2015. Although contraceptives are vital in reducing maternal death in the short term, an integrated and strategic approach should incorporate proper management of obstetrics complications and quality intrapartum care for a more effective intervention (Erim et al., 2012).

2.3.5 Medical Conditions

There are two broad categories of medical factors associated with death according to the International Classification of Diseases (ICD), 10th Revision; "Direct obstetric deaths are those resulting from obstetric complications of the pregnant state (i.e. pregnancy, labour and the puerperium), from interventions, omissions or incorrect treatment, or from a chain of events resulting from any of the above. Indirect obstetric deaths are those resulting from a previously existing disease or a disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by the physiological effects of pregnancy." (WHO 2011, p.156).

Globally, 73% of maternal deaths were from direct pregnancy-related conditions such as haemorrhage, hypertensive disorder, sepsis, embolism, obstructed labour, septic abortions, while indirect illnesses developed during pregnancies or aggravated by the state of pregnancy such as cardiac or renal disease and HIV/AIDS account for about 27% of deaths (Say et al., 2014; WHO et al., 2019; APHRC, 2017). In consensus, Fubara et al (2007) correctly identified that MM in Nigeria is an obstetrics care problem after sixty retrospective autopsies at the UPTH Nigeria. This information is consistent with a previous study by John & Uzoigwe (2004) in the

same hospital that revealed a high rate of maternal deaths due to hypertensive related issues known as Preeclampsia or eclampsia, which was alarmingly higher for first time unregistered mothers. A recent study by Mbachu et al (2017) also confirms that direct medical factors are significant concerns for Nigeria.

Unfortunately, there was no apparent dichotomy between direct and indirect causes of maternal death (Cross et al., 2010). Consequently, a single approach for tackling obstetric causes of maternal deaths and insufficient attention is given to indirect causes such as HIV/AIDS, diabetes, anaemia, malaria is the leading cause of maternal death in Sub-Sahara Africa. In agreement, Adeniran et al (2019) pointed out that pre-existing conditions contribute to more devastating outcomes for women but have not been given as much attention as direct causes in Nigeria. Firoz et al (2013) also pointed out that out of one maternal death, twenty-thirty women experience severe or chronic health conditions or cannot function normally.

Lassi et al (2014) stressed that proper management of chronic illness before conception leads to better outcomes. Lassi and colleagues showed how diabetic care prevented congenital malformations during pregnancy, and pre-conception counselling and changes in anti-epileptic drugs six months prior to embarking on pregnancy had significant positive outcomes.
However, in Nigeria, there is an unmet need for pre-conception care and reproductive healthcare services, which contributes to devastating outcomes (Ahmed et al., 2012), and obstetrics complications are in some cases unpreventable as things could deteriorate very quickly (Mackintosh & Sandall, 2016). In which case, timely medical intervention is required but often unsuccessful due to late or no detection of the problem and non-prompt referral of the patients (Mbachu et al., 2017), lack of organisational and individual accountability towards patient safety (Aveling et al., 2016), including several socio-political factors that impact on the

management of obstetrics complications (Mackintosh & Sandall, 2016). Which case makes the risk management process in hospital settings in Nigeria a daunting task for stakeholders. As such, they require an effective strategy for dealing with such complexity (Kuruvilla et al., 2014).

Regardless of which factors contribute significantly to maternal death. It is essential to understand their differences and intervention strategies tailored to address both direct and indirect causes of death. More so, women that have previously suffered near-miss deaths within four years are at risk of all causes of pregnancy-related mortality (Storeng et al., 2012). The usefulness of differentiating these factors will enhance the implementation of appropriate preventive measures through strategic resourcing, setting targeted objectives and effective planning, such as providing skilled birth attendance and emergency maternity care services (Cross et al., 2010; Fubara et al., 2007; Storeng et al., 2012). Olaide (2002) indicated that there are three times more deaths than recorded, and, in most cases, causes of death were unknown in communities in Nigeria. Notably, reduced health utilisation and traditional births make measuring mortality and morbidity outcomes in these regions extremely difficult. The literature review shows complex and interrelated factors contributing to MH outcomes, as presented in Figure 2.1.

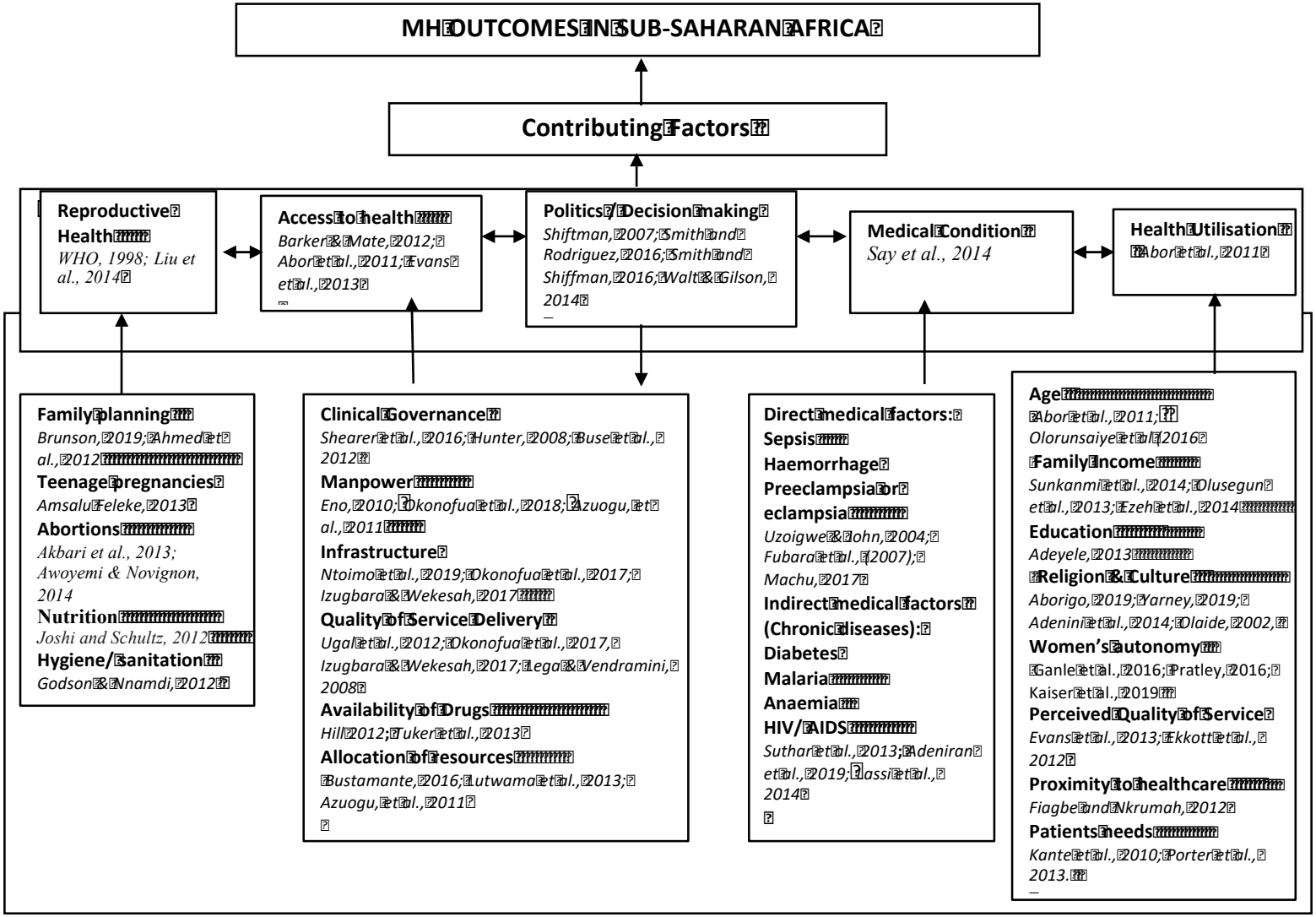


Figure 2.1. **Source: Thesis Summary of Factors contributing to MH Outcomes in Low-Income Countries**

Figure 2.1 reveals the complexity of factors associated with MM in low-income countries. However, it is crucial to ascertain the main clinical and non-clinical factors responsible for poor outcomes in Rivers State, Nigeria, to employ a context-specific strategy for the reduction of MM in this region as recommended by Say & Raine (2007). A holistic evaluation of the MH delivery system is required (Gil-Gonzalez et al., 2006; Callister & Edward, 2017; Erim et al., 2012) through practical implementation of an effective risk analysis method (PRISMA) provided in this study to investigate the root causes of MM. (Martijn et al., 2012; van Galen et al., 2016).

Several fundamental research in maternal care in Nigeria has identified MH problems, as shown in Figure 2.1. However, there is a considerable gap in MH studies on the use of the risk management process (evidence-based research) for complex evaluation and mitigation of risk in MH settings in Sub-Saharan Africa, including Nigeria (Enuku & Igbinosun, 2012; Callister & Edward, 2017). Consequently, the adopted intervention measures were not holistic and failed to address the complex factors influencing MH outcomes simultaneously. Hence, there is still a high rate of MM in Nigeria (WHO et al., 2019). Several policies developed in Nigeria were unsuccessful due to ineffective monitoring and implementation setbacks (Bankole et al., 2009) which shows systematic failures in the delivery system. The PRISMA, used in this research, provides a holistic platform for a broader evaluation and mitigation of risk factors. An integrated or holistic intervention measure will improve the quality of care, enhance patient safety and provide highly-needed value in care (Porter & Lee, 2013).

The remainder of this chapter includes a detailed review of the healthcare delivery system in Nigeria, the implication of maternal mortality, current intervention measures adopted to reduce

MM in Nigeria and their limitations, an in-depth evaluation of risk management approaches used in other developed countries; Root Cause Analysis techniques, Quality-patient safety concept, Porter's value-based approach in healthcare and justification for the use of PRISMA model for mitigating risks in maternal care settings.

2.4 Maternal Healthcare Service in Nigeria.

In 2019, post MDG for improving maternal care, the estimated MMR in Nigeria was 917 deaths per 100,000 live births (WHO et al., 2019). Unfortunately, healthcare utilisation is still a significant issue in Nigeria. According to the UNICEF report (2019), only 22% of women from the most impoverished home have at least four antenatal care visits in Nigeria between 2016-2017.

Studies have identified some fundamental issues with the quality of healthcare delivery in Nigeria, leading to a high rate of MM. A prospective case-control study design using mixed methods involving 375 pregnant in a Nigerian by Adeoye et al (2015) revealed factors contributing to pregnancy-related morbidity in a tertiary healthcare facility in Nigeria were late referrals, complications at antenatal care booking leading to severe birth asphyxia and concern over the lack of facilities to address the life-threatening situation at the point of occurrence. Osungbade et al (2011) reinforced the concerns that late booking for antenatal care is a significant problem, but in many cases, hospitals did not also have the equipment to deliver quality care in Nigeria despite antenatal care attendance.

There is a lack of standardised procedures or action plans to address obstetrics emergencies, a lack of monitoring systems to identify causes of maternal mortality and appropriate intervention to improve MH outcomes (Izugbara & Wekesah, 2018; Oknonofua et al., 2017).

Although the use of quality measures like the Maternal Death Review in Jigawa State, Nigeria, led to some improvement, there is still a long way to strengthen notification of maternal deaths (Bandali et al., 2016). According to Hofman & Mohammed (2014), efforts toward improving outcomes through Maternal Death Review encountered setbacks such as lack of commitment, poor reporting and documentation of incidence, staff shortage, lack of accountability and the blame culture. It was increasingly difficult to sustain positive outcomes for women when key individuals responsible for improvement within the management transferred or resigned from the hospital. Furthermore, Nigeria needs to evolve from Maternal Death Review to a maternal death surveillance response system (Bandali et al., 2016). An enhanced death reporting system will enable clinicians to learn from past incidences and improve their practices (Mathai et al., 2015; Bandali et al., 2016; Aveling et al., 2016).

The over-burdened workload in many hospitals in Nigeria has influenced women's perception of the quality of care (acceptability) and contributed to the lengthy waiting times, weak medical diagnosis or investigation of women's condition, deficient number of antenatal attendance, and workload complaints often expressed by care providers (Ogu et al., 2017). In agreement, Okeke & Chari (2018) revealed a lack of facility led interaction, one to one planning and risk management for expectant women due to the overburdened workload. As such, it led to an additional ten (10) infant deaths per 1000lives for night-time childbirths as a result of accessibility issues, which could be better planned and managed with an active midwife-led community intervention for spontaneous childbirths cases beyond the control of the women to improve skill birth attendance, especially at night. An example is the community level interventions for Preeclampsia in reducing MM ratios in Ogun State, Nigeria (Sharma et al., 2017) and the deployment of extended community workers to support frontline care services due to staff shortage in northern Nigeria (McNabb et al., 2015).

Interventions for tackling birth complications, emergencies and the increased use of skilled birth attendance are often complex and must be contextualised (Solnes Mitenburg et al., 2017; Morisaki et al., 2017; Philibert et al., 2017). It is also a very daunting task for health experts and hospital management. It involves understanding what is prevalent (social norm influencing maternal outcomes) within the community aligned with the capability of the healthcare provider (quality of delivery). In which case, it requires the accountability of stakeholders at multiple levels for the practical evaluation and mitigation of the problem (George & Branchini, 2017). Unfortunately, the evaluation process is often overlooked or missed in Nigerian settings, and this is crucial for understanding the mediating factors resulting in maternal outcomes (Sharma et al., 2017).

The behaviour or attitudes of midwives in hospitals is also a concern in Nigerian hospitals and can impact patient-staff relationships and effort towards patient safety improvements (Ntoimo et al., 2019). This problem was expressed by Jonas et al (2017), as poor attitude displayed by clinical staff in Nigeria prevented young adolescent girls from accessing sexual healthcare or antenatal care because of their immaturity, despite being sexually active or pregnant. Proper investigations into this safety concern are crucial in these settings as age-related factors have profound implications for maternal care in Nigeria. Olorunsaiye et al (2018) indicated that adolescent girls between ages fourteen-nineteen (14-19) years have a less significant correlation with institutional delivery than those above age 40years even where skilled antenatal care exists. Poor attitudes paint a broader picture about the quality of healthcare services in Nigeria, which raises earnest questions about patient safety in these settings and efforts made by the organisational management to address social and cultural issues. George

& Branchini (2017) stressed the need to promote women's right to sexual, reproductive health and antenatal care in this region.

Although, institutional delivery is no guarantee for skilled birth attendance due to the inadequacy of the delivery system, especially for women with higher maternal risk in Nigeria (Olorunsaiye et al., 2018). Izugbara & Wekesah (2018) highlighted the mistreatment experienced by women and the lack of thorough health check-ups when women turn up during antenatal care in several states in Nigeria. There are complex correlations between acceptability, accessibility issues and their impact on health utilisation in the MH delivery system in Nigeria. Therefore, influencing women's overall perception of the quality of care and their health-seeking behaviour.

Osungbade et al (2008) suggested equipping hospital facilities with a capacity to identify conditions such as anaemia, proteinuria and provision of iron and folate supplements, including administering malaria prophylaxis to all women, provision high-quality care for mothers and children with HIV in Nigeria through the provision of antiretroviral therapy (ART), follow-up care to improve quality of care (Ojikutu et al., 2014). However, this intervention will be successful where women are utilising antenatal care. Poor antenatal care attendance in Nigeria can influence the quality or intervention process. Fagbamigbe et al (2017) revealed that women in Nigeria tend to commence care at the second trimester of pregnancies, which is associated with patient safety risks. An earlier study by Osungbade et al (2008) also revealed that doctors try to catch up when women use antenatal care services towards the third trimester in Nigeria. The implication of this is the lack of early identification of complications and adverse consequences. Francis et al (2017) that care providers must ensure earlier ANC appointments within the hospital setting to prevent avoidable complications. Kuuire et al. (2017) used

multivariate negative log-log and logistic regression models on health surveys data to estimate how women utilise healthcare in Nigeria. The study revealed that 9% of women in Nigeria were more likely to utilise ANC at least four times in 2013 than in the 2003 report, and the timing of ANC attendance is influenced by contextual factors such as wealth and urban-rural locations.

Regardless of antenatal care attendance, it is clear from previous research that the high rates of MM in Nigeria is associated with obstetric causes (Fubara et al., 2007; John & Uzoigwe, 2004; Ugal et al., 2012). Also, late obstetrics intervention in low-income countries have contributed significantly to MM, and in Nigeria, senior healthcare practitioners were not well equipped to manage obstetrics emergencies (Okonofua et al., 2017). In consensus, a study conducted by Morisaki et al (2017) found that in developed countries, early obstetrics interventions such as the planned pre-labour caesarean section and induced labour reduced MM despite the increase in pre-term birth, but this was not the case in low-income countries including Nigeria. Although, clinical guidance, education and continuous professional development are required to ascertain the appropriateness of the caesarean section (Nelson, 2017).

WHO (2016) strongly recommends that hospitals take all necessary measures to save a woman's life anytime during the pregnancy rather than strict adherence to the 40 weeks' gestational mark, which may not be practicable in all cases and could lead to devastating consequences for the mother and child. However, lifesaving interventions are not sufficient by themselves to reduce mortality ratios. The success of an intervention depends significantly on the quality of healthcare delivery and emergency care in countries such as Africa experiencing severe maternal outcomes (Perry et al., 2017; Souza et al., 2013). Health managers must deploy

all relevant resources, skills and devise a strategic plan to tackle obstetrics emergencies (Okonofua et al., 2017).

However, the problem in the delivery system has more issues due to the high cost of care and out of pocket payments as women at death risk are unable to access facility-based deliveries (Gomez et al., 2015). Aliyu & Dahiru (2017) suggested universal health coverage and health insurance as interventions for health utilisation and maternal health. Although financial programs will lead to cost benefits in settings, there are no direct relationships between the use of programs and an increase in facility-based deliveries (Philibert et al., 2017). Philibert and colleagues envisaged socio-cultural influences on health behaviour and the decision of pregnant women to use insurance health schemes in low-income countries. Contextual factors such as rural-urban locations and wealth are related to health-seeking behaviour in Nigeria (Kuuire et al., 2017). Women utilise health out of convenience, affordability and accessibility of care (Izugbara & Wekesah, 2018). Adeyanju et al (2016) recommend that specific maternal intervention programmes targeting the poor, less educated and women living in rural areas address inequality and accessibility issues in the Nigerian setting. The complexity of the MH delivery system makes it challenging to coordinate all dimensions of care, including dealing with organisational, obstetrics and socio-economic facets of maternal care. Izugbara & Wekesah (2018) indicated that healthcare providers in Nigeria could not integrate and coordinate care to meet all aspects of maternal needs required to improve quality resulting in high MM, which has severe consequences.

MM has enormous economic implications, especially in developing countries; it impacts non-health Gross Domestic Product (kirigia et al., 2014) and is estimated to be up to Int$ 4.5 billion (PPP) in 45 out of 47 countries in the Africa Region. It is evident from this sensitivity analysis

by Kirigia and colleagues that the ability to prevent avoidable deaths is an indication of economic enhancement, and empowering women have implications for their healthcare, and this affects the nation's economy (Brunson, 2019). In Sub Saharan Africa countries, there is generally a non-urgent priority towards improving MH outcomes, despite the high rate of MM. Particularly in Nigeria, the political priority given to reducing MMR is low in Nigeria (Shiftman, 2007). Abekah-Nkrumah et al (2011) suggested that empowering women through microfinance and education enhances health utilisation and could prevent avoidable deaths. Maternal death is an injustice to vulnerable women and has a devastating long-term consequence on family life (Miller & Belizan, 2015).

In most cases, there is a reduction in family income (Bazile et al., 2015), and older siblings withdraw from school to support their families (Molla et al., 2015). Another consequence of maternal death is malnutrition, adult depression, weak family dynamics, poor healthcare access, and adolescent sexual risks (Knight & Yamin, 2015; Pande et al., 2015). Also, pregnancy complications are a leading cause of disability for women of their reproductive age and contribute significantly to infant mortality (Moucheraud et al., 2015; Houle et al., 2015). In agreement, Scott et al (2017) revealed that a child's survival has a strong correlation with a mother's survival using a cox proportional hazard model for maternal and neonatal analysis in Gambia, West Africa.

Also, a qualitative study by Knight & Yamin (2015) involving twenty-two families directly affected by maternal mortality using community focus groups in a South African community drew attention to the high cost of maternal mortality as caregivers are unable to provide needed education, emotional and psychological support for living siblings which exposes them to sexual risks, especially in girls. In some cases, maternal death affects the family finances,

especially where the woman was the primary source of income or contributed to family bills, as seen in a community in Tanzanian (Yamin et al., 2013). Kirigia et al (2014) stated an urgent need for a cost-effective intervention to scale up quality maternal health delivery to achieve better outcomes for low-income countries.

2.5 Current Interventions for Improving MH Outcomes in Nigeria

Previous interventions adopted in Nigeria to reduce MM were to improve health utilisation or provide skilled birth attendance (FMOH, 2006; 2007; Ononokpono et al., 2014). Understandably, numerous research and statistics showed a strong correlation between the inability of women to access primary care to maternal deaths (MICS, 2011; APHRC, 2017; NPC & ICF Macro, 2009). In agreement, Ononokpono et al (2014) recommended a region-specific intervention for health utilisation following their finding that North-West and North-East regions in Nigeria had a lower rate of antenatal care attendance. Rightfully so, there were efforts and recommendations made towards eliminating constraints to health utilisation, such as poverty alleviation and women empowerment schemes like the National Economic Empowerment Development Strategy (FGN, 2004). Corroon et al (2014) advocated for women's empowerment as a tool for influencing reproductive behaviour, use of skilled birth attendance, and contraceptives, which positively influences MH outcomes in urban Nigeria. Also, public education or enlightenment programs on sexual reproductive health issues like family planning and contraceptives, safe abortion practices and teenage pregnancies (FMOH, 2003; 2006).

The quality of obstetrics care has also been under scrutiny following the studies, which indicated that direct and indirect medical factors contribute to the high rate of deaths in Nigeria (Say et al., 2014, WHO et al., 2019). Ekkott et al (2012) stressed that antenatal care attendance

provides the opportunity for early identification and timely treatment of pregnancy-related illnesses and attention given to improving medical facilities and proper management of healthcare services. Arguably, when there is a plan or strategy to address a particular illness, then it can be better tackled as seen in the treatment of Preeclampsia in Kano, Nigeria, with a reduction of maternal mortality from 20.9% - 2.3% using Magnesium Sulphate (MgS04) (Tukur et al., 2013). Tukur and colleagues observed the low-cost treatment for Preeclampsia and eclampsia in ten hospitals; however, they revealed the major setback was the lack of availability or commercialisation of MgS04, which contributed to the inefficiency of the approach. Although, early booking for antenatal care minimises risks associated with pregnancy-related complications, as seen in research conducted by Ekpenyong & Ekpenyong (2011), where a high percentage of women that suffered mishaps had little or no antenatal care.

Tukur et al (2010) emphasised the need to site hospitals close to areas of need to promote health utilisation. In consensus, studies have shown that some women result in TBA because health facilities are not within their reach (Tamuno, 2011, Fakeye et al., 2009). Hence Azuogu et al (2011) emphasised the need for community mobilisations and improved links to antenatal care in rural communities. Also, McNabb et al (2015) pointed out that community extension health workers improved front line care using mobile phones to support the decision-making process, increasing health education, counselling, behavioural change, and technical services.

Rather than eliminating TBA, the government is beginning to see the possibilities of working with TBA to bring about positive behavioural changes in women during pregnancies (Schack et al., 2014). Lately, more steps have also been taken in several regions in Nigeria to improve TBA practices and encourage better and timely referrals through several community intervention schemes (WHO, 2012; Schack et al., 2014). Olusanya et al (2011) make an

interesting point on TBA birth outcomes, stating that children born by TBA were at a lower risk of hyperbilirubinemia and undernourishment when compared with those born in the hospital and their homes, respectively. Olusanya and colleagues indicated that TBAs practice more safely; they can identify obstetric problems and make timely hospital referrals while providing safe delivery environments. Also, most trained TBAs are not likely to accept risk pregnancies (Olusanya et al., 2011). Agbo (2013) expressed the need for training of TBA and incorporating their practices into the healthcare system to reduce MMR. This area of intervention is still very under-researched. Future studies will be necessary to investigate how TBA practices can be integrated into the Nigerian healthcare system to combat maternal mishaps in rural areas.

However, the role of the midwives and health practitioners cannot be over-emphasised in the reduction of MM. Nurses act in the capacity of an educator, adviser, administrator, birth attendant and lots more (Okpala et al., 2019). Pat & Ekpemiro (2015) expressed the need for nurses to be better equipped to address context-specific illnesses and challenges by providing them with adequate training and infrastructure to address conditions like HIV/AIDS, Malaria, and tuberculosis, thereby promoting their role in the decision-making process in the effort to improve MH. The experience and knowledge of nurses are vital for the development of policy towards the reduction of maternal mortality, as seen in a midwife-led study that identified low blood supplies and informed effective strategies for managing postpartum haemorrhage (Ezeonu, 2014).

Furthermore, educating women on pregnancy issues is a significant responsibility of the midwives because it promotes positive behaviour in women and enhances their perceived quality which projects the image of the health institution (Akin-Otiko & Bhengu, 2012). In

Nigeria, midwife-led interventions played a vital role in reducing maternal mortality. An example of such intervention is the introduction of the Midwives Service Scheme (MSS) (Abimbola et al., 2012).

The MSS is a public-sector initiative designed by the National Primary Healthcare Development Agency (NPHCDA) in collaboration with all thirty-six states in Nigeria to reduce maternal mortality by deploying midwives to rural areas. The MSS utilised cluster model; were four primary healthcare facilities providing basic obstetric care clustered around a general hospital capable of providing comprehensive or emergency obstetric care. Qualified midwives were then deployed to each primary care provider to ensure skilled birth attendants at every childbirth. Adeyemo & Enuku (2014) investigated the impact on MSS in Edo, Nigeria, and the finding shows improved maternal outcomes but highlights the design of the MSS should incorporate all stakeholders and must be void of any political conflicts. Adeyemo and colleagues noted that the MSS could benefit from using ICT to support communication between participating hospitals, proper recording of information, and quick access to health records.

The inaccuracy of health information about actual mortality rates and the causes of MM contribute to weak interventions and solutions to the problem (Adegoke et al., 2013). In agreement, Anasi (2012) emphasised that proper dissemination of health information can reduce disease burden, improve MM ratios and a solid foundation for public health research. Also, inadequate or lack of accurate information leads to poor practices and ultimately high rates of MM (Anasi, 2012; Raman et al., 2018). Pilot ICT systems in maternal care (m-Health) developed to manage obstetrics care Nigeria includes: The Abiye Safe Motherhood Project, Mobile Community Based Surveillance (mCBS), Malahfiya project, Health Project Federal

Medical Centre Owerri (FMC), Society for Family Health; Use of Call Centres to Improve Maternal and Neonatal Healthcare and OpenMRS for MH Kaduna, Nigeria (Obasola, 2015).

The Abiye Project provided pregnant women mobile phones to keep track of pregnancy complications and adequately follow-up women in rural areas using call centres representatives (Love, 2013). Isola (2015) revealed a 96% increase in live births, 47% and 26% reduction in mother and child mortality rate, respectively, with the Abiye Project in Ondo State, South-West Nigeria. The Malahfiya Project, Mobile Community Based Surveillance and OpenMRS m-health for MH provided a platform for a prompt response to emergencies and support for diagnosis. Each m-health intervention recorded positive outcomes in areas implemented in healthcare utilisation and overall MH outcomes. However, the management of diseases in Africa is not without its challenges with ICT. Factors such as illiteracy, electricity supply, low ICT skills and political interference hinder the use of m-health (Steele Gray et al., 2018; Bervella & Al-Samarraieb, 2019; Anstey Watkins et al., 2018). M-health in Nigeria is still very underdeveloped and used mainly for data collection. According to Obasola et al (2015), m-health in Sub Saharan Africa should support healthcare intervention strategies that incorporate all aspects of care throughout the treatment cycle.

In some cases, the use of Malahfiya and Mobile Community Based Surveillance mainly supports diagnosis and has enabled health practitioners to respond promptly to emergencies. However, patient safety or the quality of obstetrics care cannot be guaranteed regardless. The MDG End Point Report (2015) indicates some efforts to reduce the maternal mortality rate (MMR) from 545 per 100000 in 2008 to 243 per 100000 live births in 2014. Nevertheless, these indicators are still very high. So, expanding healthcare coverage by building new infrastructure or cutting costs may not necessarily improve the quality of care delivery (Porter

& Lee 2013; Teisberg & Porter 2006). Porter (2010) stated that a value-driven approach incorporates both clinical and non-clinical intervention to improve MH care indicators such as the Integrated Practice Unit (IPU) for a more efficient outcome. Intervention measures focused on dealing with socio-economic factors remain a viable option for reducing MMR but may not be enough solution by itself considering other clinical and systematic failures contributors of mishaps in maternal care.

Due to the complex inter-related factors contributing to MH outcomes in Nigeria, as in other systems around the world, detailed analysis of factors contributing to MM should take into consideration internal and external factors capable of reducing or increasing patient value (quality of care) aligned with good governance, integrative strategies and evidenced decision making (Kuruvilla et al., 2014; Say & Raine 2007; Callister & Edward, 2017). This study will utilise root causes analysis (RCA) to investigate the underlying causes of mishaps. RCA considers direct and indirect causes of maternal death in any given context, which is essential for reducing MMR (Say et al., 2014; Cross et al., 2010). RCA attributes incidences to failures in systems such as poor coordination between the team, lack of equipment rather than individuals involved in the incidence (Ryan 2004; Mengis & Nicolini, 2010). When conducted correctly, the RCA isolates factors contributing to incidence and determines whether the organisation can control the occurrence of such incidence (Williams, 2008). Tomlinson (2015) emphasised that the presence of the hazards is not necessarily the problem, but the lack of coordination or dysfunction within a system causes the problem to exist. The RCA is vital to avoid premature conclusions about an adverse event that will not lead to corrective actions or effective mitigation (William, 2008; Black & Vernitti, 2015). The importance of incidence investigation is to prevent re-occurrence (Black & Vernitti, 2015).

The PRISMA RCA technique has been used widely in the National Healthcare System (NHS) in the UK and the Netherland to investigate underlying causes of adverse events (van Galen et al., 2016). The International Classification for Patient Safety (ICPS) recommends using PRISMA. According to WHO, it is the starting point for improving the quality of care delivery and developing a patient safety conceptual framework (Runciman et al., 2009; Sherman et al., 2009). The Eindhoven Classification Model (ECM)-PRISMA Medical version includes both clinical and non-clinical causes of adverse events under four broad categories such as organisational, technical, human behaviour and patient-related factors for more excellent inter-intra reliability (Smits et al., 2009) and stresses the needs for incident reporting in care settings (Jansma et al., 2011). When used correctly, the PRISMA is a pointer to areas of high risk in a care setting and should provide insight to policymakers, health managers, practitioners and directors on risk mitigation and elimination in subsequent or re-occurring cases (Martijn et al., 2012; Habraken & van der Schaaf, 2010). The following sections present the value-based approach to healthcare, the safety-quality concept, and the risk management methods in healthcare.

2.6 Healthcare Quality Measures Adopted in Developed Countries.

Healthcare improvement measures have been adopted in developed countries to improve the quality of healthcare outcomes. These include The Value-Based Approach, Quality-Patient Safety concept, Risk Management and Root Cause Analysis models discussed in the next subsections.

2.6.1 Value-based Approach in Healthcare

Healthcare systems around the world, including developed nations, are confronted with the dilemma to improve their health outcome, quality and, at the same time, reduce the ever-increasing healthcare cost (Larsson et al., 2012; Porter & Lee, 2013). However, where the emphasis is on cost-cutting and monetary profits, it results in access to poor healthcare, cutting costs at the detriment of quality (Porter & Lee, 2013; Porter & Teisberg, 2006). Friedberg et al (2010) also indicated that healthcare spending on primary care expansion alone is insufficient to deliver patient value. In agreement, a study conducted by Azubuike & Odagwe (2015), in the Niger Delta region of Nigeria, using correlational analysis of MM ratios, shows free maternal health led to a very gradual reduction in mortality ratios from 932/100,000 in 2005 to 604/100,000 in 2009. Instead, Philips & Bazemore (2010) recommended primary healthcare expansion to achieve its full functions by integrating several aspects of care necessary for improved health outcomes at a reduced cost, consistent with Porter's IPU system.

Hence, it is vital to understand the definition of health outcome, quality and value in healthcare and how they are measured. Value is a function of both cost and health outcome (Porter, 2010) and its defined as health outcome per unit dollar spent to deliver the desired outcomes or the quality of health outcome, where health outcome is a complete patient expectation through their treatment cycle and not just for a single health treatment (Porter & Teisberg, 2006; Porter et al., 2013). Eddy et al (2012) described quality in healthcare as the degree to which health services increase the likelihood of desired health outcomes, and according to Porter & Teisberg (2006), health outcomes are patient's expectations all through their treatment cycle for a particular health condition and not just the mortality or survival rate. The Organisation for Economic Cooperation and Development, OECD (2019) defines health outcome as an

indicator of an individual's wellbeing or the efficiency of any healthcare system and contributes significantly to a nation's economy.

The measurement of health outcomes plays an essential role in managing diseases. To improve, Larsson et al (2012) conducted a retrospective analysis of thirteen disease registries of acute illnesses involving five countries; Australia, Denmark, the UK, and the United States. Retrospective analysis is instrumental as medical consultants could determine the most efficient treatment method from records to improve outcomes for similar treatments, clinical practices, and cost of treatment (Larsson et al., 2012). However, arguably this method cannot provide the desired health outcome because analysis consists of a single entity such as mortality or survival rates instead of a set of expectations through the treatment cycle (Porter & Teisberg, 2006; Porter & Lee, 2013). Also, another limitation of a single evaluation is that there is more attention on process rather than functional outcomes that matter most to the patients. The target for health outcomes should include risk factor predictions such as multiple symptoms, co-occurring treatments, the frequency and probability of occurrence risk (Porter, 2010; Eddy et al., 2012; Porter & Teisberg, 2006).

Ideally, the process of obstetrics care should begin before conception (pre-natal stage) all through to post-natal stages (Damayanti et al., 2019). According to Porter & Lee (2013), measuring functional outcomes throughout the treatment cycle is a better approach to providing patient value based on quality. By analysing the degree of recovery; mortality or survival rate or the ability of the woman to return to regular activity as before childbirth, the process of recovery; time it took for complete recovery, need for re-operation and general quality of service delivery and sustainability of health; disability acquired as a result of childbirth, loss of mobility or inability to nurse a child (Porter & Lee, 2013).

Measuring health outcomes for pregnant women with multiple conditions such as HIV/AIDS, cancer, and hypertensive disorder can be complicated. Applying Porter's IPU system will involve identifying existing medical conditions, then managing MH by integrating all aspects of care and treatment co-occurring systems through a multi-disciplinary team (Porter & Lee, 2013). This IPU promises to reduce cost, increase the quality of service delivery, and improve measurement of outcomes, allowing for healthy competition based on patient value while boosting profit. The value system comprises of six interrelated components focused on the actual needs of the patients such as categorising patients' conditions into IPUs, measuring health outcome per cost for each patient, using bundled payments system, integrating healthcare across services, expanding healthcare geography and effective use of ICT for running the system. Figure 2.2 shows the pictorial representation of the Value-Based Agenda.

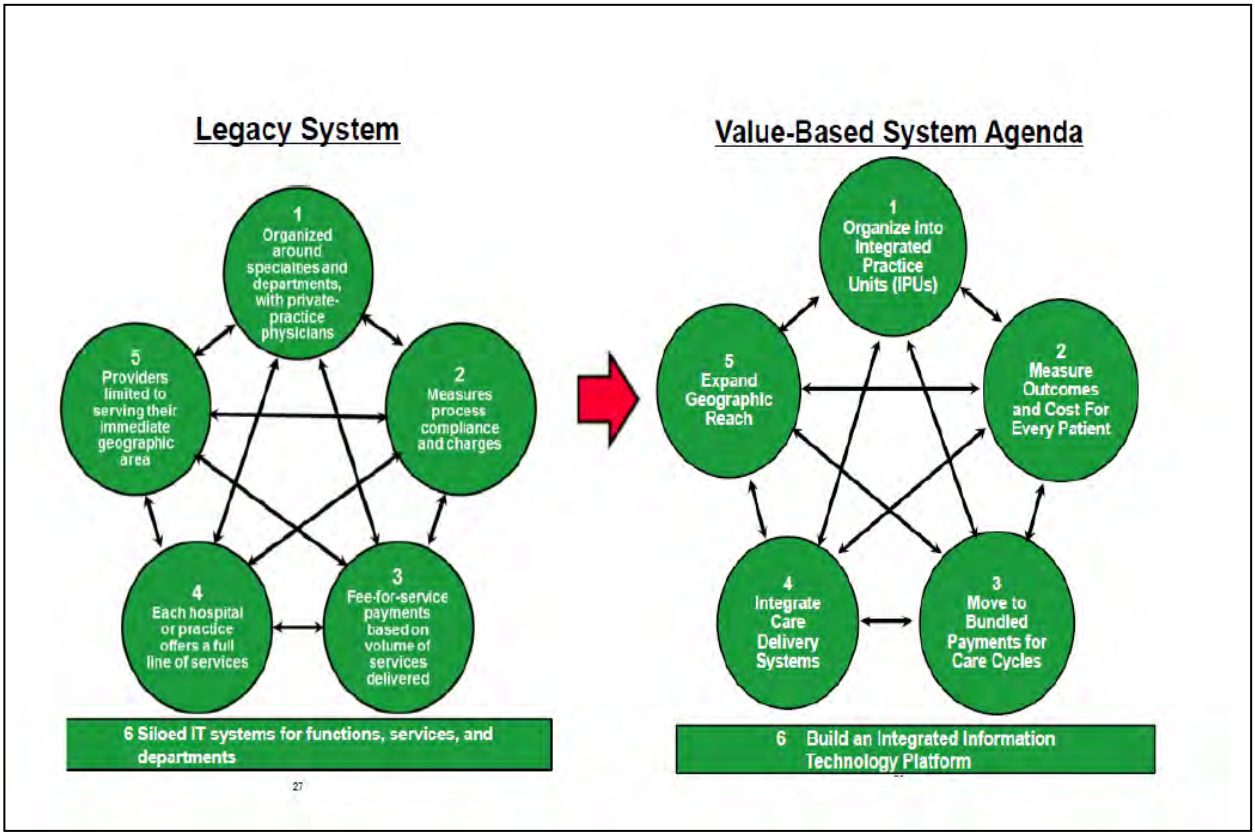


Figure 2.2: Value-Based Approach (Porter & Lee, 2013)

The IPU system can improve patient value, but in the Nigerian context, there are limitations due to poor health utilisation by women, inadequate human resources and infrastructural setbacks (Ntoimo et al., 2019; Izugbara & Wekesah, 2018). Applying the IPU system will require women to work with a dedicated team, get counsel from experts, and improve their health conditions before and after childbearing (Lassi et al., 2014).

The Value-Based Agenda presents a detailed description of improving patient value in the healthcare delivery system through the IPU system recommended by Porter & Lee (2013). However, the development of the IPU system begins with an extensive investigation into the healthcare delivery system, which can be achieved by conducting a value chain analysis and providing an in-depth understanding of the internal environment's strengths and weaknesses that contribute to MH outcome. Porter's (1985) value chain analysis (VCA) was to create competitive advantage through sustaining superior performance in a business environment. Nevertheless, Porter & Teisberg (2006) and Ginter et al (2013) adapted it for the healthcare delivery system, where competition is not for profit but to drive quality improvement. However, where the system's efficiency is optimised, the cost of the delivery outcome is reduced significantly. Porter & Teisberg (2006) adapted the value chain for an IPU in the delivery of care for chronic kidney diseases and HIV/AIDS in developing countries (Rhatigan et al., 2009), which produced an apparent strategy for creating patient value based on outcomes that matter most to patients living within those regions. Hence, the most crucial goal in healthcare delivery is to improve patient value, not reducing cost or providing health access at the expense of quality (Porter, 2010).

2.6.2 Value Chain Analysis

"Value analysis is the science of balancing the mandate to deliver high-quality clinical outcomes with the necessity to drive down costs in order to thrive in the challenging economics of health care" (Murray et al., 2012: 93). According to Ginter et al (2013), the value chain consists of two interrelated functions; the support activities and service delivery components, as shown in figure 2.3 below.

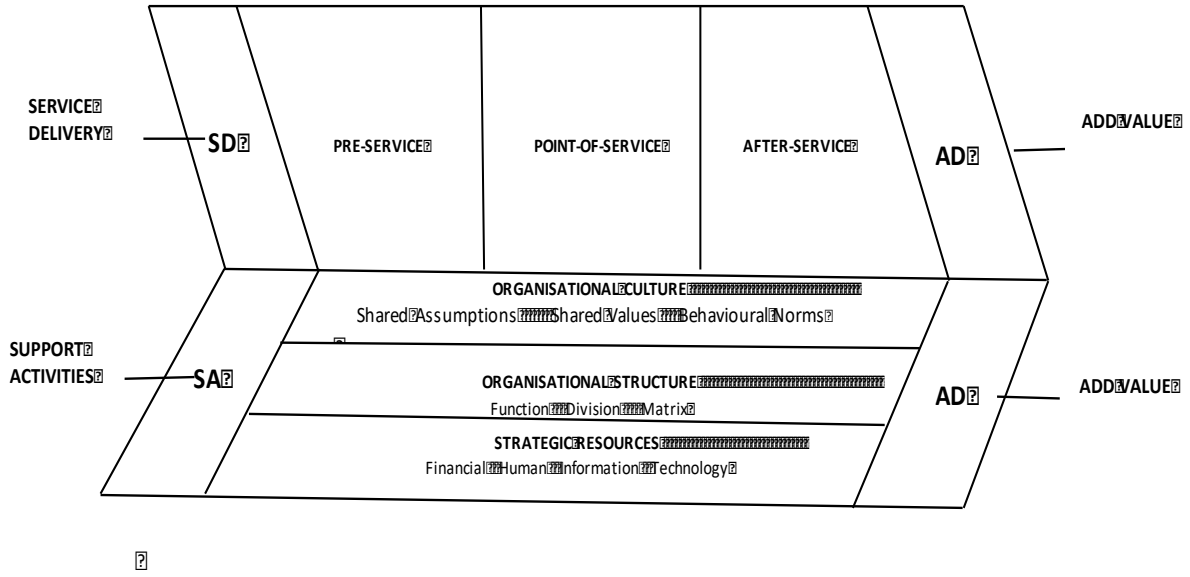


Figure 2.3: Value Chain Analysis for Healthcare (Ginter et al., 2013).

The service delivery component of the delivery system includes the pre-service, point-of-service, and after service activities, while support activities include culture, resources, and the organisational structure. MH outcome is a product of activities within the value chain but highly influenced by its external environment. The healthcare system cannot operate in isolation from its external environment, and figure 2.2 shows several complex relationships from the external environment that can influence MH outcomes. Therefore, the value chain

analysis identifies the value-increasing strengths and value-reducing weaknesses of the internal environment's service delivery and support activities components while investigating the opportunities and threats from the external environment.

Ginter et al (2013) recommended that healthcare activities focused on improving the service delivery and support activities components functions of the care delivery value chain will create the desired patient value. Arguably, creating patient value will improve the overall health outcome and reduce the cost of delivering the desired outcomes (Porter & Teisberg, 2006). A value chain is a valuable tool for analysing the internal environment and assessing how to create value in the healthcare delivery system. However, according to a study conducted by Murray et al (2012) in the Mississippi Medical Centre, multilevel linear mixed model methods were used to determine the effects of value analysis program on primary healthcare outcomes such as the average length of stay, cost of care, morbidity and mortality outcomes in the orthopaedic, cardiovascular, cardiology neuroscience healthcare services.

Findings suggest no notable difference in outcomes for medical centres that applied the value analysis and those that did not; value analysis did not negatively impact patient care. In this case, it was unclear how value analysis improved patient safety or influenced the patient outcome. However, like any other management approach, value analysis requires supervision and dedication of the leadership and management team and meticulous use for optimal impact on the delivery system (Murray et al., 2012). Also, management approaches must incorporate elements of patient safety and not just focus on cost-effective management of illness or diseases. Zismer (2013) emphasised the need for health management approaches to evolve from disease management to adopting preventive measures to ensure it does not happen in the

first place. By doing so, Zimer paved the way for integrating public health with healthcare management.

Nevertheless, the value approach provides a solution to fragmentation in services experiencing poor health outcomes to enhance the quality of care (Enthoven, 2009). For example, Kim et al (2013) utilised the healthcare value chain through the Global Health Delivery Framework, which incorporated prevention, diagnosis and treatment of medical conditions through shared delivery infrastructure, service integration, social and economic development. Cochran & Berkowitz (2015) implemented the framework to manage epilepsy in low-income countries with poor access to quality care. The finding revealed a context-specific and integrated approach that reduced stigma associated with epilepsy and improved health outcomes, and enhanced economic productivity in these regions. Likewise, Rhatigan et al (2009) recommended the framework as a viable tool for HIV/AIDS care in poor resource settings. In essence, management approaches must adopt patient safety measures. It involves a detailed investigation into the root causes of maternal mishaps and a strategy to reduce or eliminate the occurrence of such mishaps in order to enhance the quality of delivery (Spencer, 2015). In order words, Root Cause Analysis (RCA) is the first step towards patient safety; RCA should inform value chain analysis and IPU system.

The PRISMA model and other RCA techniques provide a platform for a detailed investigation into causes of events and inform improvement measures to enhance patient safety (Macdonald & Leyhanel, 2005; Spencer, 2015, Hambleton, 2005). The use of management principles in healthcare must incorporate patient safety initiatives. In agreement, Obasola (2015) recommended that several tools adopted in Nigeria such as the Abiye Project, the Mobile Community Based Surveillance and the Use of OpenMRS for management of patients should

evolve to an intervention involving stakeholders and adopt an integrated approach in the continuum of care. More so, if the management approach is an end in itself, it will not be helpful, but when implemented correctly, it can promote change (Ginter et al., 2013). Therefore, management scholars have considerable expertise to offer strategy and implementation (Nembhard et al., 2009). Hence, collaboration should be encouraged between scholars, risk managers, health experts, and stakeholders to improve patient safety (Wiig et al., 2014), especially for improving MH outcomes in Nigeria. The next section presents the link between patient safety, quality, and outcomes.

2.6.3 Quality-Patient Safety in Healthcare

Quality cannot be achieved without addressing safety issues (Illingworth, 2015). Therefore, patient safety is a component of quality (Yu et al., 2016; Wiig et al., 2014). The UK's National Reporting and Learning System (NRLS) defined patient safety as "any unintended or unexpected incident that resulted in or could have resulted in harm to one or more patients receiving state-funded care". Several health systems worldwide are faced with the pressing need to improve the quality and safety of care at a minimal cost (Millar et al., 2015; Ball et al., 2014; Baines et al., 2015). About 1 in 10 people suffer from an avoidable incidence or series of adverse effects during healthcare delivery (Cowper, 2015; Mengis & Nicolini, 2010). The strategy for healthcare should be first to avoid harm, and where incidence is unavoidable, resort to mitigation (Yu et al., 2016). It is also known as a safety-first approach, but quality cannot be sustained when patient safety is not incorporated into frontline delivery (Cowper, 2015). Patient safety is not a quick fix but requires continuous effort, which should gradually evolve over a period (Pronovost et al., 2015). Incidence is not an inevitable occurrence that should be tackled at the point of occurrence, but the risk is envisaged, monitored, mitigated promptly (Pronovost et al., 2015). Hence, improving patient safety requires methodological systems or

structures deliberately put in place to mitigate risks. Understandably, patients' situations could deteriorate rapidly (Mackintosh & Sandall, 2016). However, envisaging potential risks is critical to timely and successful intervention ultimately. Effective safety management involves identifying, assessing, and reducing latent and active risk factors (van Schoten et al., 2014). For example, to tackle obstetrics emergencies such as shoulder dystocia during delivery, a dedicated multidisciplinary team must plan and coordinate the process (Cornthwaite et al., 2015).

Unfortunately, critical maternal care is under-researched compared to other critical conditions (Scholefield et al., 2011), and obstetrics emergencies are a severe risk to MH delivery that requires a safety management system. During emergencies, emphasis must focus on the organisation's safety culture and incidence reporting system to enable identification of the root causes of mishaps and learning from past errors (Stavropoulou, 2015). In Africa, efforts to improve safety increased workforce numbers but did not address the root causes of incidence in healthcare (Madzimbamuto, 2014). Scholefield et al (2011) suggest that there should be an apparent dichotomy between women that require ordinary care, those that require strict observation or do not pose immediate threats and those critical cases that often require invasive intervention or/and require organ support in other to adequately prioritise care according to risk factors associated with each patient.

Patient safety issues are preventable through practical evaluation and implementation strategy. Kirkup (2015), in the Morecombe report, cited an incident involving the death of a baby due to mismanaged labour which could have been prevented by a proper investigation into causes of adverse event and intervention strategy adopted to prevent the occurrence of such incidence

but in this report, the existence of adverse event was often not detected by the clinical staff. To ensure potential mishap early identification of mishap, the Francis (2013) report on maternal mortality highlights the need for clinicians to listen to their patients and their families and other practitioners. In agreement, Berger et al (2014) recommend engaging patients and carers in safety issues to reduce the adverse effect on healthcare. Also, patients' experience and satisfaction are critical determinants of quality (Bjertnaes et al., 2013).

Also, safety initiatives like the surgical procedure checklist significantly improved post-surgery complications in hospitals in the Netherland, as seen in a retrospective study (Baines et al.,2015), showing a forty-five per cent decrease in preventable incidences. It, therefore, implies that the deliberate implementation of patient safety initiatives can improve patient outcomes. High-risk diseases or areas in healthcare that require improvement can utilise such a targeted approach or checklist to improve surgical complications, including maternal care in Nigeria. Similarly, The Belize Health Information system experienced a dramatic decline in maternal mortality rate from 134.1 per 100000live births in 2005 to zero in 2011 through effective monitoring of healthcare interventions and detailed investigation of maternal deaths (Graven et al., 2012). The Belize system provided a platform to inform health promotions, disease prevention, and management protocol using artificial intelligence, leading to better staff training and a more unified approach for dealing with maternal conditions such as preeclampsia.

The WHO Safechild Checklist are amongst some of the quality improvement measures recommended to improve outcomes around the time of birth in countries with high maternal mortality and morbidity (Spector et al., 2012). Positive outcomes with the implementation of

the checklist in seen in some African countries such as Namibia due to strict adherence to guidelines which enhanced patient safety within the hospital facility (Kanbongo et al., 2017). The implementation of the Safechild Checklist at the UPTH in Rivers State, Nigeria, had positive outcomes because it created patient safety awareness and promoted enhanced patient safety practices, which enable clinical staff to anticipate and address complications, manage supplies and provide better advice to patients (Dohbit et al., 2019). However, having examined the Checklist implementation in Cameroon, Ghana, Nigeria and Zambia, Dohbit and colleagues revealed that the checklist was not implemented across all obstetrics facilities due to limited financial and human resources. Also, Perry et al (2017) established that the use checklist requires adaption to local text, adequate training of staff, supervision and leadership engagement with the process to enhance the general acceptability of the tool by all clinical staff as there were inconsistencies in the use of Safechild Checklist amongst midwives, nurses, consultants and doctors. In agreement, Russ et al (2014) indicated that there had been concerns with the applicability of the checklist to medical cases; it failed to unify the team, and there were other design issues with the checklist in the hospitals in the UK. Hence, implementing the checklist is not without its challenges in this context.

Patient safety implementation requires a coordinated effort involving patients to identify the weaknesses and strengths, and ethical practices shared across settings (IIIingworth, 2015). Brewster et al (2015) stressed that proper evaluation is essential for healthcare improvement but characterised by frictions between evaluators, stakeholders and implementers. However, practical evaluation involves a detailed analysis of mishaps' root causes and patient safety risk mitigation. An effective incident report system guarantees the authenticity of the investigation into root causes (Jansma et al., 2011). The incident document provides detailed evidence of

how the incident occurred, measures taken to mitigate risk, and this is vital for handling similar incidences in the future (Carson-Stevens et al., 2015).

Since 2010, reporting incidence to respective regulatory bodies or incident management organisations has been mandatory in the UK (Carson-Stevens et al., 2015). Unfortunately, the case is different in Sub-Saharan Africa as most incidences or deaths are not being reported or recorded in some communities in Nigeria (Olaide, 2002). The inadequacy of the incident reporting system leads to under-reporting, selective or incomplete reporting and, in some cases, non-detection of future hazards within the healthcare settings and blame culture (Carson-Stevens et al., 2015; Hoffman & Mohammed, 2014). The lack of patient safety culture and practices within the MH delivery system in Nigeria and most low-income countries has resulted in high MM (Ogu et al., 2017; Okonofua et al., 2018). Hence, an appropriate risk management approach will minimise patient safety risk and improve the quality of MH outcomes

2.6.4 Risk Management

The New International Standard on Risk Management 31000 defines risk as: "effect of uncertainty on objectives, and an effect is a positive or negative deviation positive deviation from what is expected" (ISO, 2018). This definition shows the relationship between risks and uncertainties in the work environment. There are many uncertainties when dealing with patients in healthcare. Westgard (2013) stated that risk management identifies potential hazards, determines the failure mode that can cause harm, and takes actions to prevent harm from occurring. Managing risk is based on three core components; organisational principles, framework and the risk management process (ISO, 2018). The ISO 31000 standard cuts across

different sectors and provides a risk management framework. Managing risks according to this standard highlights the commitment of leadership towards patient safety, organisational principles such a culture, human factors, dynamics between staff, the ability of the organisation to create value (quality) and the risk identification, evaluation, treatment and control process (IRM, 2018). Therefore, patient safety intervention must incorporate all three components for a successful outcome in risk management. The risk management process consists of four sub-processes: risk identification, risk assessment, risk evaluation, and risk control processes (ISO, 2018). Risk identification involves highlighting the failure mode in the system, and risk assessment establishes the severity of the outcome before its occurrence (NPSA, 2008). Risk assessment involves estimating the probability of the risk occurring, severity, and detectability (Westgard, 2013).

Risk control involves planning, monitoring, and implementing patient safety options within a time frame; this means establishing required risk control measures and the equivalent response level (NPSA, 2008; 2004; ISO, 2018). Evaluating the risk control process is often the most neglected aspect of the four-part process; this involves identifying side effects with patient safety options adopted and redesigning better safety options (Brewtster et al., 2015; Westgard, 2013). However, in cases where there are multiple risks associated with a particular condition, it becomes challenging to manage and prioritise risks. In most cases, the contextual factors influencing the implementation of patient safety intervention is not well understood (Kringos et al., 2015). Due to the complexity of these processes, managing risk by ordinary clinical staff not trained in risk management has proven to be very problematic. To assess, control, and evaluate risk in healthcare settings, adequate training and guidance are needed.

Leitch (2010) pointed out that the ISO 31000 is impossible to comply with; it assumes a perspective that tolerates risks if some positive outcomes are realised rather than mitigating risks completely. Another primary concern in applying risk assessment tools is achieving consistency between investigators (Johnson, 2003). In consensus, Card et al. (2014) expressed concerns with the lack of uniformity between NHS trusts in the East of England with assessing and scoring risks, implying that risk analyses outcomes may vary between assessors. Also, the probabilistic nature of risk calculation makes risk evaluation a daunting task (McDonald et al., 2005). Also, it is crucial to define the percentage of risk factors that cannot be prevented (Ozok, 2012).

Regardless of the complexity of risk management standards, risk management creates patient safety awareness within the organisation, preventing the occurrence of adverse events in a system. The three components of risk management, process, framework and principles should be adapted (improved) for consistent and efficient risk management within the organisation (ISO, 2018). Nathan & Kaplan (2017) stressed that improvement models are helpful for patient safety, and frontline staff and management participation is vital as they can modify the model to a specific context.

In healthcare, risk management tools are commonly used, such as the Root Cause Analysis (RCA) methods, Failure Mode and Effect Analysis (FMEA), Proactive Risk Reduction, Clinical Risk, and Error analysis. Risk management model such as the RCA methods is used to identify the root causes of an adverse event rather than managing risk as a single cause of mishaps. Proper understanding and implementation of RCA tools are helpful for risk management. So, selecting an appropriate risk analysis and management tool requires a deep

understanding of patient safety problems as there are numerous RCA techniques in healthcare (Sobel, 2017).

Through the PRISMA model, this research identifies the root causes of mishaps in Nigerian hospitals and provides mitigating solutions to the risk factors (Habraken & van der Schaaf, 2010; Martijn et al., 2012). The next section will discuss RCA methods used in healthcare and the justification for the preferred PRISMA flow chart model used as a tool for analysing risks in this study.

2.6.5 Root Cause Analysis Methods

RCA has been used in several sectors for over sixty years for dealing with challenges efficiently (Sobel, 2017). RCA supports the theory that complex problems are best solved by dealing with the root causes rather than addressing the immediate or apparent symptoms (Thwink.org, 2014). It supports thorough investigations of mishaps (retrospective analysis) and possible corrections (Trucco & Cavallin, 2006).

Improving quality and patient safety requires change (Ashmore & Ruthven, 2016). It is essential to understand what aspect of the care delivery in a complex healthcare system requires change and evaluate the root causes of events responsible for poor outcomes. It is not often an easy task for health managers or practitioners because it is time-consuming (Pradhan et al., 2001), require expert opinion for complicated casual relationships (Sobel, 2017).

RCA is primarily a quality improvement tool (Boaden & Walshe, 2006) and can be particularly useful for staff responsible for clinical audits as they can be adapted to enhance the quality of delivery. Ashmore & Ruthven (2016) produced a clinical audit guide for quality improvement,

which identified underlying factors responsible for adverse effects in healthcare practice. Similarly, Flottorp et al (2010) recommend that audits and feedback focus on improvement functions rather than the feedback recipients (non-punitive). RCA enhances healthcare audits by highlighting the improvement functions (Ashmore & Ruthven, 2016). It is vital to explore the underlying causes of medical errors to improve system failures (Hsu, 2007), improve the patient profile, and enable clinicians to learn from adverse events (Perroti & Sheridan, 2015). It is focused on the weakness in the system and eliminates the blame culture during an incident investigation (Walshe & Boaden, 2006).

The National Patient Safety Agency (2004) guide recommends seven primary steps for RCA these includes; problem identification, gathering intelligence on the problem, building links between problems (Mapping), evaluating the problem, barrier analysis, implementation plan on how to resolve issues and finally present a report on findings. The RCA requires deep understanding and reflection of the intervention policy because of its contradicting aims as it can be used as a learning tool after an incident or as a governance tool that could affect sustained change (Nicolini et al., 2011). However, RCA helps create a safety culture that anticipates and puts measures to control problems within the system (Venier, 2015; Cerniglia-Lowensen, 2015).

RCA has been used to identify service-related prevention of suicide in healthcare (Gillies et al., 2015) and support infection control in the healthcare premise (Venier, 2015). Some RCAs used in healthcare are Elicitation and analysis techniques, event-based techniques, flow charts and taxonomies models, accident models and argumentative techniques. Card et al (2014) stated that although these tools are handy for organisational level diagnosis management but involve huge administrative tasks, which does not necessarily support risk control processes.

In consensus, Taitz et al (2010) stressed that it might not achieve the desired result despite the enormous amount of time spent using RCA. Also, RCA involves substantial financial cost, expertise, complicated causation and competing interests (Sobel, 2017). However, a proactive approach should be adopted to assess the implementation of RCA, which involves the use of evidence-based research to investigate whether the identified risk led to improved patient safety within the system (Taitz et al., 2010).

2.6.5.1 The Elicitation and Analysis Techniques

The elicitation models are investigative; they enable the identification of causal factors (Bishop et al., 2003). This model includes the Barrier and Change Analysis. The Barrier Analysis identifies potential obstacles within the systems to prevent a mishap from occurring. Barriers are protective or preventive, which means the ability to deflect or minimise the consequence of an incidence (Hollnagel, 1999), known as active or passive barriers in a system. Therefore, investigators conducting barrier analysis are focused on why active or passive barriers (patient safety defences) failed to protect the system (Hollnagel, 1999; Trost & Nertney, 1985). Likewise, the change analysis reveals how the current systems experiencing adverse events deviates from the ideal or prior system (Goldkuhl & Rostlinger, 2006; Kepner & Tregoe, 1976). Woloshynowych et al (2005) criticised it for overlooking corresponding changes, and where change is incorrectly defined leads to more questions than answers.

The elicitation techniques models are hugely dependant on incident reporting and not efficient for more live events occurring within the system but used in conjunction with other advanced RCA such as the Event-Based Techniques, flow chart and taxonomies models for a more complex and comprehensive analysis of events (Woloshynowych et al., 2005). Bishop et al

(2003) argue that the Event-Based Techniques for RCA provides better reconstruction for more adverse events in a system than the elicitation models of analysis (Bishop et al., 2003).

2.6.5.2 Event-Based Techniques

The Event-Based Technique identifies the events leading to the incidences in the system and creates a chronology of events (Bishop et al., 2003). This analysis model includes; Fault Tree Analysis, Event Tree Analysis, Event and Causal Factor Analysis, Multilinear Events Sequencing and Sequential Timed Event Plotting. The Event and Causal Factor Analysis uses standalone accident investigation tools and is more productive when integrated with other RCA processes (Bishop et al., 2003). It is simplistic and valuable for establishing a cause-effect relationship without apportioning blame. The Multilinear Events Sequencing provides a more advanced version of the Event and Causal Analysis in that it analyses incidences as it progresses over time (Johnson, 2003). Similarly, Sequencing and Sequential Timed Event Plotting is also a straightforward tool, used for mapping sequence but focused on establishing what happened and less on why it occurred (Woloshynowych et al., 2005). However, the models highlight the agents that interfered with the control system, such as equipment, human influences, monitoring systems to create a chain of events, including a timeline (Nano & Derudi, 2013; Johnson, 2003).

Fault Tree Analysis is a highly recommended tool for patient safety in healthcare (Raheja & Escano, 2009). The Fault Tree Analysis is designed for success and utilises a deductive approach to resolve a significant event or incident to its primary causes. It achieves this by building a systematic logic of events leading to the initiating event using electric circuit design

(Johnson, 2003, Bishop et al., 2003). The process provides a thorough understanding of event relationships. Fault Tree Analysis identifies weaknesses in a system, the reliability of a design, identifying human errors, and quantifying failure probability (Yang et al., 2013). Its failure mindset promotes early identification of risks, prioritise contributing risks and focuses on multiple problems solving using "AND" and "OR" gates (Raheja & Escano, 2009).

The Event Tree Analysis is very similar to the Fault Tree Analysis, but it is more forward-thinking in its approach. It assesses a given initiating event (Kirwan, 1994). Combining both methods is known as the bow-tie model, and both methods are complementary (Abdi et al., 2016). The bow tie method was utilised to manage patient safety risks in the intensive care unit, covering a range of clinical risks with control medications, pneumonia, catheter-related bloodstream infection, urinary tract infection, and unwanted extubating (Abdi et al.,2016). The Fault Tree Analysis offers a preventive measure (deductive approach) while the Event Tree Analysis assumes a mitigation measure (inductive approach) and provides an extension to the Fault Tree Analysis (Cristea & Constantinescu, 2017). It is often preferable to take preventive measures in risk management as familiar with managing financial and business risks but not always practicable when dealing with health risks due to uncertainties or deterioration of patient conditions (Abrahamsen et al., 2016). Therefore, minimising the effect or consequences of an event is a risk management option, which suggests Event Tree Analysis should precede the Fault Tree Analysis because understanding the consequence of an event predicts the severity of risks.

Risk measurement requires investigating its severity and possibility of occurrence (Westgard, 2013). Consequence scoring is critical to actions taken to mitigate risks but require some level of consistency or standard within a healthcare system and colossal dependence on expert guidance (Abrahamsen et al., 2016). Achieving this consistency in risk scoring has been a significant challenge among the British National Health Service (NHS) acute trusts, including poor control over the risk management process (Card et al., 2014). The Fault Tree Analysis has been used to manage clinical alarms (Hyman & Johnson, 2008), medication errors, analysing human errors and mishaps with medical facilities (Raheja & Escano, 2009). Fault Tree Analysis is also a handy tool in total quality management; to analyse failures in risk management strategies and implementations. Aghaie (2004) used the Fault Tree Analysis to review failures implementing the ISO 9001:2000 risk management process.

In recent years, the Fault Tree Analysis has become increasingly popular with a wide range of applications in the health sector, such as seen in the use of Fault Tree Analysis to reduce error with wrong-site surgery (Abecassis et al., 2015) in the management of infectious medical waste (Makajic –Nikolic et al., 2016) and to improve vaccine intake in low-income countries (Gilstad-Hayden et al., 2015). Also, Fault Tree Analysis was adapted to develop more advanced risk analysis tools such as the PRISMA flow chart model, which utilises causal tree analysis (Johnson, 2003). Although Fault Tree Analysis and other Event-Based Techniques help to produce chains of events, investigators using these methods on a case may not arrive at the same conclusion (Card et al., 2014; Bishop et al., 2003), it is vital to ensure logic used in the Fault Tree Analysis is correct as this could be complicated (Woloshynowych et al., 2005).

2.6.5.3 Accident Model

The accident model for causal analysis includes the TRIPOD and Systematic Theoretical Accident Model Process (STAMP) models. The TRIPOD uses a graphical model to illustrate the causes of an incident. It assumes that incidence or accidents occur due to general failure types such as hardware and organisational factors, poor working conditions, improper housekeeping, incompatible goals, weak communication structure, lack of training and defence planning (Bishop et al., 2003). However, useful for preliminary hazard analysis, the TRIPOD methods are being criticised for their limitation to single incidence, and secondary risks are not considered (van Schoten et al., 2014, Johnson, 2003). van Schoten et al (2014) used a multilevel econometrics approach to evaluate the validity and reliability of TRIPOD and indicated the method is not sensitive enough to detect differences between hospital departments.

On the other hand, an evaluation of the technical characteristics and usage of the STAMP accident model by Underwood & Waterson (2013) shows that the STAMP embodies the model of system theory in accident analysis. The STAMP model focus on management factors and dysfunctional relationships between departments in a healthcare setting as the culprit for mishaps in the system. The STAMP model defines safety as a control problem, not a failure problem (Levenson, 2004; 2011). It assumes that incident occurs when external influences cannot be controlled (Johnson, 2003). The STAMP develops a relationship between entities and investigates the flaws or lack of control within a system (Levenson, 2011; Johnson, 2003). Hence, causes of mishaps identified are; poor control, such as missing feedbacks, documentation and time lag which leads to a blame culture (Leveson, 2004; 2011; Kim et al., 2016). So, the STAMP method restricts analyses to control issues within the management system. The use of STAMP is common in industries such as petroleum exploration and

production (Pereira et al., 2015), maritime transportation (Kim et al., 2016), aviation industry (Passenier et al., 2015).

Because of their limitations, the STAMP and TRIPOD can be complementary tools with other models. According to van Schoten et al (2014), the TRIPOD complements other models such as FMEA to identify several failures modes in the system relatively just a single incident or accident. Also, the hybrid FMEA, a combination of Health-FMEA and STAMP, accommodates unceertainties within a system (Faiella et al., 2018). Although the TRIPOD is similar to The PRISMA model, because of the inclusion of general failure types, the PRISMA guides the detection and prevention of structural issues rather than single causes of the mishap as seen with other models (Johnson, 2003).

2.6.5.4 Argumentative Techniques

The Argumentative Technique is an incidence analysis that enables investigators to develop causal arguments from incidence reconstructions using control diagrams and causal analysis. This model includes Ladkin & Loer's (1999), Why Because Analysis and the Conclusion, Analysis and Supporting Evidence (CAE) diagrams. The Why Because Analysis begins building a causal relationship similar to the Fault Tree Analysis but based on competing arguments. In this case, the investigator employs reasonable formal arguments to prove and explain the correctness of casual relationships (Bruseberg et al., 2002). In a sustained analysis, investigators must go beyond making an argument for direct causes but form more persuasive arguments for other underlying or additional causes of a mishap (Johnson 2003). Such arguments include the human behaviour that caused the incident and component failures. However, the unique feature of the Why Because Analysis is that it uses mathematical procedures to ensure the validity and consistency of arguments on the causes of incidence

(Bishop et al., 2003). Also, according to Ladkin & Loer (1999, 1998), the Why Because Analysis is a complex and rigorous process commonly used in aviation or industry influenced by environmental factors. The quality of the technique is based on the investigators' ability to detect and correct errors in the system (Paul-Stüve, 2005). It was used to complement the Factors Analysis and Classification System for Maritime Accidents to gain a comprehensive insight into the incident (Chen et al., 2013). Similarly, the Conclusion, Analysis and Supporting Evidence (CAE) diagrams use competitive arguments for and against a recommendation and conclusions after a complicated incidence has occurred (Johnson, 2003). It ties the incident to a recommendation. However, this method lacks the consistency and validity obtainable with Why Because (Bishop et al., 2003). Although it is flexible, simplistic and can be very useful for organisations with small budgets, competing arguments can undermine a recommendation, and the application of the Argumentative Model in the healthcare industry is under research (Johnson, 2003).

2.6.5.5 Flow Chart Model and Taxonomies

Contrary to the elicitation and event models, the flowchart and taxonomies model such as the Management Oversight and Risk Tree, FMEA and PRISMA shows the more consistent result as it encourages investigators to consider a set of casual relationships even with minimal training (Bishop et al., 2003). However, it incorporates the casual analysis techniques like the Fault Tree Analysis for creating a chain of events leading to incidence (Johnson, 2003). Also, for optimising the reliability of the risk analysis process, it was suggested by Cristea & Constantinescu (2017) that the Fault Tree Analysis and FMEA should be combined in a hybrid approach. RCA tools utilise retrospective risk analysis based on incidence reporting, while tools such as the FMEA takes a preventive approach (prospective risk analysis) which ensures

mishap does not occur in the first place (Hambleton, 2005; Cristea & Constantinescu, 2017). It is imperative since proper and early risk identification is the first step to an effective decision-making process and critical to the overall risk management design for enhancing patient safety (Trucco & Cavallian, 2006).

The Health-FMEA was developed by the United States Department of Veteran Affairs National Centre for patient safety in 2002 and has been used to manage risk in healthcare extensively (Bagian et al., 2002). Such as preventing risks during the following healthcare process; drug administration (Vélez-Díaz-Pallarés, 2013), radiology (Abujuden & Kaewlai, 2009; Thornton et al., 2011), chemotherapy (Cheng et al., 2012; van Tilburg et al., 2006), sterilisation and use of surgical equipment (Huang et al., 2016). Also, The Health-FMEA has been used in the management of acute conditions as in the treatment of aspiratory pneumonia with positive outcomes (Moore et al., 2006) and adopted by behavioural health specialists to assess suicidal thoughts (Mills et al., 2011).

There are several forms of FMEA such as; Process FMEA, Design FMEA, safety/System FMEA and the Health FMEA. As these names suggest, FMEA can be used to latent analysis failure in systems, designs and processes based on the inductive approach (Hambleton, 2005). It starts by reviewing the process, system, or design to identify the failure mode and possible effects (severity of outcomes) using brainstorming and fishbone analysis techniques. It then investigates the potential causes of failure, puts in control measures and evaluation techniques to optimise patient safety for similar events in the healthcare setting (DeRosier et al., 2002). However, according to Abrahamsen et al (2016), the Health-FMEA needs to be adjusted to incorporate uncertainties within the healthcare delivery, such as changes in patient conditions to improve its reliability or effectiveness. Faiella et al (2018) recommended the hybrid version

of the HFMEA, which combines the Health-FMEA, the STAMP and System Theoretic Process Analysis method and the Systematic Human Error Reduction Prediction Analysis (SHERPA) to address reliability issues with the method. The Systematic Human Error Reduction Prediction Analysis eliminates the limitations with the HFMEA methods and identifies human errors (operational failures), and STAMP-System Theoretic Process Analysis evaluates errors due to lack of adequate control. Although a powerful combination, the STAMP model is based on control theory, creating a blame culture. Also, the application of the hybrid version suggested by Faiella et al (2018) needs to examine its adaptability for use by risks managers mainly due to several stages involved in the combination of STAMP-System Theoretic Process Analysis and Health-FMEA.

2.7 Justification for the Use of PRISMA

The PRISMA tackles the organisational and technical factors associated with the health system before operational failures, such as human behaviour and patient-related factors (van der Schaaf & Habraken, 2005). The PRISMA model assumes that individuals have been set up to fail (van Vuuren et al., 1997; van der Schaaf & Habraken, 2005). The ability of the PRISMA to take on latent and active failures in a unique hierarchy of events makes it more superior to the elicitation and analysis techniques and event-based techniques because it enables or creates a platform that unifies risk analysis between assessors (Woloshynowych et al., 2005). Also, the Action Matrix is a unique characteristic of the PRISMA model that enables investigators to make a practical recommendation to address identified risk factors that are not obtainable with other analysis models (Johnson, 2003).

The PRISMA and Management Oversight and Risk Tree are similar in that they both utilise the flowchart models, but the latter assumes that mishaps are due to poor management oversight in the operating system, leading to blame culture (Johnson, 2003). Errors are attributed to the work process rather than what went wrong (Bishop et al., 2003). However, the Management Oversight and Risk Tree method helps identify and address management-related problems in different sectors, but not enough to tackle the technicality of problems associated with risk assessment in the healthcare sector.

On the other hand, the PRISMA accommodates more generic causes in the following order of importance; technical factors, organisational factors, human behaviour factors and patient-related factors (Bishop et al., 2003; Johnson, 2003, Woloshynowych et al., 2005; Schaaf & Habraken, 2005). Van Vuuren (2000) used PRISMA to investigate the cultural influence on risks and risk management. The PRISMA Eindhoven medical classification incorporates the patient-related factor, making it well suited for the healthcare sector (Johnson, 2003; van Vuuren et al., 1997). Also, the PRISMA-Medical has been utilised in the NHS UK and Netherland healthcare systems because of its efficiency (van Galen et al., 2016).

One dominant bias associated with PRISMA is starting the flow chart or analysis with underlying causes (latent failures) before other factors. Arguably, when organisational risks are effectively minimised, individuals are better prepared to address active or unpredictable risks (Van Vuuren et al., 1997; van der Schaaf & Habraken, 2005; Kirkup, 2015). The PRISMA efficiently identifies high-level risks contributing to incidents, and investigators can make recommendations based on assessed risks at different stages to improve patient safety

(Fluitman et al., 2016; van Galen et al., 2016). Snijders et al (2009) stated that the PRISMA-medical is feasible and reliable for identifying and classifying the causes of an adverse event in health care.

2.7.1 Underlying Assumptions with the use PRISMA

The PRISMA starts with investigating latent failure in the system before the active or operational failures. These latent failures are inherent in the system due to structural or system failures, while actives are human factors (van Schoten et al., 2014; van der Schaaf & Habraken, 2005). The PRISMA assumes that addressing the latent factors first will enable the organisation to tackle the operational failures better.

In an organised system as obtainable with hospitals in developed countries, establishing an apparent dichotomy between these categories of failures is a known concept for risk mitigation (Cowper, 2015; Mengis & Nicolini, 2010). In the developing country context, these failures are not isolated in the risk mitigation process and constitute a significant setback for reducing MM (Cross et al., 2010). The inability to categorise risk is due to the severity issues in a typical low resource setting like Nigeria. For instance, latent failures due to equipment or technical issues can be attributed to corruption, embezzlement of funds, or a general lack of accountability, which are active human behaviour failures in a system (Enuku & Igbinosun, 2012; Callister & Edward, 2017). The complex inter-relationships between factors make risk investigation and analysis a daunting task in low resource settings. However, RCA techniques such as the PRISMA helps risks manager to get to the bottom of the problem, enable investigators to categorise risks and understand the relationship between risk factors (Snijders et al., 2009). Martijn et al (2012) used PRISMA to characterise the root causes of incidences

in low-risk pregnancies. However, the validity of the PRISMA findings is determined by the credibility of the sources of information collected and how it is analysed by investigators, which could be subject to biases (van Eeuwiik-Gielen, 2007). The investigators must decide on documents or evidence to include in the investigation. Collecting sufficient information from suitable sources is key to a successful intervention. To minimise bias, multiple sources of information is necessary helps to ensure all risk are identified from a diverse perspective. Unilke the STAMP, Management Oversight and Risk Tree and FMEA, the PRISMA model provides a holistic platform for a detailed investigation into root causes of the problems. The other approaches are best suited for examining a single cause of mishap; STAMP and Management Oversight and Risk Tree addresses management failures and the FMEA operational failures in the system, while the PRISMA investigates both operational and management problems.

2.7.2 The Limitations with the use of PRISMA

PRISMA has not been widely applied in developing countries. This research is the first attempt to apply such a sophisticated patient safety strategy in this context, which is not without setbacks. The implementation of PRISMA requires expertise in root cause analysis techniques, and involvement in driving safety is highly crucial. In Nigeria and other developing countries, there is a general lack of implementation and monitoring of healthcare systems and processes (Bankole et al., 2009). The lack of commitment by the healthcare provider to drive safety can be attributed to several socio-economic factors discussed in Section 2.3. The PRISMA also rely on a substantial collection of clinical data, records and information, but currently, the information technology and system for recording information are inadequate and unreliable (Anasi, 2012; Raman et al., 2018; Adegoke et al., 2013). There is also a need for collaborations

and delibrations with safety investigators to review safety issues and to provide appropriate recommendations for improvements, which requires training and active participation from all clinicians and healthcare professionals to implement this action. Due to the dysfunctionality in the system, weak infrastructure, lack of financial and human resources, the priority to cultivate a safety culture is sometimes relegated to the background as more emphasis is placed on treatments rather than preventive measures (Zismer, 2013). Nonetheless, the applicability of the PRISMA in Rivers State, Nigeria, will provide insight into the theoretical efficacy of the approach in the developing country context. The methodology chapter provides valuable information on data collection techniques and approaches to minimise these application issues.

2.8 Summary

Improvements in MH indicators have remained stagnant in developing countries or low-income countries despite attempts to improve MMR (Alkema et al., 2016). There are still considerable setbacks in dealing with obstetrics emergencies and the use of an effective monitoring system to tackle complicated cases in Nigeria (Izugbara & Wekesah, 2018; Oknonofua et al., 2017). There is also limited human and financial resources to meet MH demand coupled with the poor attitude of staff towards patient safety and lack of accountability by stakeholder required to effect and sustain positive outcomes for women in Nigeria (Ogu et al., 2017). The complex socio-economic factors and their impact on the quality of delivery and MH outcomes as shown in Figure 2.1. Section 2.6 covers current interventions adopted to prevent MM in Nigeria, which includes dealing with socio-economic factors and health utilisation through poverty alleviation, public education, use of ICT in healthcare and improved skilled birth attendance (Ezeonwu, 2014; Ensor et al., 2014; Tukur et al., 2013; McNabb et al., 2015; Obasola et al., 2015). Also, patient safety monitoring and quality process were

implemented like the Safe Child Checklist and the Maternal Death Review but suffered many challenges due to organisational failures (Dohbit et al., 2019; Hofman & Mohammed, 2014; Bandali et al., 2016).

Understandably, these are all important for improving outcomes. However, the problem with the delivery system is systematic; therefore, a holistic approach is required, which incorporates socio-political, clinical or obstetrics factors. An extensive system evaluation is crucial by implementing an appropriate risk management process in healthcare settings. In Nigeria and Sub-Saharan Africa, there is a significant gap in the literature on using RCA techniques or risk analysis methods in healthcare settings. To the researcher's knowledge, this is the first use of the PRISMA to investigate the root causes of MM. The PRISMA provides a platform for generic investigation of risks and will inform a holistic or integrated approach for improving the MH delivery system in Nigeria. The next chapter describes the PRISMA model and the conceptual framework for improving MH outcomes in Rivers State, Nigeria.The PRISMA starts with investigating latent failure in system before the active failures, which can be further categorised as avoidable factors. These latent failures are inherent in the system due to structural or system failures, while the active failure are human factors (van Schoten et al., 2014; van der Schaaf & Habraken, 2005). The PRISMA assumes that addressing the latent factors first will enable the orgnaisation to tackle the active failures better.

In an organised system as obtainable with hospitals in developed countries, establishng clear dichotomy between these categories of failures is a known concept for risk mitigation (Cowper, 2015; Mengis & Nicolini, 2010). Whereas, in the developing country context these failures are not easily isolated in the risk mitigation process and major set back for reducing MM (Cross et al., 2010). The inability to categorise risk is due to the severity issues in a typical low resource

setting like Nigeria. For instance, latent failures due to equipment or technical issue can be attributed to corruption or embezzlement of funds or a general lack of accountability, which are active human behaviour failures in a system (Enuku & Igbinosun, 2012; Callister & Edward, 2017). The complex inter-relationships between factors makes risk investigation and analysis a daunting task in low resource settings. However, RCA techniques such as the PRISMA helps risks manager to get to the bottom of the problem, enable invetsigators to categorise risks and undertstand the relationship that exist between risk factors (Snijders et al., 2009). Martijn et al (2012) used PRISMA to characterise the root causes of incidences in low-risk pregnancies. But the validity of the PRISMA findings is determined by the credibility of the sources of information collected and how it is analysed by investigators, which could be subject to biases (van Eeuwiik-Gielen, 2007). The investigators must decide document or evidences to included in the investigation. Collecting sufficient information from the right sources is key to a successful intervention. To minimise bias, multiple sources of information is necessary helps to ensure all risk are identified from diverse perspective.

Chapter Three: Conceptual Framework

3.1: Introduction

This chapter presents the proposed conceptual framework for improving MH outcomes in the healthcare delivery system guided by the PRISMA model, as van der Schaaf & Habraken (2005) recommended. It includes a detailed description of the PRISMA structure as a tool for improving healthcare safety practices and its significance in the MH delivery system. It also presents an overview of active and latent factors within the healthcare system, thereby highlighting the association between patient safety, quality of healthcare delivery and MH outcomes based on previous research.

3.2 The PRISMA Flow-Chart Model

The PRISMA model was initially developed by van Vuuren et al (1997) for the chemical processing industry but adapted for medical settings (van der Schaaf & Habraken, 2005). The main aim of PRISMA is to identify quantitative data for safety incidences and process failures in order to develop improvement measures (Martijn et al., 2012). The unique characteristic of the PRISMA method, unlike other RCA tools, is that it investigates both latent and active failures in the system (MERS TM, 2001). The latent failures are due to inherent organisational issues contributing to patient safety risk (van Schoten et al., 2014). For example, the lack of specialised equipment for monitoring complex cases or issues emanating from the organisational structure or culture.

On the other hand, active failures are a result of human activities such as the inability of clinicians to tackle obstetrics complications or patient-related complications induced by failures to comply with medical advice or due to patient's medical condition, which can be very

unpredictable (van der Schaaf & Habraken, 2005). Using PRISMA, Gaal et al (2011) conducted a retrospective medical record analysis to identify areas for potential improvement in a General Practice. The root causes of mishaps were associated with poor coordination of primary care practice, and clinicians' non-adherence to the organisational protocol was identified, which informed appropriate intervention strategy. However, Scherer et al (2010) stated that one of the significant challenges with reconstructing the root causes of mishaps is the inconsistencies between investigators. Therefore, Scherer and colleagues indicated that using an organised incident report taxonomy will maintain coherence are vital in preventing mishaps. Root cause analysis and safety taxonomy are crucial parts of an integrated risk management system needed to manage patent safety risks and improve the quality of healthcare delivery (Runciman et al., 2006).

The incident taxonomy provided by PRISMA is apparent and includes categories of risks in the following hierarchy; (i) Technical Factors, (ii) Organisational Factors, (iii) Human Behaviour Factors and (iv) Patient-related Factors. The will enables investigators working on a case to achieve consistency during risk evaluation and allows for identifying common causes of mishaps between each stage of events (van der Schaaf & Habraken, 2005). For example, in a study conducted by Smits et al (2009), two PRISMA experienced analysts identified similar failures within an organisation after analysing three hundred (300) reported unintended events. Similarly, a prospective observational study conducted by Wagner et al (2016) using PRISMA analysis across three central hospital units, the emergency medicine, internal medicine and general surgery units in twenty Dutch hospitals. Wagner and colleagues identified similarities in the distribution of root causes of incidence in the emergency and general surgery units than the internal medicine unit. Hence, the consistency and taxonomy of the PRISMA provide an organised structure that allows for such comparisons between hospital organisations and

departments. According to van Vuuren (1999), the PRISMA taxonomy goes beyond incident description (who, what, where and when incident occurred) to how and why it occurred by highlighting active and latent system failure. The PRISMA is a comprehensive risk management tool that provides in-depth analysis of risk factors (van Vuuren, 2000), and it is a very reliable tool for root cause analysis and risk classification (Smits et al., 2009).

The characteristics of the PRISMA makes it well suited to the healthcare organisation, although designed for use in the chemical and steel industries (van Vuuren, 1999). The PRISMA model has been employed in healthcare to identify and categorise mishaps. A cross-sectional study conducted by Fluitman et al (2016) using PRISMA identified human-related factors (lack of coordination between health care workers) as responsible for unplanned readmission within thirty days of discharge. In an observational study, de Vries et al (2015) used the PRISMA to categorise causal factors contributing to mishaps during urological procedures. It was used for reporting systems in transfusion medicine to eliminate human errors (MERS TM, 2001). In maternal care, Martijn et al (2012) used PRISMA to characterise the root causes of incidences in low-risk pregnancies, and improvement measures recommended to strengthen the use of clinical guidelines for risk assessment, use of appropriate intervention for high-risk lifestyle and to improve skilled birth attendance during birthing care. The following sub-sections present the critical features of the PRISMA model and how each component is helpful in the risk management process.

Incident analysis using the PRISMA model has three core components; (a) Causal Tree Incident Description, (b) Eindhoven Classification Model (ECM) of failures, and (c) the Action Matrix (van der Schaaf & Habraken, 2005).

3.2.1 Causal Tree Incident Description

Johnson (2003) stated that causal analysis is when investigators identify why an incident occurred while mishap reconstructions identify what happened during the incident. The PRISMA includes an initial reconstruction of mishaps based on the causal tree analysis (van der Schaaf, 1996). It provides a detailed description of the root causes of the investigation organisation's mishaps. Fluitman et al (2016) used the causal tree to describe root causes of unplanned readmission less than thirty days of discharge.

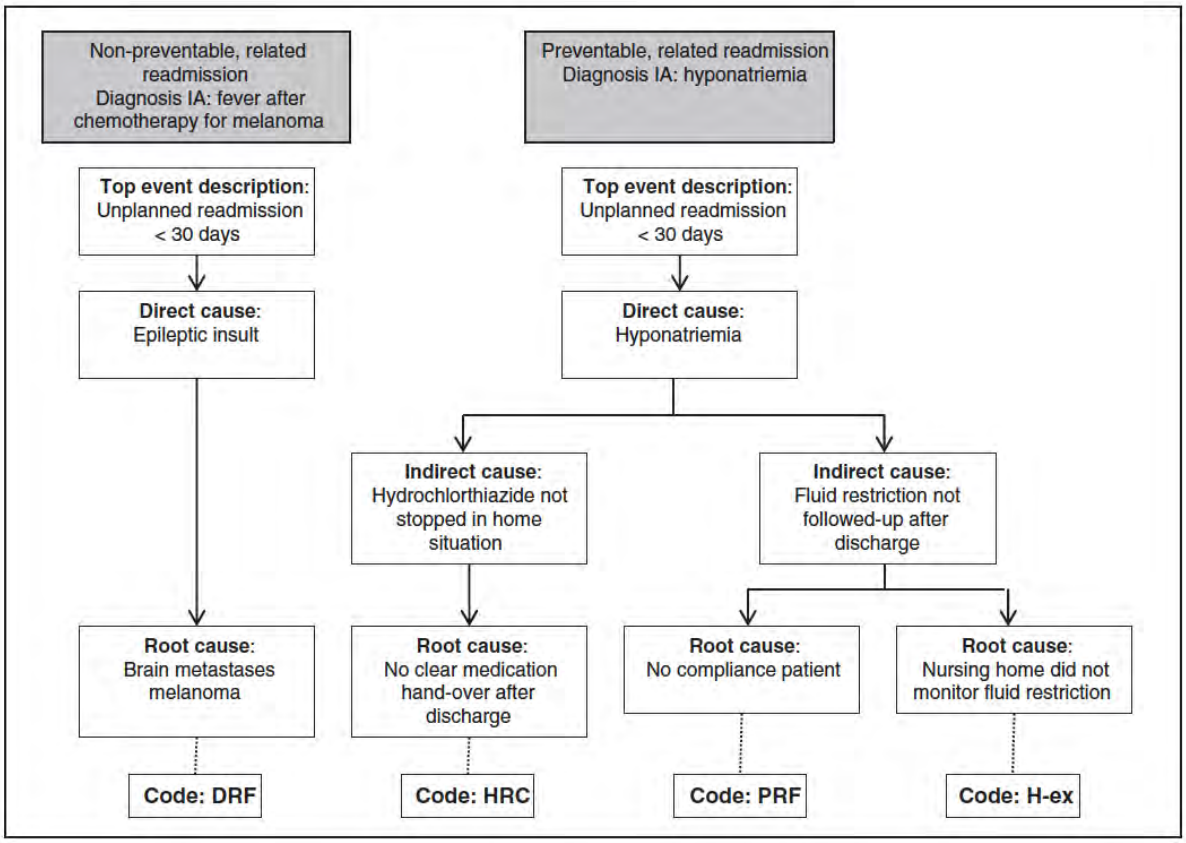


Figure 3.1: Two Examples of Casual Tree for Unplanned Readmission <30days (Fluitman et al., 2016)

As shown in Figure 3.1, the root causes of preventable readmission in the treated of patients with hyponatraemia were as a result of human-related coordination (HRC), patient-related factor (PRF) due to non-compliance, and the external human factor (H-ex) as the nursing home did not monitor fluid restrictions after being discharged from the hospital. In some cases, as seen in the disease-related factor (DRF), incidences are sometimes unpreventable due to medical complications. However, the dominant bias with causal analysis is when investigators have preconceptions about why an incident or accident occurred. In which case, mishap reconstructions are built on evidence that supports their preconception (Johnson, 2003). According to van Eeuwiik-Gielen (2007), the success of the incidence investigation process depends on the integrity of the multidisciplinary team, and the role of the management is to facilitate the process and not control it. Although, in some cases, senior healthcare practitioners were unwilling to participate in the process than in other industries as they claim to be very busy (van Vuuren, 1999).

3.2.2 Eindhoven Classification Model (ECM)

One of the unique characteristics of the PRISMA-medical version is ECM. It acknowledges that patient condition and characteristics contribute to mishaps in the healthcare system, unlike other methods such as the Sequential Timed Event Plotting and STAMP approach, where incidences are due to a faulty process or system (Johnson, 2003). Hence, failures identified from the causal analysis in medical settings are classified according to ECM as evident in several studies (De Vries et al., 2015; Martijn et al., 2012; Fluitman et al., 2016; Smits et al., 2009).

Table 3.1: Categories of the Eindhoven Classification Model: Medical Version (van Vuuren et al., 1997; MERS TM, 2001)

		Code	Category	Definition
Technical		T-EX	External	Technical failures beyond the control and responsibility of the investigating organisation.
		TD	Design	Failures due to poor design of equipment, software, labels or forms.
		TC	Construction	Correct design, which was not constructed properly or was set up in inaccessible areas.
		TM	Materials	Material defects not classified under TD or TC.
Organisational		O-EX	External	Failures at an organisational level beyond the control and responsibility of the investigating organisation, such as in another department or area (address by collaborative systems).
		OK	Transfer of knowledge	Failures resulting from inadequate measures taken to ensure that situational or domain-specific knowledge or information is transferred to all new or inexperienced staff.
		OP	Protocols	Failures relating to the quality and availability of the protocols within the department (too complicated, inaccurate, unrealistic, absent, or poorly presented).
		OM	Management priorities	Internal management decisions in which safety is relegated to an inferior position when faced with conflicting demands or objectives. This is a conflict between production needs and safety. An example of this category is decisions that are made about staffing levels.
		OC	Culture	Failures resulting from collective approach and its attendant modes of behaviour to risks in the investigating organisation.
Human		H-EX	External	Human failures originating beyond the control and responsibility of the investigating organisation. This could apply to individuals in another department.
	Knowledge-based behaviour	HKK	Knowledge-based behaviour	The inability of an individual to apply their existing knowledge to a novel situation. Example: a trained blood bank technologist who is unable to solve a complex antibody identification problem.
	Rule-based behaviour	HRQ	Qualifications	The incorrect fit between an individuals training or education and a particular task. Example: expecting a technician to solve the same type of difficult problems as a technologist.
		HRC	Coordination	A lack of task coordination within a health cares team in an organisation. Example: an essential task not being performed because everyone thought that someone else had completed the task.
		HRV	Verification	The correct and complete assessment of a situation including related conditions of the patient and materials to be used *before* starting the intervention. Example: failure to correctly identify a patient by checking the wristband.
		HRI	Intervention	Failures that result from faulty task planning and execution. Example: washing red cells by the same protocol as platelets.
		HRM	Monitoring	Monitoring a process or patient status. Example: a trained technologist operating an automated instrument and not realizing that a pipette that dispenses reagents is clogged.
	Skill-based behaviour	HSS	Slips	Failures in performance of highly developed skills. Example: a technologist adding drops of reagents to a row of test tubes and than missing the tube or a computer entry error.
		HST	Tripping	Failures in whole body movements. These errors are often referred to as "slipping, tripping, or falling". Examples: a blood bag slipping out of one's hands and breaking or tripping over a loose tile on the floor.
Other factors		PRF	Patient related factor	Failures related to patient characteristics or conditions, which are beyond the control of staff and influence treatment.
		X	Unclassifiable	Failures that cannot be classified in any other category.

The ECM medical version categorises active and latent failures in a system, as shown in Table 3.1 above. This approach starts by analysing latent failures in the system; these are technical and organisational failures. Arguably, by eliminating latent factors contributing to incidence, the organisation can tackle operational failures in the system (Kirkup, 2015). According to van Vuuren et al (1997), technical factors are issues relating to equipment design, construction, installation, software, forms and labels, while organisational factors include; protocols, operating procedures, management priorities, shared culture and values. Active failure in the

system results from human activities or behaviour, which includes skill-based behaviour, knowledge-based behaviour, and rule-based behaviour. Including the patient-related factors often unavoidable in healthcare settings (Yu et al., 2016; Mackintosh & Sandall, 2016). The next sub-sections show a detailed description of ECM components and their impact on healthcare delivery.

3.2.2.1 Organisational Factors

The PRISMA ECM –medical version description of organisational factors as shown in Table 4.1 includes; external organisational failures outside the authority of the hospital management, transfer of knowledge to less experienced or knowledgeable staff, protocols management Priorities and organisational culture.

These organisational factors influence the quality of the patient outcome. As stated by Kringos et al (2015), contextual factors are responsible for quality outcomes; these are organisational characteristics that relate to the effectiveness of the delivery system. The leadership style and organisational culture play a key role in perceiving safety (Ballangrud et al., 2012). Likewise, the hospital board and executive members are responsible for promoting a safety culture (Millar et al., 2015) and a climate that encourages feedbacks and communication about incidences in a care setting, primarily where incidence report supports the development of a preventive measure to improve the quality of care (Valentino, 2010; Ballangrud et al., 2012). Mannion et al (2016) emphasised that the healthcare governance and management approach contributes to how clinical staff feel about reporting incidence and organisational commitment to tackling adverse events within the healthcare settings. Also, a study conducted in Botswana by Madzimbamuto (2014) attributes the inability of the hospital to implement policies, protocols and guidelines as the highest contributor to maternal deaths.

Furthermore, an efficient staff to patient ratio will lead to a better working environment, staff retention and ultimately, the quality of care is optimised (Coetzee et al., 2012). Ball et al (2014) stressed that care left undone or frequently missed is associated with low staffing levels in the hospital, which adversely affects the quality of care delivered. Similarly, clinical negligence by staff leads to low staffing levels, blur vision and lack of training (Sholapurkar, 2015). Ball and colleagues assert that nurses' evaluation of care often left undone could lead to better staffing or job allocations (patient per staff ratio) to enhance patient safety. Although, there are vital factors to consider when planning staff to patient ratio during intrapartum care (childbirth); accurate measurement of the workload, sudden demand or rise in the number of patients in labour or delivery suite (emergencies), procedures and standards to be maintained by the hospital, other staffing issues such as specialist skills of midwives or experience and budget. In the past, the NHS England has employed Birthrate Plus to plan unpredictable demand in maternity services for several years and enhance the design of more efficient computerised tools to support workforce planning (Ball & Wasbrook, 2010). Brewster et al (2015) advocate for collaboration between interested parties to evaluate tools adopted to ensure an appropriate level of satisfaction. Studies assert that an organised workforce through effective human resource management will lead to safe and sustainable care (MacKenzie et al., 2011; Kramar, 2014). Therefore, staff deployment must target capable individuals based on patient needs to improve quality and save cost in the long run (Kaufman, 2015).

The organisational incidence reporting procedure helps enhance patient safety (Jansma et al., 2011). Notably, learning from incidence will better prepare staff for the subsequent occurrence of similar mishaps (Linsay et al., 2012). Lindsay and colleagues advised that rather than

blaming individuals for the incidence, the general workforce can adopt a better approach and attitude; this means coming together to plan to assess the incidence and suggest a plan of action for future occurrences. A blame culture prevents staff from reporting incidence, withholding information for fear of losing their jobs or being punished (Carson-Stevens et al., 2015; Kringos et al., 2015). Aveling et al (2016) recommend a just culture where collective efforts from both the induvial and the organisation are responsible for patient safety. In agreement, Lindsay et al (2012) stated that trust and intelligence are required to build a culture that promotes patient safety values by highlighting potential incidences rather than focusing on risk-based reviews of health delivery performance as it is the norm with the British NHS with sets performance criteria regulated by the CQC. The management must promote a culture that enhances trust relationships since a positive work environment links the high rate of incident reports in hospitals (Kirwan et al., 2013). However, Levison (2012) suggests that underreporting could be due to a lack of knowledge on reporting, but ultimately the organisation has the responsibility of creating a working environment that supports patient safety, including training and re-training of staff. So, underlying organisational issues emanating from leadership, structure, and culture impact daily healthcare activities and patient outcomes. Although technical failures also contribute to the underlying problem in the system, this can equally be attributed to other external issues, as discussed in the next section.

3.3.2.2 Technical Factors

The ECM technical category consists of latent factors which could contribute to mishaps such as equipment design (TD), construction (TC), material (TD) and the external technical failures not within the control of the organisation (T-EX). Below is a complete description of these factors shown in Table 4.1.

In the MH delivery system, technical factors play a critical role in patient outcomes. The monitoring/ interpretation of fetal heart rates is vital for preventing perinatal deaths/morbidity. The NHS England has paid out 3.1 billion pounds of claims for negligence leading to maternal deaths over the past decade, most commonly due to errors in cardiotocography readings (Sholapurkar, 2015). It supports the need to eliminate clinical staff errors during healthcare practices as a strategy for improving health. Intrapartum fetal monitoring is a patient safety agenda for most health institutions worldwide, and in the absence of an active monitory device, perinatal mortality/ morbidity is inevitable. The intermittent auscultation and the cardiotocography machine are the most commonly used for fetal monitory. Newer versions include computerised cardiotocography machines, fetal electrocardiograms, and fetal oximetry, and birth attendants must use the best approach to suit patients' needs. Ideally, according to Patenaude et al (2014), diagnostic imaging in obstetric care requires specialist training and highly skilled technologist in fetal Magnetic Resonance Imaging to identify abnormalities and deformities in pregnancies. They place a considerable responsibility on technicians or professionals as inaccuracies can lead to devastating consequences. The leading causes of direct maternal deaths are thromboembolism, haemorrhage, sepsis, and hypertensive disorder (Knight et al., 2014; Say et al., 2014). Therefore, early detection of illness by clinical staff could improve patient outcomes (Banfield & Roberts, 2015). Monitoring systems can detect early signs of health complications during pregnancy in maternal care.

The National Early Warning Signs (NEWS) is used across UK and Canada to check for changes to psychological parameters in general health care, but the modification made for obstetrics care because of changes in health parameters during pregnancy. The Modified Early Obstetric Warning System (MEOWS) have been used to manage early signs of sepsis in women in the UK. Women could describe their symptoms if unwell during appointments with the midwives.

Then, signs and triggers were identified using the MEOWS charts to ascertain the severity level and backed up with an appropriate level of response or intervention. However, Kodickara & McGlennan (2010) explained that although the MEOWS is very useful for detecting illness, there is a high false-positive reading with an inaccurate blood pressure reading. Also, the use of such monitoring systems requires skills, training, and resources (Swanton et al., 2009). Mao et al (2015) explained that the influence of ergonomics is often overlooked whereas, most patient safety incidents result from human factors and ergonomics. Electronic healthcare systems can introduce errors to administrative processes, especially with drop-down options when filling or updating health records, as its more likely to choose the wrong options in some cases (Daker-white et al., 2015). WHO (2009) highlighted that the interaction between systems, tools and clinical staff plays a vital role to work outcomes and patient safety. There is a problem of illiteracy and design-reality gaps between the rational designers' specifications and actual users' requirements (Bervella & Al-Samarraieb, 2019; Nyame-Asiamah, 2020).

3.2.2.3 Human Behaviour Factors

The ECM has three broad categorisations of human behaviour or active failures in the system. These consist of knowledge-based Behaviour, Rule-based Behaviour and Skill-based behaviour. It also includes external human behaviour beyond the control hospital (H-EX), as seen in the causal tree description for unplanned readmission where a patient was discharged, but the care home did not monitor fluid restriction (Fluitman et al., 2016). Table 3.1 shows a description of all three groups of active human factors.

The maternal care delivery team consists of professionals such as midwives, obstetricians, gynaecologists, sonographers, laboratory technicians, anaesthetists, theatre professions, external specialist doctors, general practitioners and other key workers. The interaction and

behaviours of team members are vital for achieving positive patient outcomes. The Health and Safety Executive (safety regulators) defines human factors as "environmental, organisational and job factors, human and individual characteristics which influence behaviour at work in a way which can affect health and safety" (HSE 1999, p.2).

In healthcare, little or no training is provided in human factors compared to other industries such as the aviation industry that apply human factor principles to design equipment (WHO, 2009). The Control of Major Accidents Hazards Regulations -COMAH highlights in-depth the impact of human factors on organisational outcomes (MacDonald & Varney 1998) in the UK. This regulation advocates the use of all necessary to prevent or mitigate mishaps, especially where human factors or roles can promote the prevention of mishaps, then risk management and control measures must include the human component. The Health and Safety Executive guide (HSG65 and HSG48) provides a human factor framework with a performance criterion (structured approach) for dealing with critical safety tasks (HSE, 2005). As elaborated by the HSE (2005), the design of patient safety framework, organisational procedures must consider three significant characteristics that influence safety behaviour at work; the job, the individual and the organisation. The job includes; nature of work, working relationships, and environments; the design of working equipment based on ergonomics principles, understanding human limitations and Jobs are to be matched with individual capabilities, skills while highlighting strengths and weaknesses; and the working culture should create a safety perception which will influence the behaviour of the staff.

Prosser-Snelling (2015) emphasised the importance of improving teamwork for obstetrics care through practical training, coordinated communication structure, and protocol for transferring critical patient information to enhance safer births and lower mortality rates. Whereas

consultants and GPs embark on their career with little or no further training on completing training. According to Tomlinson (2015), learning and development through clinical supervision are mandatory for patient safety and quality improvement (Davies, 2006). Clinical supervision directed towards patient safety is most effective when perceived as supportive and educative to achieve the desired outcome (Tomlinson, 2015).

Clinical supervision involves the provision of monitoring, guidance, and feedback on personal, professional and educational development in the context of the doctor's care of patients (Tomlinson, 2015). Kilminster (2010) stressed the importance of anticipating a doctor's strengths and weaknesses to maximise patient safety. The use of audit and feedback can bridge the gap between what is obtainable in healthcare and the recommended care and can improve the quality of health care delivery (Flottorp et al., 2010). The rule of thumb is that feedback must focus on improvement functions rather than the feedback recipients (Ashmore & Ruthven, 2016). Feedbacks following audits must be prompt, realistic and non-punitive (No blame culture) (Aveling et al., 2016), and COMAH indicates that the analysis and management of human failures is a step towards patient safety (MacDonald & Varney 1998).

In many cases, the organisation fails to acknowledge human errors; they instead blame the equipment. Whereas, there might be some human failures such as tiredness, errors with readings and general incompetence when using equipment that might result in incidence at work (Mackintosh et al., 2013). It is vital to analyse human failure and put in measures to improve the system's efficiency. According to Taib et al (2011), there are three dimensions of the human factor in the risk analysis taxonomy for medical error. These include; External Error Mode, which is the observable human error such as the administering the wrong medication; Psychological Error Mechanism such as the inability of the staff to remember the right dose or

time to administer medication; and Performance Shaping Factor, which error due to organisation or system problem such staff shortage or time constraints when administering medication. A comprehensive analysis of risk analysis taxonomies conducted by Taib and colleagues revealed that the PRISMA-ECM medical version included all three dimensions of human factors, unlike other risk taxonomies such as the Reason's model of accident causation, Human Factors Analysis and Classification System (El Bardissi et al., 2007) and the Reason's generic error modelling system (Nuckols et al., 2008). It is evident in a study conducted by Nast et al (2005), using the ECM in the Cardiothoracic Intensive Care and Post Anaesthesia Care Units involving 157 adverse events, which were the most comprehensive taxonomy for risk analysis because it took into consideration three dimensions of human failures. Hence, this justifies the use of ECM as a viable tool for investigating the different categorised human failures in the MH delivery system. However, other human factors such as the patient factors could interfere with the medication administration process as a patient may refuse to follow medical advice in some cases. Similarly, in MH, patient-related factors contribute significantly to mishaps to mishaps (Fagbamigbe et al., 2017). The next section presents the patient-related factors that influence outcomes.

3.2.2.4 Patient-Related Factors

According to van der Schaaf & Habraken (2005), there are adverse effects relating to patient characteristics or conditions which the organisations have no control over. In Sub-Saharan Africa, patient's characteristics influencing maternal outcomes include; illiteracy, poverty, self-medication, the use of traditional medicine, culture, religion and reduced utilisation of healthcare as indicated in several studies (Adjiwanoua et al., 2018; Adedini et al., 2014; Ibeh, 2008; Olusegun et al., 2012; Abor et al., 2011; Ugal et al., 2012, Aborigo et al., 2019; Yarney, 2019). Also, women's medical conditions could become very unpredictable; in some cases,

women could experience co-occurring symptoms which will require highly skilled interventions (Faye et al., 2014). Examples of such medical conditions are Preeclampsia or eclampsia, haemorrhage, prolonged labour, HIV AIDS, sepsis and birth complications such as shoulder dystocia (Fubara et al, 2007; John & Uzoigwe, 2004; Suthar et al., 2013, Cornthwaite et al., 2015, Say et al., 2014; WHO et al., 2019; Knight et al., 2014). In pregnancy, most birth complications could result in an emergency caesarean section and loss of blood (Morisaki et al., 2017; Ezeonwu, 2014). Regardless of the development of complications during pregnancy, the ability of the medical team to manage active risks, early identification and control of the situation will save lives and improve the MH delivery system (Mackintosh & Sandall, 2016, Banfield & Roberts, 2015). The ECM allows risk managers to investigate the impact of uncontrollable medication cases on the delivery system in terms of the hospital's preparedness to tackle obstetrics emergencies. Also, identifying prevalent medical conditions will inform health policy reform and instigate appropriate strategic approaches to mitigate patient risks (Prata et al., 2012).

Having identified all the components of the ECM, which is the first step towards risk mitigation and an essential aspect of the risk management process, the next step is mitigating the risk identified. The PRISMA approach utilises structural improvement measures known as the Action Matrix to improve the quality of service delivery in the various categories. The next section presents a description of the Action Matrix.

3.2.3 Action Matrix

The Action Matrix is a unique characteristic of the PRISMA process. The ECM-medical does not end with the description and classification of root causes of mishaps, but it supports the development of specific countermeasures to eliminate risks (van Eeuwiik-Gielen, 2007). Dye

& van der Schaaf (2002) explained that the principal aim of risk analysis and classification is to formulate corrective measures. Van der Schaaf & Habraken (2005) used the Action Matrix to formulate structural measures for improvement by linking recommended measures to the ECM classification codes such as T-EX, TD, TC, and TM as defined in Table 3.1. However, the recommended measures must not be strict but flexible to meet the context factors and incident requirement; who, what, where and when the incident occurred (van der Schaaf & Habraken, 2005). For example, Dye & van der Schaaf (2002) utilised the Action Matrix to formulate corrective actions to promote customer satisfaction in the telecommunication industry by improving organisational responses towards investigating and resolving customer's complaints. One of the main objectives of this study is to recommend improvement measures for MH delivery in Rivers State**.** Below is a diagrammatical representation of the conceptual Framework for Research**.**

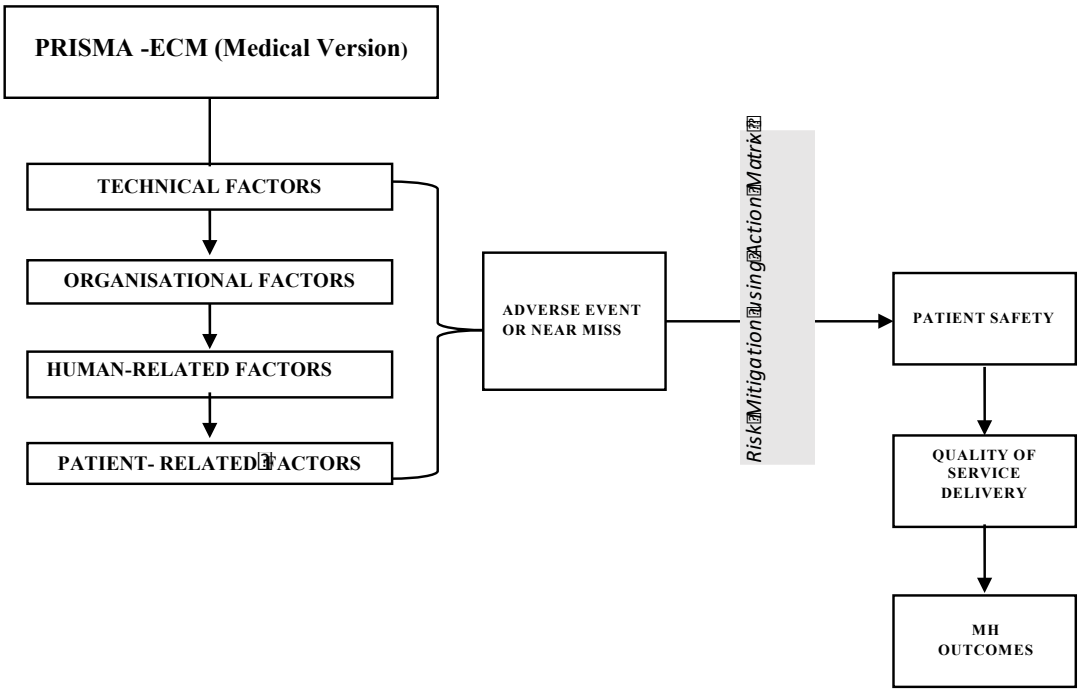


Figure 3.2: Thesis Conceptual Framework for improving MH Outcomes based on the PRISMA Model

The conceptual framework for this study adapts the ECM-medical version to the MH delivery shown in Figure 3.2. It proposes that risk should be managed in the hierarchy starting with latent failures such as technical factors, organisational factors before active failures, human behaviour factors and patient-related factors. These are complex relationships responsible for preventable maternal deaths. Although a patient condition in cases of severe chronic disease can be unpreventable, the organisation must fully exhaust all possible options for the patient's safety even in such cases.

Section 2.6.3 in the literature review chapter discussed the Quality-Patient safety concept. Studies indicated that patient safety is synonymous with improved quality of healthcare delivery (Yu et al., 2016; Wiig et al., 2014; Illingworth, 2015). In agreement, Graven et al (2012) stated that enhancing the quality of delivery through patient safety intervention positively correlates with better outcomes when managing unpredictable obstetrics emergencies. For example, shoulder dystocia; effective organisational and technical planning through a coordinated multidisciplinary team will improve outcomes for women (Cornthwaite et al., 2015). Graven et al (2012) indicated that the Belize Health Information System experienced a drastic decline in maternal mortality through an effective patient safety intervention in the treatment of preeclampsia. Similarly, implementing safety management systems in the Dutch healthcare system improves health outcomes significantly (Baines et al., 2015). In contrast, the absence of relevant patient safety strategy resulted in miss-management of labour during childbirth, as seen in the Morecombe case involving the death of a mother and several babies in the maternity unit at the Furness General Hospital in Cumbria, the United Kingdom, due to determination of midwives to pursue normal childbirth at all cost without considering the risk factors for women (Kirkup, 2015).

Efforts to mitigate latent and active failure in the system, organisational, technical, human behaviour and patient-related failures will improve MH outcomes. The PRISMA-medical tool is practical safety management for improving the quality of outcome (Smits et al., 2009; van Vuuren, 2000; Wagner et al., 2016). Hence, this project will utilise the PRISMA model to investigate and analyse the root causes of an adverse event in MH delivery in Rivers State, Nigeria. It also employs the Action Matrix recommended by the PRISMA model to design corrective measures to address latent and active failures in a system. Although the PRISMA classification is to guide the understanding of incidences and inform corrective measures, it must be continuously appraised and compared with subsequent implementations to gauge its overall effectiveness in risk mitigation (van der Schaaf & Habraken, 2005). The research methodology Chapter (4) will provide an overview of data collection methods for identifying root causes of adverse events and corrective measures in the MH delivery system.

Chapter Four: Research Methodology

4.1 Introduction

Using the PRISMA model, this research aims to improve MH outcomes in Rivers State, Nigeria. First and foremost, it is crucial to examine the reason for the MH delivery system's failures to suggest interventive measures based on evidence. Previous chapters have demonstrated the need for a holistic approach in assessing and mitigating risk factors to reduce mishaps in MH delivery, which contrasts to what is obtainable in healthcare systems in low-income countries and particularly in the Nigerian context, is the focus of this research. The PRISMA model approach provides an empirically robust platform for generalised and structured assessment of complicated risk factors using simplified categorisations such as organisational, technical, human-behaviour and patient-related factors.

A detailed investigation of the MH system will require collecting comprehensive data using surveys and semi-structured interviews. A mixed-method approach is, therefore, imperative to achieve the research objectives:

To investigate and analyse clinical and non-clinical risk factors contributing to MM using the PRISMA Model.

To investigate the relationship between risk factors and their order of riskiness using Exploratory Factor Analysis (EFA).

To coordinate health experts' perceptions of clinical and non-clinical risks identified and how the MH delivery system can be improved.

To make practical recommendations for improving MH outcomes in Rivers State, Nigeria.

According to Creswell & Tashakkori (2007), mixed-method research begins with a robust research objective. However, there is a dichotomy between the mixed method as just a qualitative and quantitative data collection and analysis method and integrating both methods in research (Tashakkori & Creswell, 2007). Carey (1993) stated that integration as a critical concept in mixed-method research is debatable, but it answers the question of substantial value. Uprichard & Dawney (2019) argued that integration is not always achievable in practice, but a diffraction method provides an alternative where data is highly complex through different data collection methods. These arguments developed an epistemological foundation for mixed-method research rather than ideologies established with individual methods (Small, 2011; Johnson et al., 2007). Mixed-method has emerged as the third methodological movement (Doyle et al., 2009; Tashakkori & Teddlie, 2003, 2010). Greene (2008) pointed out that mixed-method can be a distinctive methodology in social science because it incorporates multiple traditional paradigms.

It is not just enough to combine methods, but it is vital to validate the rationale for mixed-method. In a study conducted by Small (2011), some researchers could not validate their rationale for mixing the same size, data collection methods, data analysis or their philosophical viewpoint on the subject. Creswell & Tashakkori (2007) discussed the rationales extensively for mixing based on four main perspectives; method perspective, methodology perspective, paradigm perspective and practice perspective. Regardless of the rationale for mixed methods research, Leech & Onwuegbuzie (2009) stated that selecting an appropriate mixed method research design is a significant challenge with researchers given numerous designs. Also, mixed analysis can be very complicated, especially with mixed data analysis. Authors like Onwuegbuzie & Combs (2010) provide a meta-framework to address mixed analysis in a two-level embedded mixed research design used to examine the coping strategy of graduate

students learning statistics, which would otherwise be very complicated without a well-defined tool and Bazeley (2003), have provided a practical guide on mix data analysis.

It is important to note that mixed methods research is widely used and offers much to health and social science research (Sale et al., 2002; Doyle et al., 2009). It enables researchers to get closer to the truth about a phenomenon than the use of a single method (Greene, 2008). Also, It provides a methodological and rigorous investigation of the phenomenon studied in primary health care services (Creswell et al., 2004). In the UK, mixed-method is common in health research studies as quantitative or qualitative methods alone are insufficient to address the complexities associated with health service research (O' Cathain et al., 2007). So, researchers can address the ambiguities resulting from pluralism (Small, 2011). Extensive literature in research methods advocates for the validity and reliability of mixed-method research (Greene, 2008; Onwuegbuzie et al., 2009; Nleme, 2016; Johnson et al., 2007).

The researcher discusses the philosophical assumption (Section 4.2), research methodology overview, triangulation in research and the justification for methodological choices (Section 4.3), quantitative research methods & analysis (4.4), qualitative research method & analysis (Sections 4.5 & 4.6), ethical considerations (Section 4.8) and risk assessment (Section 4.9).

4.2 Philosophical Assumption in this Research

4.2.1 Positivist and Interpretivist Debate.

For several years, validity, reliability, paradigmatic intellectual dominance and legitimacy in social inquiry has been the subject of debate. Denzin & Lincoln (2011) discussed the contradictions and controversies of different world views; positivism, post-positivism, critical

theory and constructivism and comparisons on the ontological, epistemological and methodological perspectives of these world views.

Quantitative research is mainly a positivist view, and qualitative research is rooted in interpretivism or constructivism. The origin of positivism stems from the 19th century by a French philosopher, Auguste Comte (1896). Comte believed that people's actions were subject to social laws governed by rules. To further strengthen the ontological perspective of the positivist, Wittgenstein (1974) argued that empirical evidence is the only valid form of knowledge. The positivist researcher bases their findings on quantifiable and observed objectively (Creswell, 2006).

The Kantians rejects positivism in its entity. Arguably, the positivist assumption objectifies human feelings and experience (Husserl, 1970) and Weber (1949) rejects scientific methods to explain the behaviour of a human being in a natural setting. The argument brought about interpretivism and constructivism paradigm in research. Building on the Kantian's view, the Marxist perception focuses on the transformative paradigm. Marx & Engels (2002) and other social realists reject the objectivism of the positivist. Horkheimer & Adorno (2002) argued that human political factors influence social structures, and to explain social reality, it is critical to evaluate their self-understanding of a social phenomenon. Making the case against positivism, Durkheim (1966) argues that positivism focuses on empiricism to establish laws through what is observable, making it challenging to explain the causes of people's actions or tendencies, especially in an open system.

The interpretivist, pragmatic, social realist and transformative philosophers scrutinised the relevance of positivism in social science research. Based on the current study, Corry et al

(2018) emphasised that positivism still have its relevance in healthcare research as long as it can provide a paradigmatic structure for scientific methods. However, the emergence of post-positivism undermines or supersedes the methodological premises of positivism.

Post-positivism can be deterministic, reductionistic, used to test theory and based on observation and measurement (Creswell, 2014). The deterministic researcher finds causes, effects, and explanations of a situation and predicts patterns of human activities (Neuman, 2009). Post-positivism partially rejects some critical assumptions of positivism as described by Corry et al (2018). The inductivism of the positivist approach applies hypothetico-deductivism, which involves developing a hypothesis of a causal relationship, then using empirical data to test a hypothesis, also known as verification. So, post-positivism is based on falsification because one cannot prove if a theory is correct but false, and reality is not absolute (critical realism), unlike the naive realism obtainable with positivism (Corry et al., 2018). It means that the perception of an infinite being does not define post-positivism; researchers follow a structured process to ensure validity and reliability (Creswell, 2009). So, post-positivism is not a continuation of or against positivism but provides an enhanced perspective to positivism (Corry et al., 2018). The post-positivist criticism of positivist empiricism makes it oriented towards a more comprehensive explanation of a social phenomenon as it is cautious about methodological errors that could occur from quantitative findings (Adam, 2014).

On the other hand, the constructivism and interpretivism worldviews originate from the construction of reality and are based on Lincoln & Guba's (1985) naturalistic inquiry. In other words, constructivists or interpretivism believe that the meaning and interpretation of natural occurrences differ from one individual to another, and the world is not static but continually changing so as individual perspectives (Dervin, 1992; Dervin & Nilan, 1986). Interpretivism

promotes qualitative data in social inquiry (Kaplan & Maxwell, 1994). According to Denzin & Lincoln (2011), while the qualitative inquiry focuses on quality, what kind of things people align to in their daily activities, the quantitative inquiry is focused on quantity, how often that kind of activity occurs. Creswell & Plano Clark (2011) argues that quantitative research should always precede a qualitative inquiry. However, the advocates of positivism are unable to justify their definition of a real word, in that, if there is a pattern in the behaviour of individuals, further exploration of this observed reality is required (Chowdhury, 2014). It claims that quantitative research is uncontrollable and counts the wrong things without a qualitative foundation (Erickson, 2006).

Interpretivism philosophical paradigm is concerned with the peculiarity of a given situation and contributes significantly to contextual depth in research (Myers, 1997). While it is valuable in providing in-depth knowledge of a social phenomenon, interpretivist research is also criticised for its legitimacy; validity, reliability and generalisation (Perry, 1998; Kelliher, 2005; Eisenhardt, 1989). According to Denzin (1970), the reliability of interpretivist research is strengthened by combining several data collections methods in a single study as known as triangulation. Although triangulation is not a validation tool, multiple sources of information bring the researcher closer to the truth (Denzin & Lincoln, 2003; Remenyi et al., 1998). In terms of generalisation, interpretivist research is subjective to the situation studied; a detailed description of the research methodology (data collection tools) will inform users in a similar study (Vaughan, 1992). Critics think that a single case might be insufficient to make a large scale generalisation (Van Maanen, 1988). Triangulation and reliability were achieved using multiple research techniques in a single case design by Kelliher (2005).

The researcher understands the strengths and limitations of both the interpretivist and positivist paradigmatic stances. However, both positivism and interpretivism have their relevance in social science research. In order to meet the research objectives, the researcher takes a complementary stance since an in-depth investigation and evaluation of the internal environment of the MH delivery system is necessary. The survey method will be administered to patients, clinical staff and health experts and quantitative data analysis are required to predict participants' perspectives on components of the MH delivery systems. Also, to gain health experts' opinions, qualitative methods and analysis will be employed to understand the pattern in human behaviour established through quantitative findings. Therefore, research takes a pragmatic approach to achieve the objective as qualitative or quantitative methods alone are insufficient to achieve set objectives.

4.2.2 Pragmatism

There are four paradigmatic views associated with mixed methods; pragmatism, transformative-emancipation, critical realism and dialectic (Shannon-Baker, 2016; Creswell & Plano Clark, 2011; Johnson et al., 2007; Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2003). In mixed-method research, pragmatism uses both qualitative and quantitative method to resolve practical issues (Morgan, 2007), transformative-emancipation use social justice issues or biases to guide the research process (Mertens, 2003), dialectic research addresses both convergence and divergence of the research data (Greene & Hall, 2010), and critical realism use causal inferences; the mental aspect and diverse perspectives to validate research (Maxwell & Mittapalli, 2010). As the research focuses on addressing problems in the healthcare delivery system, pragmatism is the best suited paradigmatic assumption for this study.

The theoretical underpinning for pragmatism is centred on the research questions and using various methods to achieve the research objectives or outcomes (Johnson & Onwuegbuzie, 2004; Maxcy, 2003). Recently, practical pragmatism has evolved, undermining the theoretical foundation of pragmatism. It is referred to as the "common sense" or "what works" approach and, based on the philosophical praxis assumption, the ability for people to theorise (Hesse-Biber, 2015). However, "what works" can be subjective to political bias (Clarke, 2012). Also, the concept behind "what works" is still developing (Greene 2007; Tashakkori & Teddlie, 2003). Communicative validation is said to justify what works: expert opinion to validate the chosen method (Kvale, 1996), but the limitation is in determining who is an expert (Hesse-Biber, 2015). According to Kvale (1996), the more robust validation is the pragmatic validation based on affirmation within the study context and broader research context.

The need for high-quality and evidence-based research to support health-related studies' decision-making is well documented and inclined to pragmatism. Finkelstein et al (2015) reviewed the potential of pragmatism research as a complementary tool for healthcare delivery and quality improvement. Callif & Sugarman (2015) stressed that a pragmatic approach in clinical trials could better inform health-related decisions. Also, it supports systematic review and evaluation in complex interventions as obtainable in healthcare settings, and a pragmatic approach will enable researchers to address such a high level of complexities (Petticrew et al., 2015). Since pragmatism is associated with complexity, it fosters a unique integration of the scientific approach to democratic decision-making and values (Ansell & Geyer, 2016). An extensive evaluation of both active and latent failures impacting the quality of MH outcomes is necessary to improve MH outcomes. Therefore, to have an in-depth understanding of the natural setting researcher will employ a mixed-method methodology, as rightly put,

"Let us be done with the arguments of qualitative versus quantitative methods and get on with the business of attacking our problems with the widest array of conceptual and methodological tools that we possess, and they demand." (Trow, 1957).

Quantitative or qualitative method alone is insufficient to understand the various factors that influence MH outcomes. Also, integrating both methods gives a clearer understanding of the problem studied.

4.3 Mixed Method Design

"A good design, one in which each component works harmoniously together, promotes efficient and successful functioning; a flawed design leads to poor operation or failure" (Maxwell 2013, p2).

The research designs are different for a qualitative, quantitative or mixed-method study. Simply put, regardless of the method of inquiry or study method, a design is an action plan for achieving the research objectives. In a qualitative study, the research design is inductive rather than deductive, meaning it is flexible rather than fixed (Robson, 2011). Data are continually being analysed and refocused in a qualitative design simultaneously rather than following a strict and structured process provided in a quantitative study (Maxwell, 2013). According to Creswell (2014), research design must address three fundamental and critical questions; the study's proposed knowledge and theoretical perspective should reflect on prospective strategies to be utilised and invariably address how data will be collected and analysed.

Mixed method design is beneficial for investigating complex problems, such as seen in health-related studies (Strudsholm et al., 2016). The mixed-method "collects and analyses persuasively and rigorously both qualitative and quantitative data" (Creswell & Plano Clark, 2011 p. 5). It combines quantitative and qualitative data collection, analysis, and inferences to

understand the research problem more than either method alone (Tashakkori & Teddlie, 2003, 2010). However, there are some barriers to mixed-method design. It is hectic, time-consuming and requires financial resources (Creswell & Plano Clark, 2007; Niglas, 2004). Also, publishing mixed methods studies in journals is challenging due to the word count restrictions (Plano Clark, 2005; Bryman, 2007). Also, the researcher must be knowledgeable in both quantitative and qualitative fields (Molina Azorín & Cameron, 2010).

Despite the barriers, mixed-method is well utilised and published in social inquiry. Several studies highlight the vital distinctive attributes of the mixed methods, such as for elaboration, generalisation, interpretation and triangulation purposes (Gibson, 2017). The elaboration allows for multiple methods to understand the different facets of the phenomenon or the research problem (Molina-Azorin, 2012). generalisation enhances the validity of research findings as it draws on the consistency of the findings to a particular context (Johnson & Christensen, 2004), and triangulation allows for convergence or consistency of findings from multiple methods (Creswell & Plano Clark, 2011). However, the methodological congruence of the use of mixed methods is crucial to the overall outcome of its use. That is how both methods fit with the research question, design and the theoretical contribution of the study (Edmondson & MManus, 2007; Creswell & Plano Clark, 2011). Also, integrating theoretical and empirical mixed methods findings into a plausible explanation is challenging (Tunarosa & Ann Glynn, 2017). The subsequent section shows the integration of both methods to achieve the research objectives.

4.3.1 Rationale for Mixed method

As previously discussed, the rationale for using mixed-method can be based on the method perspective, methodology perspective, paradigm perspective and practice perspective

(Creswell & Tashakkori, 2007). The method perspective is focused on the strategy for collecting and analysing data without much emphasises on paradigms or philosophies. As such, there is an apparent dichotomy between qualitative and quantitative data. Arguably, Gilbert (2006) stressed that methods could not be separated from paradigms or worldviews and creating a dichotomy between methods is a significant setback. Instead, the integration of both methods allows for a more in-depth understanding of the phenomenon (Tashakkori & Creswell, 2007; Carey, 1993). The paradigm perspective for mixed methods is less about methods and more on philosophical assumptions, which based its rationale on what knowledge is sought, the nature of reality, and the socio-political and historical perspective of the research (Creswell & Tashakkori, 2007). In essence, there must be a broader rationale for the mixed method, not just embedding the quantitative or qualitative methods as with the method perspective.

The methodology perspective is similar to the paradigm viewpoint in that it embraces both the qualitative and quantitative viewpoints but, in this case, for collecting, analysing and making inferences (Johnson et al., 2007). Likewise, the practice perspective is also based on pragmatism. However, it is mainly a bottom-up approach, where the researcher is open to new data collection methods in inquires such as ethnography study, action research, experimental and narrative studies (Tashakkori, 2006) contrary to this study. Therefore, the researcher rejects using the practice and method perspective as the rationale for mixed-method.

This research adopts the use of methodology perspective and the use of mixed methods will achieve one or more of these objectives; for maximum generalizability, to ensure the authenticity of the research context and for the precision of control and measurement, as achieving these enhance the internal and external validity of the study (McGrath, 1995). For example, Turner et al (2017) mentioned that interviews address the internal validity of the

observed phenomenon while survey methods enhance the precision of control and measurement of variables in an authentic environment. The use of both methods in a single study enriches the construct validity. It shows that the theoretical rationale for using mixed methods goes beyond the method perspective as it links or integrates several methods to achieve a general purpose for the study, which is also known as triangulation. It shows how findings from multiple strategies are complementary or new insights that emerged from both methods (holistic triangulation) or the use of holistic-convergent triangulation.

Pragmatism gives the researcher the freedom to use methods most suitable to achieve the research objectives (Johnson & Onwuegbuzie, 2004). The survey method is essential to achieve research objective 1 of the study, and it provided a precise and controlled measurement of risk factors contributing to MM based on the PRISMA flowchart model. In contrast, the semi-structured interview provided a more in-depth understanding of why the problem exists and how to improve MH outcomes to achieve Objective Three and Four. However, integrating both qualitative and quantitative findings is complementary, and the mixed method design is that of the explanatory sequential method, discussed in Section 4.3.3.

4.3.2 Triangulation and Complementary Stances of the Research

In mixed-method studies, triangulation and complementarity stances are interchangeable, leading to much confusion. For example, the definition by Jick (1979) implied that triangulation is studying a phenomenon from different perspectives and understanding new findings that emerged from the use of multiple methods, which is not obtainable for a single method. Likewise, Stake (2000) maintains that triangulation enables analysis from a different perspective, thereby clarifying the meaning of the observed phenomenon from both

viewpoints. Researchers like Greene et al (1989) helped clarify three broad reasons for using mixed methods in a single study: triangulation, collaboration or converge research findings, complementarity, explaining data analysis and development, and enabling further studies data collection and analysis. Consistent with Green and colleagues, Yin (1994) defined triangulation as a vehicle for cross-validation when multiple data sources produce comparable findings.

The purists believe that the use of qualitative and quantitative methods in a single study is contradicting based on their diverse epistemological and ontological viewpoints and questions the compatibility of mixed methods (Uprichard & Dawney, 2019; Bryman, 2006; Caracelli & Greene, 1993; Lincoln & Guba, 1985). Understandably, the complementary stance acknowledges the valuable difference between the individual methods. The ontological and epistemological assumptions of the quantitative researcher is that of positivism; based on a single truth; and the investigator is independent of that which is being investigated (Guba & Lincoln, 1994; Creswell, 2009). In contrast, qualitative researchers have a social constructivist or interpretivist viewpoint, subjective to participant worldview (Creswell, 2009). Arugaubly, Sale et al (2002) stated that cross-validation or triangulation is impossible in a single study involving multiple paradigms or viewpoints. However, the complementary use of mixed methods is said to preserve the integrity of each methodology while expanding the scope of the study (Morse, 2003; Sale et al., 2002). Although, it is debated that mixed methods should evolve from complementary purposes to triangulation to increase its validity and accuracy in research (Johnson et al., 2007).

The strengths and limitations of both the quantitative and qualitative methods are established in several studies (Nleme, 2016; Wahyuni, 2012; Denzin & Lincoln, 2011; Leech & Onwuegbuzie, 2011; Corry et al., 2018; Onwuegbuzie et al., 2009, 2011). Triangulation used

in mixed methods helps eradicate the limitations associated with the particular research method (Denzin, 1978; Onwuegbuzie & Johnson, 2006). Although, arguably, triangulation can only increase the scope of the phenomenon being studied, and the issue of credibility lies with individual methods (Morse, 2003; Greene, 2008). However, triangulation can test validity as its process ends with converging, inconsistent or contradicting information about a social phenomenon which enables a more in-depth explanation of what is being observed (Denzin, 1978; Johnson et al., 2007). For example, Bastian et al (2016) conducted a study where a mixed-methods research framework integrates qualitative and quantitative tools that systematically provided a broader and holistic assessment of the health care improvement processes and workflow.

In this study, the rationale for mixed-method is for complementary triangulation purposes, as identified by Greene et al (1989). The quantitative data provides an insight into factors contributing to MM in Rivers State, Nigeria, based on clinicians' perspectives. On the other hand, the qualitative data obtained through a semi-structured interview with Twelve (12) health experts provided cross-validation (triangulation) of the issues highlighted from the quantitative findings. Health experts' perspectives provided a more in-depth explanation of the phenomenon (complementary) and informed action measures for change. Thus, triangulation is not just for multiple data collection purposes to assess the construct validity but used to heighten understanding of the problem in MH in participating hospitals and gain new knowledge on how to improve MH outcomes through key health experts' perspectives. It is consistent with the argument that triangulation should generate new insights or develop a complete understanding of a phenomenon (Denzin 2012; Gibbert & Ruigrok, 2010).

4.3.3 Explanatory Sequential Mixed Method

The procedure for conducting sequential explanatory research has been explained in detail by Creswell (2005). This method includes collecting initial quantitative data, followed by qualitative data, which is time-consuming but better understands the research problem (Rossman & Wilson 1985). However, Ivankova et al (2006), in an extensive study, pointed outs methodological issues in the use of the mixed methods, in terms of how much priority or preferences is given to either the quantitative or qualitative approach, the sequence of data collected and how to integrate both sources of data to achieve research objectives. In agreement, Morse & Cheek (2014) indicated that those mixed-method studies are often quantitatively driven with qualitative methods relegated to a secondary approach in health-related research known as the QUAL-quan approach. The researcher starts with a qualitative inquiry, but findings are quantified using a quantitative approach. As such, it diminishes the authenticity of the naturalist approach (Morse & Cheek, 2014).

This study utilises the QUAN-qual rather than the QUAL-quan approach. The QUAN-qual method started with a quantitative inquiry followed by a qualitative investigation. The rationale for using QUAN-qual was first motivated by the need to investigate risk from a broader spectrum of clinicians. Secondly, to determine the order of riskiness where there are numerous contributing factors to MM, which can be achieved through the quantitative method rather than the qualitative method. Notably, risk investigation requires several ways to gain insight into the problems in clinical settings. Predominantly, retrospective or/and prospective approaches are viable approaches employed in PRISMA studies such as analysing patient records (Incident report) or conducting a survey with clinicians as seen in these studies (Martijn et al., 2012; van Galen et al., 2016; Fluitman et al., 2015). In Nigeria's absence of a credible incident reporting system and records (Bandali et al., 2016; Hoffman & Mohammed, 2014), the most effective

approach is adopted to investigate risks. The researcher adopts a pragmatic approach and determines the most suitable methods to achieve the research objectives (The PRMQ instrument).

Most importantly, gaining insight into the most significant factors or problems is the first step towards risk mitigation, and factor prioritisation enables managers to focus on issues that have the highest impact on outcomes. The researcher designed the PRMQ clinical risk investigation tool using the extensive literature review of patient safety factors and the PRISMA-ECM structure. The PRMQ survey method administered to a spectrum of clinicians enabled the researcher to investigate risks using a structured approach. A similar clinical tool was developed and used by Martijn et al (2012) for assessing low-risk pregnant women using survey methods to identify safety issues in the system. Martijn and colleagues advised that analysis and interpretation of risks require clinical judgement and consultations with health experts. Hence, the survey method allowed for statistical analysis, followed by a complementary qualitative inquiry to address the problem using expert opinion.

In this case, the use of both methods is complementary, and the mixed-method approach preserves the integrity of the individual methods (Green & Caracelli 1997; Tashakkori & Teddlie, 1998). Also, explanatory research is widespread in social and behavioural research, and it gives an in-depth understanding of the quantitative findings, creating new ideas or insight into the study (Morse, 1991). For example, a study conducted by Agwu Kalu et al (2018) resulted in a comprehensive understanding of the psychosocial factors that impact midwives' confidence to provide bereavement support to parents who have experienced a perinatal loss. Other valuable studies that utilised the explanatory sequential methods effectively

psychosocial medicine (Hesse-Biber, 2018), reproductive health (Hannan et al., 2009) and the distance-learning program in educational leadership (Ivankova et al., 2006).

Several data collection approaches can be used in an explanatory design, such as literature review, case study, focus groups and interviews. A survey method followed by a semi-structured interview was used for this study, which provided a detailed understanding of risks factors contributing to poor MH outcomes. Figure 4.1 shows an overview of the research mix

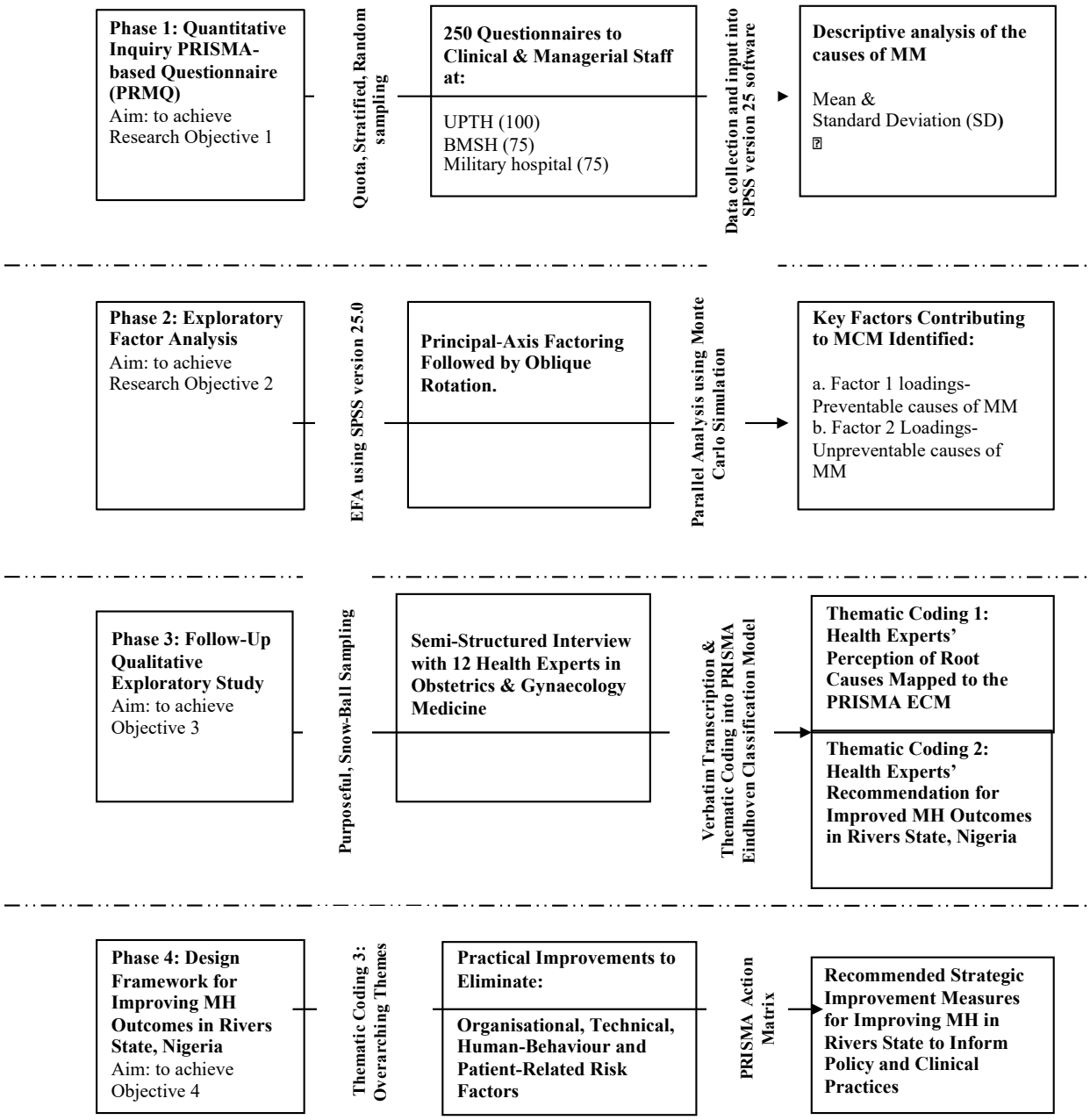


Figure 4.1: Mixed Method Design Used in this Study

The mixed The mixed research design is in four phases, as shown in Figure 4.1. Phase 1 of the study is to achieve the first research Objective; two hundred and fifty (250) PRISMA based questionnaires (PRMQ) were distributed to clinical and managerial staff at the three hospitals UPTH, BMSH and the Military Hospital in Rivers State to identify risk factors in MH. These

hospitals were purposefully selected as they are the leading government-owned specialist hospitals and attracts patient from oil-rich Niger Delta regions with a catchment population of 10 million people (Brisibe et al., 2014). The unique position of these hospitals and the growing demand for quality care by patients put excessive pressure on staff and the hospitals.

In Phase 2, an EFA was conducted to achieve research Objective Two (2), identifying key risk factors and their relationship. Then followed-up with a semi-structured interview to achieve research Objective Three (3); an in-depth understanding of the risk factors identified from the quantitative approach and insights gained on how MH outcomes can be improved (Phase 3). Finally, in Phase 4, practical improvements are recommended to mitigate MH risks to achieve research Objective Four (4).

4.3.4 Time Horizon in Research

A cross-sectional research design studies a phenomenon at a particular time and allows for comparison between different population groups at a particular time (Creswell, 2014). In contrast, the longitudinal approach enables the researcher to study changes in the behaviour or character of participants throughout developmental change (Creswell, 2014). One of the advantages of the longitudinal design pointed out by Kodlin & Thompson (1958) is that it provides information on how successive measurements in multiple source research correlate. It is more sensitive to static tests (simultaneous analysis) and dynamic testing of constructed variables to show incremental changes from one point in time to another (Svalastoga, 1970). However, the longitudinal study is costly, time-consuming, requires human resources and motivation (Svalastoga, 1970). Neither the cross-sectional nor longitudinal design was suitable for this research. The nature of the research questions should inform the research design, which is; (i) What are the main clinical and non-clinical risk factors contributing to MM in Rivers

State; and (ii) How can the quality of MH outcomes be improved in Rivers State? Therefore, this study does not establish a cause-and-effect relationship or a sequence of events over a period. Although there were three hospitals and various population groups represented in this study, such as consultants, directors, doctors, managers, midwives and others, comparisons between hospitals or population group was not the objective. It instead identified problems in the MH delivery system and recommended measures for improving patient outcomes. Hence, data was collected and analysed in participating hospitals in a four-phased research design shown in Figure 4.1.

Phase 1 to Phase 3 of the study between October 2016-August, 2018. This duration includes getting ethical approval for participating hospitals, conducting surveys simultaneously across hospitals and interviews with Health experts. The survey method (Phase 1) was from January 2017 to May 2017. On receiving all hand copies of the questionnaire from Rivers State, it was inputted into the SPSS software and analysed from September 2017 to March 2018. The semi-structured interview Phase 3 commenced in May 2018 to August 2018. The interviews were transcribed verbatim and analysed using thematic coding. These were grouped into existing PRISMA themes and sub-categories of risk, which provided a structure for the thematic coding and analysis. Further inference from thematic coding resulted in practical improvement measures for the MH delivery system (September 2018 to May 2019). A detailed description of the data collection methods is presented in Sections 4.4 and 4.5.

Quantitative research originated from psychology, and it is a post-positivist worldview. There are two types of quantitative research used in social science instead of the original experimental design; causal-comparative research and correlation design (Creswell, 2014). The researcher compares cause-effect relationships between dependant and independent variables (Campbell

& Stanley, 1963). The quasi-experiments design or the actual scientific experiments concern how a specific treatment or process influences the research outcome (Creswell, 2014). On the other hand, the correlational design is a more advanced non-experimental design that uses statistical or mathematical models to establish the degree of correlation between two or more variables (Creswell, 2012). Other designs such as structural equation modelling, logistic regression, hierarchical linear modelling and factorial designs are even more elaborate

This positivist view originated from Augustus Comte (1855), and it justifies the use of scientific inquiry in social science. This form of inquiry is based on objectivity, what can be observed and measured and not based on uncertainty or the unknown (Vidich & Lyman, 1994). Although a paradigm shift spearheaded by Thomas Kuhn's 1962 towards naturalist research focused on multiple realities, the quantitative approach is still relevant in social science (Culbertson, 1988). Most recently, the paradigm wars have given birth to pragmatic research, maintaining the integrity of both positivist and naturalist approaches in social science. The validity and quality of research are enriched with the integration of inductive or deductive reasoning is adopted in a single study, instead of choosing one paradigm over another (Newman & Ridenour, 1998).

The quantitative approach adopted in this study is a non-experimental survey design. The survey method provides a numeric description of the opinions of a target population. It is a structured approach for collecting descriptive data that can be generalised from a sample considered representative of a population (Fowler, 2009). The survey method could include questionnaires or structured interview methods where the research uses a set of rigid questions to as many respondents simultaneously (Dawson, 2002; Kumar, 2005). The survey method will enable the researcher to conduct questionnaires to a larger population.

4.4 Phase 1: Quantitative Research method

4.4.1 Quantitative Strategy

In the quantitative approach, deductive reasoning is used to test the hypothesis (Saunders et al., 2007). Deductive reasoning is applicable in natural science and can be rigid; it is based on existing laws or principles and allows for a certain level of control over the outcome (Collis & Hussey, 2014). The control is perceived as a weakness; however, Saunders et al (2007) pointed out that one of the characteristics of deductive reasoning is its ability to measure facts quantitatively and generalise from sample size to a larger population.

Sample Size

The main benefit of the quantitative method is the generalisation of the study sample to the population (Saunders, 2007). However, determining the sample size requires careful consideration as the validity of the finding is influenced by the sample size. Krejcie & Morgan (1970) and Cochran (1977) have described formulas for estimating sample size for categorical and continuous data. Also, Bartlett et al (2001) determined valid estimates on minimum return sample size and the margin of errors for both data types. However, Bartlett and colleagues suggested other methods of determining the sample size: regression analysis, factor analysis, sampling non-respondents, cost of data collection, time and constraints. Hair et al (1995) stated that there is a risk of overfitting in a regression analysis where the ratio of observation to the independent variable is below five, resulting in invalid generalisation. Similarly, over a hundred observations are recommended for factor analysis used in this study to ensure a lower significant factor loading on items (Bartlett et al., 2001). For example, a sample of 50 will require a higher significant loading value of 0.75 in contrast to a sample of 350 with a significant value of 0.3 (Hair et al.,1995). Hence, the generalisation of finding with values

above 100 is enhanced. In this study, 250 questionnaires were administered to ensure the favorability of the sample size, taking into account unreturned questionnaires that could further reduce the sample size. Although there were other constraints with time and budget discussed in Section 4.7. on methodological problems

4.4.2 Quantitative Technique and Procedure

Applying the PRISMA model, 47 closed questions were developed around the organisational, technical, human-behaviour, and patient-related factors and their sub-categories to identify the root causes of MH outcomes in the three hospitals in Rivers State. The first seven questions were developed to gain the demographic profile of the participants, while the following 40 questions focused more on the research content and followed a five-point Likert scale format, starting from 1 (strongly disagree) to 5 (strongly agree).

Pilot study:

The questionnaire was initially tested with two nurses to assess its clarity and practicality in maternal care in the selected hospitals, and no issues were highlighted on the content of the survey. The independent research assistant facilitated the administration and collection of the paper-based questionnaire with one senior manager who volunteered to supervise this task. However, there were issues with administering the survey to capture varied clinicians working night and day shifts. The senior manager, conversant with the running of the hospitals, provided ideas on suitable times to get maximum return and participation. The survey was issued at different times, capturing all available clinicians on duty for all shifts and providing advice and support. It took the clinicians ten minutes to complete the survey where the clinician was uninterrupted.

Sampling:

Following stratified and randomised sampling techniques (Lim et al., 2017, Fowler, 2009), a total of 250 clinical and managerial staff who worked at the Obstetrics and Gynaecology Departments of the hospitals were selected had a broad understanding of MH. Initially, the target population was stratified by 30% male and 70% female, allowing more female staff who might have the natural propensity to experience childbirth to take part in the study. Each gender group was then partitioned into homogeneous subgroups based on the respondents' job descriptions (see Table 5.1). The subgroups were further apportioned to the three hospitals based on their relative sizes and the ratio of 4:3:3 for UPTH, BMSH and MH, respectively. Two hundred and fifty (250) questionnaires were distributed accordingly to the respondents in the hospitals through the recruited and trained non-clinical staff research assistant from one of the hospitals using the randomised sampling technique.

The respondents' consents were sought at all times, and their rights to withdraw were provided. They were provided with a brief explanatory statement and informed of their rights to withdraw and anonymity. The first part of the PRMQ were demographic questions (Appendix 3.1), which took about ten (10) minutes to complete. By completing the questionnaire, the participant implied consent.

4.4.3 Instrumentation -PRMQ Design

The first step in using PRISMA is the causal analysis of problems (van der Schaaf & Habraken, 2005). Various methods can be used in the investigation process; reviewing the incident report (Jansma et al., 2011), maternal death note review (Hofman & Mohammed, 2014; Bandali et al., 2016), direct observation (Crocetti et al., 2019), retrospective analysis of patient information (Baines et al., 2015), interviews or direct questioning and survey methods. There were inconsistencies with patient records in Nigeria, and incidence was not reported and

recorded appropriately in hospitals (Hoffman & Mohammed, 2014). Using a clinical document could introduce inaccuracies in the research findings. Likewise, direct observation helps get real-life experience of what is obtainable in practice as the observer can first-hand identify risks and areas of improvement (Crocetti et al., 2019). However, the observer could be perceived as a threat by the observe and the healthcare management team, and the clinical activities can be pretentious.

Therefore, PRMQ was designed without an efficient incident reporting record system as obtainable in hospitals in Nigeria (Hofman & Mohammed, 2014). Using the PRISMA Eindhoven Classification Model, this study utilised the survey technique to identify risk factors based on clinical and managerial staff perspectives (van der Schaaf & Habraken, 2005). The research participants were assured confidentiality, and as a result, they answered questioned without fear of any repercussions. The design consists of 40 items generated from the PRISMA model and extensive literature, as shown in Appendix 3.1. Each statement was rated on their level of agreement on a five-point Likert scale range: 1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree.

The ECM medical allows for categorising active and latent failures in a system. This approach starts by analysing latent failures in the system; these are technical and organisational failures. Kirkup (2015) asserts that when latent factors contributing to incidence are managed appropriately, the organisation can tackle active failures in the system.

Technical factors

According to van Vuuren et al (1997), technical factors are issues relating to equipment design, material defects, construction, accessibility issues and technical factors outside the

responsibility of the investigating hospital. This category consists of 6 items (10-15). The use of equipment in MH is critical to a positive outcome. The NHS England has paid out 3.1 billion pounds of claims for negligence leading to maternal deaths over the past decade, most commonly due to errors in CTG readings (Sholapurkar, 2015). Therefore, human and ergonomics, the interaction between systems, tools, and clinical staff is essential for a successful outcome (Mao et al., 2015; Daker-white et al., 2015). The use of monitoring systems requires skills, training, and resources (Swanton et al., 2009). In the Nigerian context, the external influence includes lack of power supply, gas and weak infrastructure.

Organisational factors

The organisational category consists of nine (9) questions that focus on protocols, operating procedures, management priorities, shared culture, and values related to the effectiveness of the healthcare delivery system (Kringos et al., 2015). These include questions on leadership and management (Ballangrud et al., 2012; Millar et al., 2015; Mannion et al., 2016; Madzimbamuto, 2014), patient safety culture (Valentino, 2010; Ballangrud et al., 2012), staffing issues (Coetzee et al., 2013; Ball et al., 2013; Sholapurkar, 2015; Brewster et al., 2015), a healthy working environment and relationship (Kirwan et al., 2013) and inter or intra department communication and information sharing (external component).

Human-behaviour factors

Active failures in the system result from human activities or behaviour and include skill-based behaviour, knowledge-based behaviour, and rule-based behaviour. Analysing and managing human failures is a step towards patient safety (MacDonald & Varney 1998). This category

consists of 13 items (16-28). Questions were focused on: the use of audit and feedback in implementing changes (Flottorp et al., 2010), clinical supervision (Kilminster, 2010; Tomlinson, 2015), obstetrics intervention (Nelson, 2017; Okonofua et al., 2017), health assessment (Izugbara & Wekesah; 2018), task allocation, teamwork and coordination (Prosser-Snelling, 2015), implementing quality control measures (Perry et al., 2017; Souza et al., 2013; Spector et al., 2012), prevent slip, trip, data and prescription errors as these human factors influence MH outcomes.

Patient-Related Factors

The unique feature of ECM is that it includes patient-related factors, which are failures due to patient characteristics. In Sub- Saharan Africa, patient's characteristics influencing maternal outcomes include illiteracy or poverty, education, self-medication, the use of traditional medicine, culture, religion and poor utilisation of health care (Ibeh, 2008; Olusegun et al., 2012; Abor et al., 2011; Ugal et al., 2012). Also, women's medical conditions could become very unpredictable; in some cases, women could experience co-occurring symptoms which will require highly skilled interventions. Examples of such medical conditions are Preeclampsia or eclampsia, haemorrhage, prolonged labour, HIV AIDS, sepsis and birth complications such as shoulder dystocia (Fubara et al., 2007; John & Uzoigwe, 2004; Suthar et al., 2013, Cornthwaite et al., 2015, WHO et al., 2019; Say et al., 2014; Knight et al., 2014). This category consists of 12 items (29-40).

4.4.4 Quantitative Data Analysis

One hundred seventy-four (174) returned questionnaires were received out of 250 questionnaires administered, a 70% return rate—seventy (70) from the UPTH, 50 Military Hospital, and 54 BMSH, respectively. The data was analysed using SPSS version 25.0 package

to generate descriptive data; the percentage mean, standard deviation and factor analysis on MH factors and to summarise the extensive data set into a smaller number of constructs that represent and explain the underlying causes of maternal mortality in three hospitals (Williams et al., 2013).

The exploratory factor analysis (EFA) was used rather than the default Principal Component Analysis (PCA) because it assumes a causal relationship and is not just a factor reduction or simplification tool (Costello & Osborne, 2005). The EFA interprets the most difficult interpretable correlation between variables (Reio & shuck, 2015). Despite the usefulness of the EFA, it was essential to verify the factorability of the variables, the determinant value, Bartlett's test of sphericity, Kaiser-Meyer-Olkin (KMO) test of adequacy for assessing the suitability for factorising variables (Beavers et al., 2013).

The principal-axis factoring was applied with oblique rotations to extract the construct validity and check the reliability of the data, the factors, their relationships and how they explain the root causes of maternal mortality. These were decided by inspecting the Eigenvalues, scree plot and the explained cumulative variances. The Kaiser–Meyer–Oklin (KMO) value determined the overall sampling adequacy. The suitability of sample size was based on the strength of the data, which is revealed in factor extraction communalities; where the commonalities across variables are majorly 0.8 and above, the data is said to be very strong, and the inconsistencies resulting from the small sample size can be minimised (Costello & Osborne, 2005; Beaver et al., 2013).

4.5 Phase 2: Qualitative Research method

4.5.1 Qualitative Strategy

The qualitative inquiry stems from anthropology, sociology and humanity (Creswell, 2014). Several qualitative approaches include grounded theory, case studies, narrative research, ethnography, and phenomenological research (Newman & Ridenour, 1998). The phenomenology perspective of this research is based on philosophy and psychology, where research participant describes their lived experiences about the issues of MH issues in this case through an interview. Douglas (1976) and Geertz (1973) believe that multiple realities exist, and research conducted from the stance seeks interpretation from different viewpoints. The positivist viewpoint is objective; phenomenology is subjective and based on the social construct (Geertz, 1973). However, subjectivity does not mean that the existence of reality should not be acknowledged (Blumer, 1980).

This naturalistic approach to study enables the researcher to have an in-depth understanding of the MH delivery system based on a first-person account; by attempting to interpret diverse perspectives of people's account of things within the natural environment (Nelson et al., 1992; Meyers, 1997; Denzin & Lincoln, 2000; Banister et al., 1994). There is no distinction between the researcher and observer (Cook, 2009). The research sample is purposeful, and the data collection method is the semi-structured interview. However, there could be concerns about sharing sensitive information on healthcare quality in settings, especially as the researcher is an outsider. The researcher intends to work collaboratively with health practitioners such as nurses, midwives, and doctors to conduct the research. Ethical consideration for research is discussed in Section 4.8.

4.5.2 Qualitative Technique and Procedure

The inductive approach was used to establish health experts' perspectives of the causes of MM and how services can be optimised in participating hospitals. The inductive reasoning approach is ubiquitous with qualitative research, and it is required to build a theory or establish diverse perspectives to a phenomenon (Easterby-Smith et al., 2002). Inductive reasoning starts from data collection and is narrowed down to theory to understand the observed circumstance (Saunders et al., 2007).

Sample Size

Sim et al (2018) stated that determining the appropriate sample size in qualitative studies is more problematic in exploratory research than in-depth analysis (explanatory research) used in this research. In agreement, Saunders (2018) asserts that where there is no prior knowledge, or key themes are not identified in a subject area, the sample size requirements are often unclear to gain a complete understanding. Morse (2000) stated that the sample size should be based on the nature of the study (aims & objectives). Hence, the broader the scope, the larger the sample size; exploratory studies require a larger sample size, while in-depth-analysis a small sample size of key informants (Malterud et al., 2016). The qualitative aspect of this study is to gain insight into the MH delivery and recommend improvement measures. Therefore, a few key informants will help to achieve the research aim. Lincoln & Guba (1985) recommended sample size of 12-20 for interviews. Likewise, Kuzel (1999) indicated 5-8 for a homogeneous group, but for sub-homogenous groups, a size of 12-20 will achieve a broader scope of responses. Emmel (2013) advised researchers to focus on the quality of the process rather than the sample size. So, twelve (12) key informants were selected to participate in this study, and these are health experts in OBYGN medicine.

4.5.3 Qualitative Technique and Procedure

Semi-structured interviews were conducted to understand better risk factors identified from the quantitative inquiry. It enabled the researcher to ask critical questions about technical, organisational, human-behaviour and patient-related failures in the MH system and mitigate risk factors to improve patient outcomes. Twelve (12) participants were selected for the semi-structured interview from the three participating hospitals in this research. Participants were chosen initially via purposeful sampling (Tongco, 2007) to capture heath experts knowledgeable in OBGYN medicine and provide a breadth of insights into MH issues and practical recommendations on the way forward. A further selection criterion was based on their experience and their active involvement in MH debates through research and other philanthropic activities in the state regarding the matter. Table 4.1 shows an overview of the health experts interviewed, and the names used in this study are pseudonyms to conceal their identity.

Table 4.1: Health Experts' Profile

Health Experts	Ares of Specialisation	Qualification	Years in Health Care	Years in MH	Publications	Job Description	No of staff under supervision
Dr Rey	OBGYN	MBBS FWACS NPMCN	15	11	20 publications; ruptured uterus, obstructed labour, attitude of doctors in maternal care, intrauterine foetal death.	consultant OBGYN, executive Director, radio & TV presenter	15-20
Dr Ali	OBGYN	MBBS NPMCN FWACS	18	13	5 publications; obstetrics care, woman's anatomy	Consultant OBGYN	15
Dr Joe	OBGYN	MBBS FWACS NPMCN	21	21	29 publications, 15 conference papers, 2 technical reports; subjects were based on caesarean section, use of implanon.	Consultant OBGYN, senior medical lecturer	15
Dr Cal	OBGYN	MBBS NPMCN FWACS	14	8	4 publications; emergency caesarean section, obstetric care in young girls, labour pain management, etc.	consultant OBGYN	10
Dr Dex	OBGYN	MBBS FWACS	24	8	3 publications; on maternal-child health care.	consultant OBGYN	30
Dr Ada	OBGYN	MBBS FWACS NPMCN				consultant OBGYN, Director	30
Dr Mya	OBGYN	MBBS, FWACS, FICS NPMCN	20	10	20+ publications; some topic was on emergency obstetrics care, gestational diabetes, antenatal care, sexual and reproductive care, primary health care, WHO safe childbirth checklist.	lecturer medical post-graduate school, consultant OBGYN, radio presenter.	15-20
Dr Ian	OBGYN	MBBS FWACS FICS NPMCN	12	6	more than 5 publications; admission of obstetrics patients' ICU units, fertility issues.	Consultant OBGYN, senior lecturer post- graduate school. Medical director, government official	overseas 400 health centres
Dr Sam	OBGYN	MBBS FWACS FICS	16	12	more than 5 publications; maternal and child health care in rural areas.	consultant OBGYN	10
Dr Ben	OBGYN	MBBS FICS FWACS	27	7	3 publications; sexual and reproductive health, ectopic pregnancies.	consultant OBGYN	15-20
Dr Jon	OBGYN	MBBS FICS FWACS	20	15	10 publications; early primigravidae birth outcomes, macrosomic births outcomes	consultant OBGYN	20
Dr Nat	OBGYN	MBBS FWACS NPMCN	15	10	2 publications; malaria infection in pregnancies	consultant OBGYN	10

Sampling:

While all consultants in OBGYN medicine were potential participants, the research sample was chosen based on recommendations by the heads of department and members of the hospital management board. In purposeful sampling, the researchers decide what knowledge is sought and individuals willing to provide such insights through their vast experience and knowledge in a field (Bernard, 2002). In this study, key informants were required to select participants; these are people within a community familiar with the organisation's culture and practices (Campbell, 1955). Suri (2011) mentioned that purposeful sampling enhances the quality of information based on informed knowledge in qualitative research synthesis. Also, in under-represented studies such as sex work research, purposeful sampling allows for the inclusion of several criteria to accommodate the variety of relationships and health issues associated with this line of work to provide a comprehensive understanding of the subject (Bungay et al., 2016).

On gaining access to the initial participants known as the seed, a snowball sampling technique was utilised; individuals knowledgeable of the phenomenon being studied recommend another clinician or consultants relevant to the study (Green & Aarons 2011; Patton, 2002). The snowball sampling is also known as the chain referral and is driven to gain access to the hidden population, which might not be easily reached in public health studies (Heckathorn, 2002). However, to ensure the most suitable candidates were recruited regardless of the approach, candidates recommended multiple times by other respondents helped converge the representative sample to the most reputable health experts in the field, consistent with Patton (2002) as unique characteristics of the snowball sampling.

Once the research participants were identified, and the respondent had confirmed interest in the study, a letter of informed consent was administered. An overview of research objectives,

aim and scope of the study was issued to the participant, highlighting the significance of the study via an email and an initial phone call and participants were given the option to decline participation at any time. Subsequently, the participants agreed to a later date for the interview to accommodate their busy schedules. On the scheduled dates, interviews were conducted with each participant remotely via a telephone conversation which lasted for an average of thirty-six minutes in most cases. Questions were open-ended and developed in line with PRISMA categorisation of risk. Also, further follow-up questions were asked for more clarity when needed and for a better understanding of the interviewee who had not answered the questions extensively.

Pilot Interview

The pilot interview was conducted on the 1st of May, 2018, with Dr Mya via telephone. The pilot interview enabled the researcher to establish the exact duration of the interview and the most suitable interview style for the participants (Health experts). The semi-structured interview started with a broad inquiry of demographic and achievement questions and general perception of the state of healthcare in Nigeria. Then followed up with specific questions in areas such as organisational, technical, human behaviour and patient-related problems. The interview lasted for thirty-nine minutes. At the end of the interview, feedback from the health expert provided insight into the quality of questions and the interview style.

The feedback and observation from the interview session revealed that the interview might require two sessions because many health experts were busy in the hospitals attending to patients. Also, getting a detailed answer required sufficient time as observed. The first part of the pilot interview lasted for twenty-four minutes and the second part fifteen minutes after two

weeks (15/05/18). Multiple phone calls were made to Dr Mya to schedule the second interview. There was also a technical issue during the interview as it was done via telephone.

Dr Mya was also concerned about recording the interview, and a few times during the interview, the health expert sought the anonymity of responses. However, there was an acknowledgement from Dr Mya that recording conversations were the quickest option to gather all the interview responses. The researcher ensured a proper schedule for each participant and a consent letter with a confidentiality agreement sent via emails and text messages. It was also necessary to read out the confidentiality statement before interviews. Participants were encouraged to stay in an area with good internet reception to prevent disruptions. In cases where one session is insufficient, a subsequent date is scheduled immediately after the interview, and multiple reminders are sent to the participants.

The interview tone was conversational to create a relaxed environment and build a friendly relationship. The interview style allowed Dr Mya to explain things in detail freely. With the free flow of discussion, it was impossible to follow the initial order of the interview. Instead, the researcher probed the interviewee on issues expanding into multiple interview questions but ensuring that all questions were covered extensively at the end of the interview. Dr Mya was sometimes uncomfortable giving details of incidences or discussing management issues because the researcher is an outsider. There was some reluctance to provide specifics. Therefore, the researcher's tone was adjusted to ask solution-based questions. For example, questions like "what major changes will you recommend for improving or enhancing delivery quality". When the questions were solution-based, the interviewee naturally discussed the solutions while highlighting the problems. The questioning style provided more opportunities to discuss the problems further.

At the end of the interview, the health expert validated the questions asked. The response was that the questions were clear and understandable. The health expert also praised how various interview questions that explored organisational, technical, human behaviour, and patient-related questions were comprehensive. Other feedback from the interviewee showed that the questions asked were relevant to hospitals in Rivers State. Dr Mya was optimistic that research highlighted issues and provided solutions to the problem. She had a generally positive tone, was enthusiastic about being a part of the solution, and was willing to share knowledge.

Conversational interviews allow the interviewer to explain questions for better understanding and clarity (Schober & Conrad, 1997), therefore having an advantage over the written questionnaire or survey method. The interviewer has much influence over how the questions are asked and whether the respondent will answer the question accurately, as demonstrated by Olson et al (2018). Although, Tsakos et al (2008) pointed out that some bias can be induced because the interviewer could modify or adapt questions to support an ideology. The researcher who is the interviewer acquired relevant interview and questioning techniques training to minimise bias. Also, as suggested by Lord et al (2016), the researcher must be sensitive to participants' demographics as this could also influence their responses or lead to other forms of bias such as cultural or professional biases.

There was a broad selection of participants in this study, and the telephone interview was employed. It allowed for a discreet conversation with health experts without being overheard by other colleagues that could influence their answers. However, one primary concern with the telephone interview expressed by the participants was anonymity, mainly as the interview was recorded. As such, confidentiality was assured through a written statement by the researcher (Appendix 3.2.1). Questions were, therefore, channelled towards problem-solving or

improvement measures, and there were no specific references to incidences in the hospital. However, the respondent has the freedom to discuss cases in their settings where they feel comfortable doing so.

The approach to interview questioning was relaxed and friendly, which fostered a healthy and productive interviewer-respondent conversation. The use of telephone interviews or conversation allows freedom of expression by the respondent, which leads to a more substantive answer, especially as the respondents were asked sensitive questions about the healthcare organisation (Lord et al., 2016). Due to the suppressed interviewer-respondent interaction that minimises the validity of answers to battery or sensitive questions in a cross-classified random-effects models study conducted by Olson et al (2018), the questioning approach must be examined to ensure better responses. There is a need for proper training on questioning techniques and the use of randomisation for battery questions to enhance the validity and reliability of the responses (Lord et al., 2016; Olson et al., 2018)

Also, the telephone interviews provided a more cost-effective approach since this research is self-funded. It allowed flexibility as the interview sessions were split into two or more parts without additional transportation costs for multiple hospital visits. However, there were some missed appointments and time spent chasing the participants, and Lord et al (2016) said opportunity cost should also be considered, not just the actual cost in deciding the most suitable approach. In this case, the actual cost of conducting a face-to-face interview outweighed the opportunity cost, so a telephone interview was the most suitable method adopted.

The first part of the telephone interview captured specific background information such as the participant's level of education, professional affiliations, research conducted in MH or any

other relevant publications, the highest level of qualification, job description or specialisation, current working position, years of experience in working in the health sector and maternal care (See Appendix 3.2.2). The participant could be eliminated at this phase where their experience and knowledge level does not meet research criteria. However, this was unnecessary as all participants recommended for the study had relevant experience and knowledge on the phenomenon studied (health experts or consultants). The subsequent section following the demographics questions was a more open-ended approach. The participants were asked to comment on the general state of the health care system in Rivers State, particularly regarding MH and suggest what significant changes are required to improve or enhance the quality of health care delivery that will result in better outcomes. They were asked to discuss external (socio-political) and internal (within the hospital) changes to improve MH outcomes. This information highlighted major clinical and socio-political issues impacting the healthcare system.

Understandably, several issues are influencing MH outcomes in Nigeria discussed extensively in the literature review and based on the quantitative inquiry. Therefore, the interview required some structure to focus and direction for the study. According to Vaughn & Turner (2016), the major challenge in qualitative inquiry is identifying what should be coded or analysed, and thematic analysis help to prioritise and focus the data.

In this case, the health experts were quizzed on specific PRISMA risk categories; the technical, organisational, human-behaviour and patient-related challenges preventing the implementation of any positive practices or changes that could improve MH outcomes in Rivers State (Appendix 3.2.2). The interview themes simplified the data analysis process as the data were thematically categorised into PRISMA themes.

In the final section of the interview, the health experts were asked to recommend an action or strategic plan to set priorities, strengthen operation and ensure clinical staff work towards achieving health outcomes for women. The strategic plan discussed covered organisational, technical, human-behaviour and patient-related factors. By so doing, participants highlighted external changes that require socio-political commitments or agendas (Appendix 3.2.2).

Seventeen (17) sessions were conducted amongst the twelve health experts, covering the three interview sections. Five participants had two sessions where the participant could not cover all questions. On average, the time taken per session was thirty-six minutes. Overall, eleven hours, thirty-four minutes was spent on the interview. Appendix 3.2.3 shows the schedule of interviews and duration for each health expert.

4.5.4 Qualitative Data Analysis-Thematic coding

This phase in the research is considered the most complex phase of qualitative research (Thorne, 2000), but when done correctly, it provides clarity to the reader, which validates the process (Malterud, 2001). Thematic coding is often used in qualitative studies and offers theoretical flexibility in qualitative analysis because it is not subject to any epistemological or theoretical ideology (Braun & Clarke, 2006). It provides a method of analysis where the data is categorised in patterns or themes. The interview was based on PRISMA themes, which simplified the coding process. However, the major issue with thematic coding is using interview questions as the themes (Clarke & Braun, 2013). However, the PRISMA themes only provided a structure to the interview questions in this case.

Holloway & Todres (2003) emphasised the need to take an epistemological position coherent with the empirical findings. The PRISMA flow chart model provided the theoretical underpinning for the qualitative inquiry. Some part of the interview was based on the PRISMA factors, and an open-ended questioning technique was utilised to understand better the different categories of risk factors contributing to poor MH outcomes. The credibility of the research process is determined by how the thematic analysis is conducted (Nowell et al., 2017; Creswell, 2014). Researchers such as Braun & Clarke (2006), Creswell (2014) and Tesch (1990) presents significant guidance in qualitative analysis and steps for thematic analysis. As suggested by these researchers, steps taken in this study include; familiarising with the data by reading the transcript repeatedly, generating initial codes, identifying themes, reviewing themes, defining themes, and presenting the finding in a report.

The semi-structured interviews were transcribed verbatim, and the transcript was studied carefully before coding the data. The initial codes in the theoretical thematic analysis phase can be inductive or deductive. The inductive analysis process involves coding the data without a pre-existing code in contrast to the deductive approach based on preconception (Braun & Clarke, 2006). Hence, the inductive coding is exploratory (open coding) and used in a relatively new area of study without prior knowledge (Boyatzis, 1998) whereas, deductive coding is used where the researcher has a direction in mind before the commencement of the interview, known as the qualitative codebook highlighted by Guest et al (2012). The codebook is said to bring about coherence to thematic coding, and this was evident in this study, as multiple interrelated risk factors were associated with maternal mortality. Although the traditional approach is open coding in the social inquiry, pre-coding techniques are prevalent in health studies (Creswell, 2014).

The researcher worked through the interview transcripts and, by hand, mapped the data into PRISMA categorises and sub-categories of risk factors. A further examination of the themes revealed three overarching themes generated from the initial coding, and these were:

Theme 1: Root causes of maternal mortality.

Theme 2: Health experts' proposed plan of action for improving outcomes.

Theme 3: Overall strategic approach for improving MH outcomes aligned with appropriate authorities to implement change.

Themes 1 and 2 were specific codes derived from the interviews, while Theme 3 emerged from the further interpretation or new ideas revealed from the coding process. In agreement, Creswell (2014) emphasised that thematic coding should transcend from semantic themes (precisely what was said) to underlying themes, looking beyond what was said to identify the underlying ideas inherent in the data. Also, the themes should capture exciting facts about the data, and there is no specific rule to do this rather than what is significant to the study, mainly, how the themes address the research question (Braun & Clarke (2006). It is essential to note that it must be coherent when defining themes, and there must be sufficient evidence to support the generated themes. The thematic analysis in the study represents these features described and shows a detailed account of health experts' perception of MH issues and improvement recommendations to mitigate risk factors. Figure 4.1 shows the diagrammatical representation of the coding process.

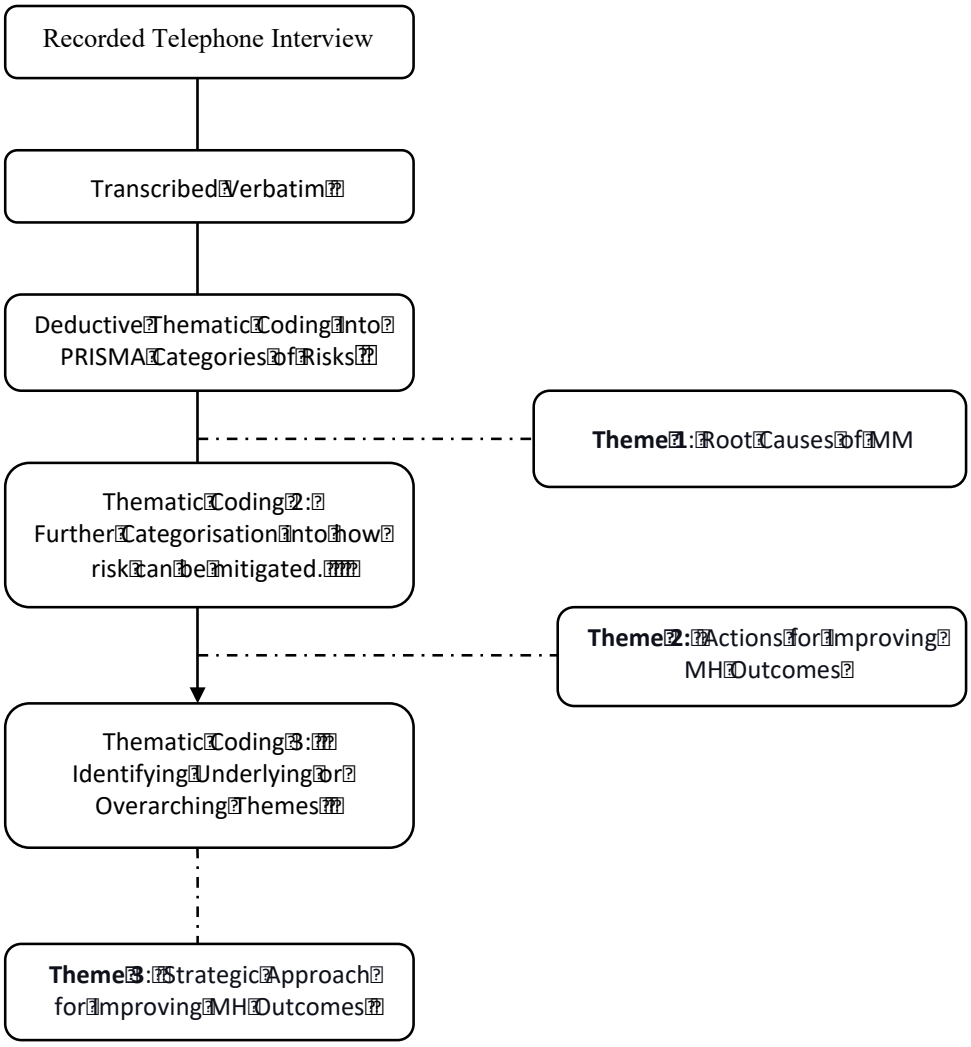


Figure 4.2: Thesis Diagrammatical Representation of the Thematic Coding Process.

4.6 Methodological Problems

This research utilised a mixed-method approach for investigating the root causes of MM at the three participating hospitals, which required different ethic clearances and approval from the researcher's institution, as shown in Appendix 2. Also, getting ethics clearances from the hospitals involved a very lengthy process and waiting time from six months to one year. However, the ethics application process was initiated on time through careful project planning to prevent significant research delays.

Secondly, as obtainable with any healthcare research getting access to clinical documents was problematic due to the confidentiality of patient information. Mainly because the researcher is an outsider, obtaining incidents reports, maternal death notes and conducting research involving direct contact with patients would have required a different set of ethics approval, further extending the research completion time. Also, gaining access to sensitive information could be threatening to the establishment. Therefore, the chances of using the above data collection methods were not feasible.

Similarly, direct observation could be beneficial as a first-hand account of events can be observed; what happened, not what was documented, which are subject to alterations (Crocetti et al., 2019). Although what is observed can be subjective to what the observer wants to see (people or the process), the observed incidence may have other underlying causes other than what is being observed (Catchpole et al., 2017). The observer must capture a complete picture of the event, which is physically impossible due to the complexity of issues (McNab et al., 2016). Direct observation will link human subjects to incidence, threatening clinicians and leading to forced or pretentious acts (altered reality) (McNab et al., 2016). Therefore, the researchers resorted to alternative data collection methods like the PRMQ and semi-structured interviews, which were best suited for the study, considering the contextual limitations. As confidentiality was assured, research participants were empowered to answer questions anonymously without fear of repercussions.

Thirdly, the research involved interviews with health experts at a different time and in two or more sessions of up to forty-five minutes each per session. Also, there were several instances of missed calls, cancelled interviews and rescheduling of appointments with the participants,

which would have incurred additional costs for travelling from the UK for a face to face meeting. Therefore, to minimise the cost for self-funded research, the interview was conducted remotely using telephone and follow-up emails. Also, because of the high rate of crime in the research area, killing and kidnapping increase, minimal visits or travels to participating hospitals to ensure the researcher's security as advised by the Foreign and Commonwealth Office (2017). Likewise, the PRMQ were administered in the researcher's absence. A nurse was trained and briefed on all survey items to enhance the quality of the process. Also, a research supervisor was appointed to coordinate activity across hospitals.

Fourthly, collecting and analysing quantitative and qualitative data in a single study was time-consuming. It involves inputting data from the completed PRMQ into the SPSS software and the challenge of manually transcribing the recorded interview, which was both very tedious. Alternatively, transcription software would have introduced other undesired constructs and sub-constructs outside the premise of the PRISMA themes. So, the researcher resorted to manual transcription.

4.7 Ethical Consideration

This research complies with UK voluntary and statutory regulation in collaboration with the CMET research ethics for management and health science, which minimises harm to the participants, researchers and institutions of study by making constructive use of data to enhance the quality of service delivery to benefit stakeholders. The research ethics committee at Cardiff Metropolitan University (CMET) approved the conduct of research, and there were no particular concerns (reference number 2005630/25/04/16). Research conducted at hospitals in Rivers State complied with the National Code of Health Research Ethics (NCHRE) as recommended by the NHREC (National health research ethics committee, 2007) for

educational health research category which involves investigation, document analysis, a survey involving human participants such as patients, clinical staff and health professionals.

A detailed description of the research aim, objectives, and methodology was presented to the participating authorities, and ethical approval was gained from the UPTH, BMSH and the Military Hospital. Following the ethical approval of this research, all prospective participants were informed about the research and individual consent gained. The research process was designed to empower the participants by keeping their responses anonymous. These participants included consultants, nurses, doctors, midwives, health managers and experts.

Confidentiality: Data protection and confidentiality of information is paramount for any health study as discussions about patients or their information are considered private. The research was conducted to protect the research participants, patients, clinical staff, and the facilities under investigation. The names of the participants are kept anonymous, and pseudonymised names for a more coherent reading. So names used in the report are not associated with any hospital consultant. Participants for this research will not be disclosed without their consent, and audio record from interviews was stored with a secure password.

Publication of research: Research finding was discussed with representatives of the participating hospitals, and the researcher worked collaboratively with stakeholder on any publication issues. However, the researcher takes a positive approach to study and aims to provide insight into how MH outcomes can be improved and not focus on fault finding and deconstructive criticism.

Reflexivity: As an outsider researching clinical settings, the researcher understands the role and responsibility surrounding accessing and reporting sensitive information on the quality of the healthcare delivery system in Rivers State. Therefore, a collaborative effort was essential to strengthen the relationship with the key informants and research participants as the research focused on resolving the complexity of problems clinicians face in their settings.

The problem-solving approach taken in this study was constructive and facilitated an in-depth discussion on critical aspects of the delivery system that require change. However, the researcher acknowledges the lack of experience working in hospitals in Nigeria and has no prior knowledge of gynaecology and obstetrics medicines. Therefore, assumptions and biases associated with being an insider were minimised (Drake, 2010). More so, the participant had an advantageous position as an expert in the field (Berger & Malkinson, 2000). The researcher's expertise was applied in patient safety and health management to recommend improvement measures in MH delivery.

There was consensus support for this study as the MH had suffered a high mortality rate. The participants were open to factual and accurate reports on the problems they face in the system. Therefore, the findings and statements quoted in this study represent an accurate account of the participant's experiences which was presented verbatim but subject to further interpretation supported with existing management practices adopted in developed countries. The anonymity of the participants was vital to protect their identity due to political differences and interplay in society. Hence, there is no conflict of interest in this study. The MDG and the current SDG agenda to reduce MM in developing countries motivated the study, and insights gained are useful for policy development and clinical practices.

4.8 Risk Assessment

The risk to the researcher: collecting data in an unfamiliar environment can result in psychological harm and anxiety about dealing with complex or sensitive information. To address this situation, the researcher worked collaboratively with key informants and health experts to design and collect data that respects the institution's rights and privacy. Also very helpful to familiarise key informants and staff on time before administering questionnaires or conducting interviews. Also, the researcher built an alliance with some of the key informants to gain entry for research.

The risk to participants: disclosure of poor practices to a researcher can be quite intimidating for participants and lead to uncertainty about the confidentiality of their responses. Participants' confidence was maintained through a verbal and written response on disclosure. Likewise, change is often a challenge for any institution, and an external researcher is perceived as a threat to hospital management. Therefore, the researcher worked collaboratively and was positioned as part of the change process. So, this involved agreeing with institutions on the publication of research outcomes and reviewing questionnaires with key informants before administering them. Also is was highlighted that research would not draw attention to any incidence or issues but instead use audit and management data to analyse how risk can be mitigated and service function optimised while highlighting good practices within the healthcare system.

The risk to the project: one of the significant risks to the project is 'Bias'. Due to the complexity of the healthcare system, the diverse opinion held about the reasons for poor health outcomes. Participants may hold political bias, professional bias and judgmental bias. However, involving diverse participants across participating hospitals resulted in diverse opinions and perspectives

on the subject. Although this can be time-consuming, online telephone and email aided quick feedback from participants.

The risk to University: exposure of sensitive information without stakeholders' permission can negatively impact the CMET. The researcher worked closely with gatekeepers and ensured published documents were following CMET policy and the participating institution.

4.9 Summary

This chapter captured the research methodology for the study, the research Philosophy, which is mainly that of pragmatism, associated with mixed methods. The integrity of individual methods is preserved in this study, and triangulation in research is for complementary purposes, as demonstrated with the explanatory mixed-method design.

The integration of mixed-method and action research allowed for diverse perspectives, which attended to the authenticity and validity of the research findings. The research was conducted in four phases. Phase 1 covered the quantitative approach for the study, which utilised the PRMQ survey to identify risk factors in the MH delivery system. The designed survey provided a generic tool for categorising and investigating risk factors in the health care system. The risk factors were further prioritised using the exploratory factor analysis to understand the relationship between factors (Phase 2).

Chapter Five: Data Analysis

5.1 Introduction

The data analysis for this research is presented in two parts, quantitative and qualitative inquiry phases. Phase 1 covers the quantitative findings designed to meet research Objective 1: investigate and analyse clinical and non-clinical risk factors contributing to MM using the PRISMA Model. Phase 2 to achieve Objective 2: To investigate the relationship between risk factors and their order of riskiness using Exploratory Factor Analysis (EFA). Section 5.2 presents the qualitative findings, covering research objectives three and four. Phase 3, to achieve Objective 3: to coordinate health experts' perceptions of clinical and non-clinical risks identified and how the MH delivery system can be improved and Phase 4, Objectives 4: To make practical recommendations for improving MH outcomes in Rivers State, Nigeria.

5.1.1 Data Analysis-Phase 1

In phase 1 of the study, two hundred and fifty (250) PRISMA based questionnaires (PRMQ) were distributed to clinical and managerial staff at the three hospitals UPTH, BMSH and the Military Hospital in Rivers State to identify risk factors in MH. The Statistical Package for the Social Sciences (SPSS version 25.0) was used to store data, tabulate and generate descriptive statistics for the study. The data were also analysed using Principal Axis Factoring followed with Oblique Rotation to identify the most significant factors contributing to MH outcomes and the relationship between them. The PRMQ in Appendix 3.1 was designed to provide valuable information on the participant demographics and PRISMA categories of risk such as Technical, Organisational, Human-Behaviour and Patient-Related factors relating to the MH delivery system. The next sub-section shows an extensive analysis of the quantitative findings.

5.1.2 Descriptive Analysis of Participant Demographics

Table 5.1: Participants Demographics

Variable	Descriptor	N	Percent (%)
Gender	Male	52	29.9
	Female	122	70.1
Age	<25	17	9.8
	25-40	102	58.6
	> 40	55	31.6
Experience	<5yrs	71	40.8
	5-10yrs	59	33.9
	>10yrs	44	25.2
Patient contact	No	10	5.7
	Yes	164	94.3
Patient contact experience	<5yrs	49	28.2
	5-10yrs	47	27.0
	>10yrs	70	40.2
	n/a	8	4.6
Qualification	MBBS/BSc	103	59.2
	PGD	20	11.5
	MSc	14	8.0
	Diploma	37	21.3
Job description	Nurses	70	40.2
	Midwives	43	24.7
	Doctors	32	18.4
	Medical consultants	5	2.9
	Senior health Officers	11	6.3
	Psychologists	2	1.1
	Medical lab scientist	8	4.6
	Counsellors	3	1.7

The The participant demographic describes the gender, age, years of experience working in the healthcare sector, patient contact, qualification and job description as reported in Table 5.1. The questionnaires were completed by individuals working directly with pregnant women as the hospital demographics could be quite diverse. So, participants were mainly from the OBYGN Department. These were individuals from diverse specialities; 40.2% nurses, 24.7% midwives, 18.4% doctors, 2.9% medical consultants, 6.3 % senior health officers, 1.1% Phycologists, 4.6 % medical lab scientists and 1.7% counsellors. Also, a small group of respondents (5.7 %) did not have direct contact with patients compared to the 94% of the

respondents who worked directly with the patients. Forty per cent of the participant had more than ten years' patient contact experience, and all the participants had the required qualifications to perform their job roles. The research participants were the right mix of specialist senior and junior clinical officers, specialist and non-clinical staff. So, their feedback captured a diverse view of the underlying causes of mishaps in the MH delivery system across various job roles. Also, the survey findings reveal that all participating staff at the OBGYN department have a primary degree qualification to perform their jobs. Figure 5.1 shows the graphical representations of academic attainments. The result shows the highest number of respondents have a Bachelor of Medicine and Bachelor of Surgery (MBBS) (59.2%, n=103), 11.5 % (n=20) have a Post Graduate Diploma (PGD), 8% (n=14) possess a Master of Science (MSc) qualification and 21% (n=37) have an essential Diploma Qualification. The research finding revealed a matured and high calibre of the clinical workforce or human resources.

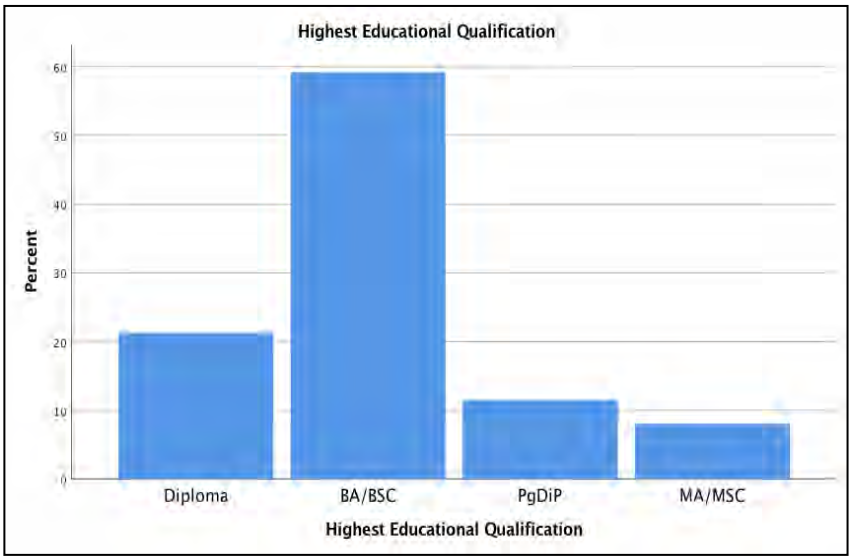


Figure 5.1: Graphical representation of respondents' educational qualification.

In addition to their educational attainments, a vast majority of respondents have required professional licences to perform their jobs, as shown in Figure 5.2. The most common license amongst medical doctors and nurses were from the Medical and Dental Council Nigeria (MDCN) and the Nursing and Midwifery Council of Nigerian Licenses (NML), with up to 18.4% and 65.5% respectively (n=146) of the survey participants affiliated to both professional bodies. Other professional Licencing bodies indicated by respondents include the Fellow of West African College of physicians (FWACP) n=4, 2.3%, Medical Laboratory Science Council of Nigeria (MLSCN) n=8, 4.6%, Registered Nurse Licence (RNL) n=7, 4%, Pharmaceutical Council of Nigeria (PCN) n=5, 2.9%, Environmental Health Officers Registration Council of Nigeria (EHORCN) n=1, 0.6%), West African Health Examination Board (WAHEB) n=1,0.6%). These regulatory bodies govern healthcare practices in the different areas of specialities. It was necessary to check that clinical staff have the required professional licences to perform their job.

Figure 5.2: Professional License / Affiliations of the Respondents

The credentials of the clinicians show efforts are made by the health management or care providers to recruit qualified clinicians. However, it is unclear whether clinicians are assigned tasks based on their job description or working within their specialisation scope. It was, therefore, necessary to review other intrinsic factors such as job allocation or distributions across different healthcare services, the flow of communication between staffs or teams and collective approach for dealing with complications, because intrinsic factors will determine the capability of the workforce, not just the level of qualifications and affiliation. The second part of the PRMQ was designed to shed more light on the workforce's productivity. So, participants were quizzed on intrinsic latent and active factors within the delivery system, which provided more insight into organisational issues and patient safety culture.

5.1.3 Patient Safety Factors

This section of the PRMQ consists of questions relating to the patient safety culture. These include; clinical supervision and monitoring obtainable in hospitals, an evaluation of the nature and occurrence of incidences that were experienced or witnessed but without making references to any incidences as this could put participants in an uncomfortable position. However, an open-ended question allowed participants to answer how incidences they experienced could be eliminated, as reported in Table 5.4. It provided an insight into the nature of incidences indirectly without the specifics. Also, the incidences reporting system and documentation and patient safety training opportunities within the organisation are reviewed.

5.1.3.1 Direct Supervision

Supervision and mentoring are crucial to improving junior and senior staff (Perry et al., 2017; Sikora et al., 2015). However, recent findings suggest that their line manager did not supervise 37.5% of respondents. This percentage includes up to sixty-five (65) clinical professionals in participating hospitals in Rivers State. The majority of these unsupervised individuals include medical doctors, senior nurses, and consultants. However, a large proportion of respondents, up to eighty-three clinical staff (47.7%), had regular monthly supervision with their line manager, which was common among nurses and staff with less work experience. Also, findings reveal inconsistencies in the pattern of supervision they get from their line managers; twelve staff (6.9%) indicated yearly supervision, nine staff (5.2%) quarterly and five (2.9%) bi-monthly. Figure 5.3 shows a graphical representation of supervision patterns amongst respondents. The irregularity with healthcare supervision is indicative of the inadequacy of the healthcare system, which will hinder staff development and performance. It also contributes to a lack of accountability and patient safety culture (Aveling, 2016).

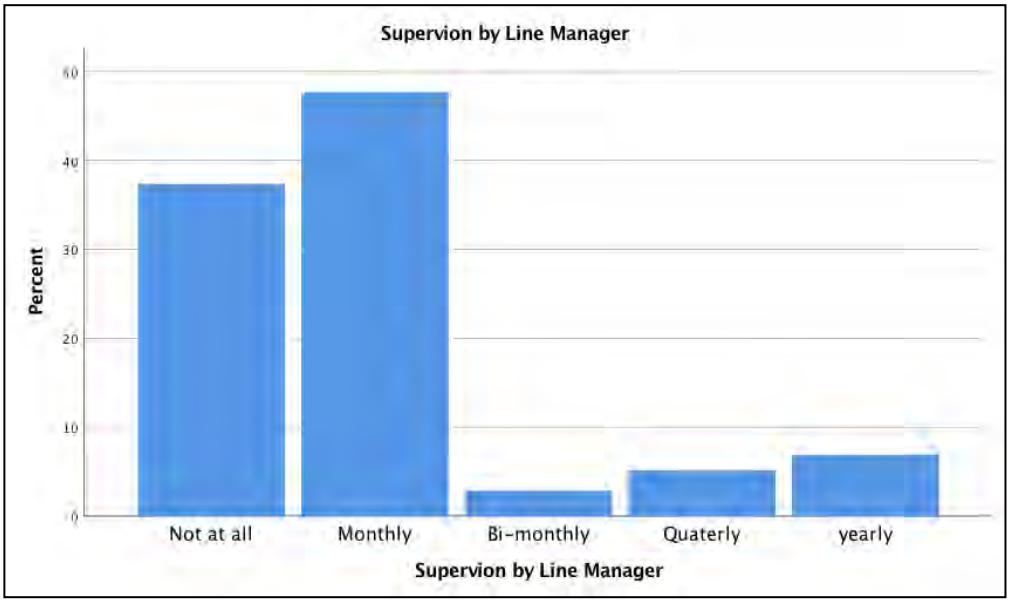


Figure 5.3: Indication of Line-manager supervision by the Respondent.

5.1.3.2 Witnessed or Experience Incidences

Furthermore, respondents indicated whether they had encountered or witnessed incidences within the last twelve months. They were also asked to rate the frequency and severity of occurrence and suggest ways to eliminate or prevent incidences at work. The incidence rating was based on staff perception of how critical the incidence experienced or witnessed was. A five Likert scale was used to rate the severity of incidence; very severe, severe, moderately severe, slightly severe, not severe and a not applicable option provided where the Respondent had not witnessed or experienced any incidence at work.

The research findings revealed that a significant proportion of respondents have experienced or witnessed an incidence at work in the past twelve months. A massive 79.3% (n=138) of the participants had experienced incidence are work while a total of 150 respondents had witnessed them. This result indicates that some had experienced and witnessed incidence at work within that same period. A small proportion of individuals had not witnessed or experienced any incidences, about 20.7% and 13.8% of respondents, respectively. Most of the latter respondents were non-clinical staff, laboratory scientists, and nurses. It, therefore, shows that incidences are quite common in these clinical settings in Rivers State, Nigeria. More so, 42.5% of these cases were considered severe, and 20.7% of cases were moderately severe. A further examination of these incidences revealed the rate of incidences. Ten per cent (10%) of the Respondent indicated that the incidence experienced occurred quite often, 56% reported it occurred occasionally, and 12.6% of cases rarely happened in their places of work. Similarly, 62.6 % of incidences witnessed occurred occasionally, 12.6% indicated this happened often, and 10.9% of cases rarely occurred, as shown in Table 5.2.

Table 5.2: Distribution of incidence experienced or witnessed by respondents

Variable	Descriptor	N=174	Percent (%)
No of participant that experienced incidence	Yes No	36 138	20.7 79.3
Severity of incidence experienced	Very Severe Severe Moderately Severe Slightly Severe Not Severe n/a	8 74 36 16 4 36	4.6 42.5 20.7 9.2 2.3 20.7
Occurrence of incidence experienced	Often Occasionally Rarely N/a	18 98 22 36	10.3 56.3 12.6 20.7
No of participant that witnessed incidence	Yes No	150 24	86.2 13.8
Occurrence of incidence witnessed	Often Occasionally Rarely N/a	22 109 19 24	12.6 62.6 10.9 13.8

This statistic shows incidence in clinical settings, and however, patient safety measures will ensure proper control or mitigation of incidences. The first step towards mitigating risk is an efficient incidence record system that allows for a proper recording of incidence and learning from past failures (Jansma et al., 2011). An overview of the reporting system in the participating hospitals is reported in the next sub-section.

5.1.3.3 Incident Reporting

An incident report is vital for improving patient safety as it gives an account of what occurred, and it is a tool for improving health care practice through learning from past mistakes (Legge, 2015; Barach & Small, 2000). However, findings show that 28.2% (n=49) of respondents did not fill in an incident report when they witnessed or experienced an incident. When asked why they did not do an incident report, an opened ended response from the respondents indicated that they were not familiar with any report. For example, one of the respondents stated, "there

is no provision for such a report in our hospital". A respondent also claimed, "a senior staff member completes incident report". However, a significant number of respondents completed a report, up to a hundred and twenty-five (125). Figure 5.3 shows the frequency of incident reports across respondents.

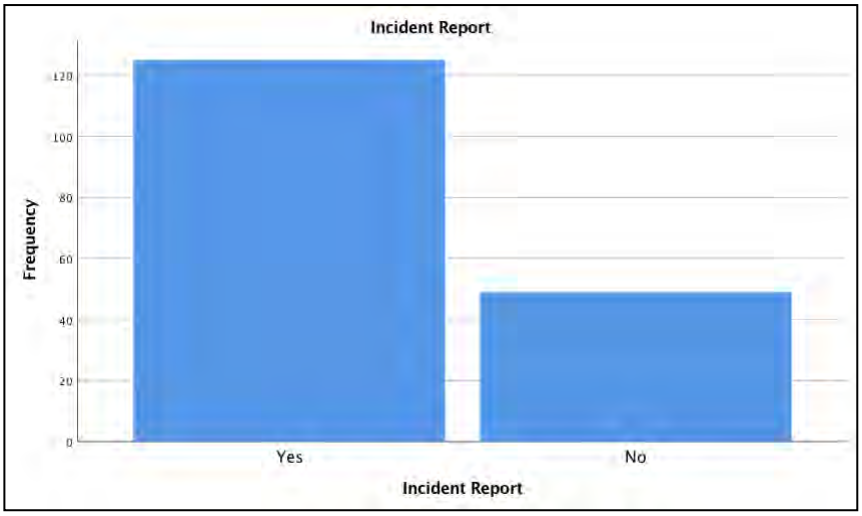


Figure 5.4: Frequency Distribution of Incident Report

It was, therefore, necessary to investigate further the consistency in the reporting incidences within the hospital settings, bearing in mind that incident reporting could vary across the three participating hospitals. Nevertheless, there are vital components of a good incident report such as date and time of the incident, nature of the incident, what contributed to the incident, what was done well (intervention measures carried out), problems encountered, and outcome to enable staff to learn and improve future practices (Mahajan, 2010; Carson-Stevens et al., 2015). Table 5.3 shows the response to incident reporting by clinical staff in the hospital.

Table 5.3: Incident Report Overview by the Respondents

Incident Report Component	No of Indications	Percent (%) N=174
Date and Time of Incident	124	33.2%
Nature of incident	121	32.4%
Good practices (what was done well)	36	9.7%
Care deliver problems	22	5.9%
What contributed to the incidence	70	18.8%

Finding suggests that all respondents (n=124, 33.2%) indicated the time, date of incidents on the report; 97.6% of cases (n=121) described the nature of the incident when filling out an incident report. Only a small proportion of respondents (n=36, 29%) will indicate any incident interventions (what was done well) during the incident, and just a few 17.7%(n=22) filled out problems encountered during the incident. Also, contributing factors were often omitted as over half of the respondents recorded what contributed to the incidence. Hence, it raises the validity of using incident report documents in risk investigations.

Subsequently, respondents were allowed to comment on ways to prevent the incidence they had witnessed or encountered, and a wide range of comments from the open-ended feedback was highlighted. An overview of their responses is shown in Table 5.4 below using thematic categorising. In this case, thematic analysis was used to identify similarities between responses. According to Thomas and Harden (2007), a systematic review can bring together or integrate qualitative findings and enhance the decision-making process (Chalmers, 2003).

A hundred and eleven (111) staff provided written comments on how hospitals can eliminate the occurrence of incidences in their settings, while sixty-three did not provide any feedback. According to respondents, recommendations for patient safety suggest a wide range of

interventions and insight into the kind of incidence they had experienced or witnessed. Responses were in themes, and a frequency table was produced to show the numbers of respondents who have given similar suggestions. The feedback from the Respondent indicates that the health education of patients weighed the most as about ten (10) participants recommended proper education on the consequences of healthcare choice and use of traditional interventions during pregnancies. Finding revealed six (6) recommendations for enhanced or more advanced equipment and monitoring equipment and tools to improve the efficiency of clinical procedures. Five respondents called for improved management practices, for safety measures to be put in place and for early diagnosis and treatment of diseases as a tool for improving patient safety.

Table 5.4: Thematic Categorisation of Respondent's Feedback on ways of eliminating Incidence

Elimination of Incidence Witnessed or Experienced					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		111	63.8	63.8	63.8
	Accessibility of Equipment, Resources and Tools	1	.6	.6	64.4
	Adequate Manpower	1	.6	.6	64.9
	Adequate Patient Clerking	3	1.7	1.7	66.7
	ANC Attendance	1	.6	.6	67.2
	Awareness Against Self-Medication	1	.6	.6	67.8
	Better Communication Between Departments and Staff	2	1.1	1.1	69.0
	Early Detection of Potential Harm	1	.6	.6	69.5
	Early Diagnosis and Treatment of Patients	5	2.9	2.9	72.4
	Enhanced Equipment and Technology	6	3.4	3.4	75.9
	Following Safety Measures	1	.6	.6	76.4
	Good Staff -Patient Ratio	1	.6	.6	77.0
	Health Education	10	5.7	5.7	82.8
	Improved Hospital Facility	2	1.1	1.1	83.9
	Improved Management Practices	5	2.9	2.9	86.8
	Maintenance of Equipment	2	1.1	1.1	87.9
	Participatory/ Integrated Health Care Delivery	1	.6	.6	88.5
	Prevent Errors in The Reading of USS	1	.6	.6	89.1
	Proper Intervention During Emergency	1	.6	.6	89.7
	Proper Planning	1	.6	.6	90.2
	Proper Sanitation	1	.6	.6	90.8
	Protection of Staff Against Patients	1	.6	.6	91.4
	Public Health Awareness	2	1.1	1.1	92.5
	Purchase of Medicines from Authorised Manufacturers	3	1.7	1.7	94.3
	Regular Use of PPE	1	.6	.6	94.8
	Safety Measures to Be Put in Place	5	2.9	2.9	97.7
	Subsidized Cost of Care	1	.6	.6	98.3
	Support Form Patient's Family.	1	.6	.6	98.9
	Up to Date Training and Development	2	1.1	1.1	100.0
	Total	174	100.0	100.0	

Other factors such as updated training, drug purchase from authorised manufacturers, proper clerking, maintenance of equipment, improved facilities and enhanced communication were at least mentioned more than once by respondents. There were other varied recommendations shown in Table 5.4 above, which reveal diverse issues within the health care settings. However, these can be categorised further as recommended by the PRISMA flow chart model under organisational, human behaviour, patient, and technical factors for easy analysis and prioritisation of any recommended suggestion demonstrated later in this research.

Furthermore, the respondents were asked to indicate if they have undertaken any form of patient safety training following an incident at work or generally to improve their practice. Finding suggests up to forty-four (25.3%) respondents received no training as such, and another twenty-four respondents (24) had received less than 10hrs training in the past 12 months. However, up to fifty-three (53) respondents received 10-20hrs training and an additional 53 respondents received more than 20hrs training. There appears to be inconsistency between the number of patient safety training received and the required standard set by these hospitals. The diversity in response might be due to job specifications, positions and the differences between organisations. However, further investigations into these differences were not necessary. However, research will focus on the respondents that have not received any form of training on patient safety within their organisation as it is unclear reasons for the lack of training where one is supposedly available according to responses by other participants.

Patient safety training is an intervention procedure to prevent incidences in the UK NHS. According to a report by the HEE (2016, p4), "The NHS cannot expect to achieve improvements in patient safety if it does not embed education and training and if we cannot

allow staff time away from the workplace to undergo training". Figure 5.4 shows the number of hours of training on patient safety that respondents have received.

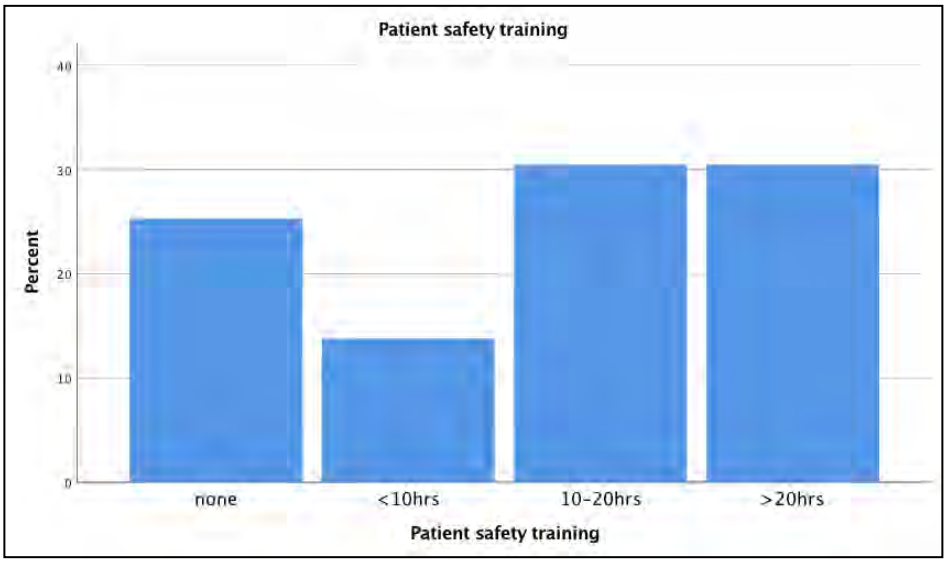


Figure 5.5: Respondents Distribution of Patent Safety Training

5.1.4 Analysis of Contributing Factors Based on PRISMA model.

A series of questions were asked based on the various categories of risks, as recommended by the Eindhoven Classification Model. These include the Organisational, Technical, Human Behaviour and Patient-Related factors (MERS TM, 2001; van Vuuren et al., 1997). Schaaf & Habraken (2005) gave a detailed description of latent and active factors contributing to patient safety within the health care organisation. The PRMQ used for this research was further developed on areas itemised by the PRISMA categories of risk and corroborated in several patient safety literatures highlighting underlying root causes that can influence the overall health outcomes of patients. The risk factors have been discussed extensively in Chapter 3, the study's Conceptual Framework. It was, therefore, necessary for participants to rate their level

of agreement or disagreement with items on factors itemised using the five Likert scale 1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree. The mean and standard deviation for each category was estimated based on the assumption that the sampling distribution of the mean is normal.

Mordkoff (2019) stated that the population mean will normalise with an increase in the size of the sample, even where the individual data is skewed, but the sample size should be thirty and above (30 or > 30). It is commonly called the central limit theorem. The impact of shape analysis, such as the calculations of skewness and kurtosis value on real data analysis, is arguable. According to Wheeler (2011, P20), "I have to agree with Shewhart when he concluded that the location and dispersion statistics provides virtually all the useful information which can be obtained from numerical summaries of the data". The use of additional statistics, such as skewness and kurtosis are superfluous".

Assuming a normal mean distribution,

$$z \text{ score} = \frac{x - \mu}{\sigma}$$

Z score is the distribution area above or below the mean, m is the mean, x is the data value, and s is the standard deviation. However, according to the empirical rule of thumb, 68% of respondents fall above or below one (1) standard deviation of the mean, 95% of respondents fall above or below two (2) standard deviations of the mean, and 99.7% of respondents fall above or below three (3) standard deviation of the mean. Therefore, it has not been necessary to calculate the Z value for each item, but the X value can be estimated by adding or subtracting the standard deviation from the mean value. From the five Likert scales 1-5; 1 strongly disagree to 5 strongly agree, the values were estimated for the percentage distribution within 1s, 2s and

3s. This estimation enabled the researcher to conclude on the general distribution of responses which could be more towards 1 (strongly disagree) or 5 (strongly agree). The frequency of responses is described in the following sub-sections.

5.1.4.1 Organisational Factor

The organisational factors were designed around nine (9) point items based on the following latent factors; 1. bottom-top communication, 2. quick response from managers when needed, 3. advice and support from more experienced practitioners 4. prioritising complex care 5. Shared values 6. consistent approach for recording and reporting 7. Inter-departmental information sharing, 8. training and development, and 9. team meetings were intrinsic factors influencing patient safety outcomes. The distribution of responses on each point is shown in Figure 5.5, and Table 5.5 presents the descriptive statistic of organisational factors contributing to MH outcomes.

Figure 5.6: Respondent distribution of organisational factors contributing to MCH outcomes

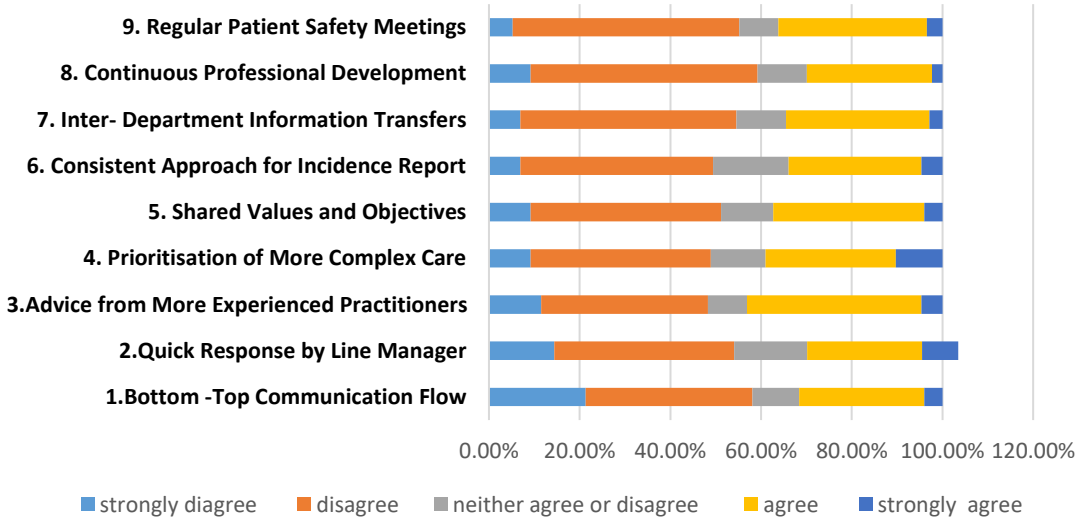


Table 5.5: Descriptive Statistics of Respondent's perception of Organisational factors contributing to MH outcomes

Organisational Factors	Mean	Std. Deviation
1. There is a free flow of communication from junior staff to senior staff	2.5632	1.21361
2. I get quick response to questions and inquiries from my line managers when needed.	2.6609	1.14041
3. I get regular advice and support from more experienced practitioners for my care giving activities.	2.8793	1.17897
4. In my team, we recognise and address more critical situations before attending to the moderate and less healthcare cases.	2.9138	1.21100
5. In my team, we have share values for achieving maternal child health objectives.	2.8103	1.11930
6. In my team, we follow a consistent approach to record and report incidence at work.	2.8218	1.07380
7. In my hospital, there is an effective way of transferring information between other departments and the gynaecology and obstetrics department.	2.7586	1.06403
8. I receive regular and updated training for my job role.	2.6379	1.05400
9. Team members meet regularly to discuss ways to improve safety practices within my department.	2.7931	1.06590

The research findings highlight severe latent issues in the participating hospitals. Based on the survey findings, 58.5% indicated poor bottom-top communication amongst team members, and 54% did not get a quick response to questions and queries when required. Fifty-five per cent revealed that team members did not meet regularly to discuss ways to improve healthcare practices, including the lack of new and updated training (59.2%). It was also indicated by 54.6% of the Respondent that there was a poor inter-department collaboration with regards to sharing information, and the weakness of the incident report system was re-emphasised. Forty-nine per cent of respondents disagree that there is a consistent approach for recording reporting incidents, and 16.7% were neutral on the issue. There was no collective or shared value for achieving MH objectives to compound the issue further. This research calls healthcare providers to tackle these underlying issues and cultivate appropriate patient safety culture. However, other external issues influence the ability of the organisation to implement changes such as healthcare funding and political decisions. The qualitative part of this study will provide a more in-depth understanding of how organisational factors and underlying issues can be addressed.

5.1.4.2 Technical Factors

Similarly, technical issues are latent factors contributing to health outcomes. Six items (10- 15) were designed to ask questions on technical factors: 10. infrastructure, 11. availability of resources, 13. functionality of equipment 14. Technical knowledge, 15. Accessibility, and 16. Equipment design. Figure 5.7 shows the respondents indication of technical factors contributing to MH outcomes in Rivers State.

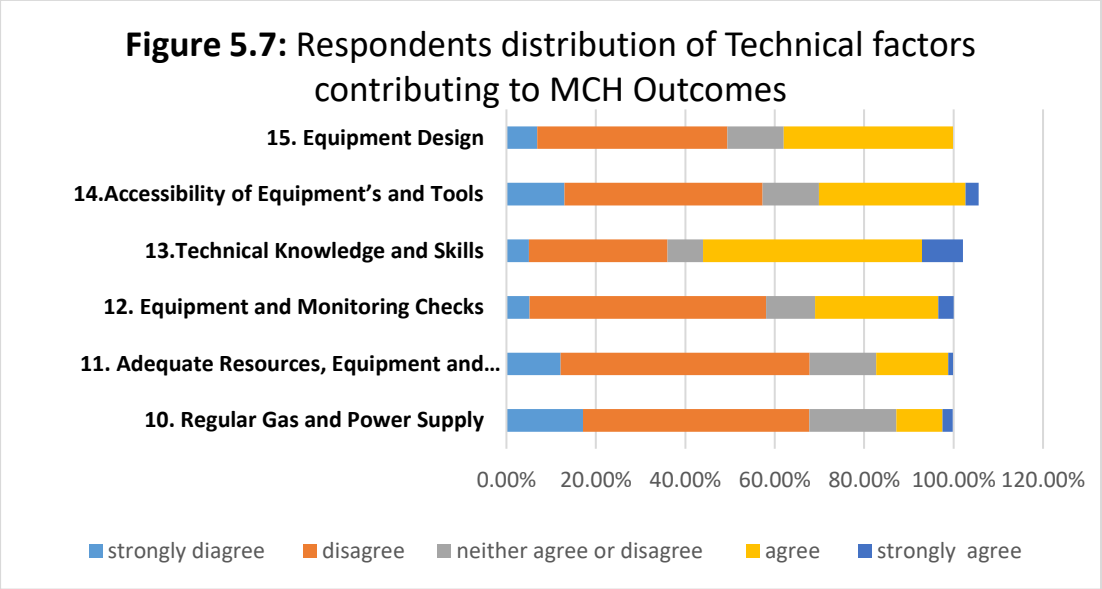


Figure 5.7: Respondents distribution of Technical factors contributing to MCH Outcomes

Table 5.6: Distribution of respondents perceived contributors to incidence in healthcare settings

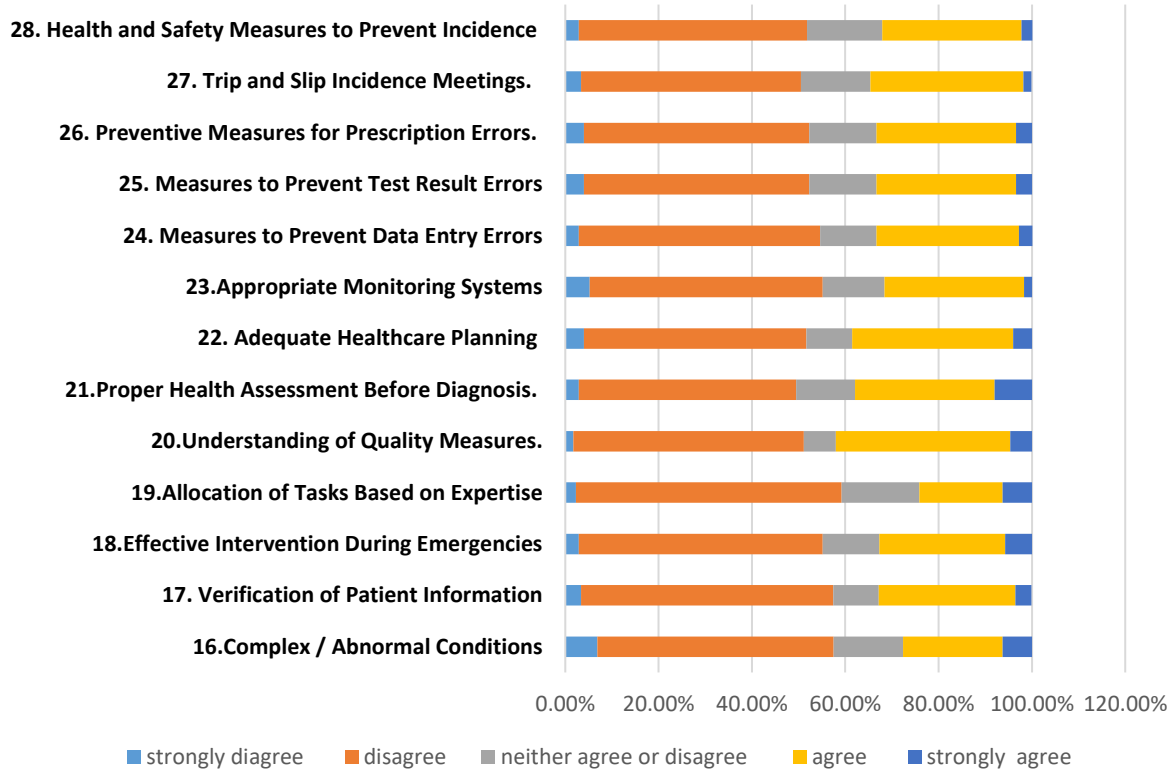
Technical Factors	Mean	Std. Deviation
10.We have regular power and gas supply to support our health care delivery.	2.2989	.95100
11. I have adequate materials, resources and equipment required to perform my job.	2.3851	.93488
12. The equipment and resources I use are regularly checked and monitored to ensure that they function correctly.	2.7126	1.03587
13. I have the technical knowledge and skills needed to use equipment and tools effectively for my job.	3.3046	1.09348
14. All relevant equipment and tools are set up correctly and kept in a room where I can easily access them.	2.7931	1.07131
15. All equipment and tools are well designed by manufacturers to an acceptable standard to allow me to do my job properly.	2.8161	1.02601

The respondents identified poor infrastructure and a lack of technical know-how to use medical equipment as a problem for quality MH outcomes. Only fifty-eight per cent indicated they had the technical knowledge and skill to use the equipment effectively, with a vast 68% highlighting that the hospitals lacked basic infrastructure such as reliable power and gas to support the overwhelming clinical demands. Sixty-two per cent also revealed that equipment was not often checked and monitored for functionality, while 57% disagreed that equipment was readily accessible when needed.

5.1.4.3 Human Behaviour Factors

These are active failures in a system as a result of human activities and behaviour. In this category, a 13 points item (16- 28) was designed to answer questions on human factors. Questioned were based on the following; 16. Handing complex conditions, 17. Patient verification, 18. Intervention measures, 19. Task allocation, 20. Quality care, 21. Health assessment, 22. Planning and preparation, 23. Monitoring systems, 24. Data entry, 25. Test results, 26. Prescription, 27. Slip and Trip incidence, and 28. Health and safety measures. See Table 4.8 for descriptive statistics on human behaviour functions. Figure 5.8 shows the respondents responses in this category, and the descriptive analysis of human behaviour failures is shown in Table 5.7.

Figure 5.8: Respondents distribution of human-behaviour factors contributing to MCH outcomes



The findings highlighted some serious human risk factors of maternal health outcomes that might originate from the poor observance of clinical procedures, inadequate clinical knowledge and poor clinical management skills. Firstly, 58% of the respondents indicated that some clinicians could not handle complex/abnormal pregnancy procedures, while 55% suggested that emergency procedures for pregnancy care were unsuccessful. Other clinical procedural concerns raised were patient verification errors (57%), a lack of effective monitoring systems (55%) and poor planning and coordination of clinical tasks (59%).

Other procedural risk factors included failure to discuss incidents in meetings (50%) and unsatisfactory measures addressing health and safety concerns (52%). Secondly, 51% of respondents disagreed that the healthcare team understood what was required to achieve quality

maternal care, while 59% believed clinical tasks were not allocated based on the staff's knowledge and expertise. Thirdly, the respondents indicated that more than half of clinical errors were caused by inadequate skills of the staff, with 55% disagreeing that adequate measures were in place to prevent data error while 52% test errors and 52% prescription errors were attributed to poor clinical skills.

Table 5.7: Distribution of respondents perceived human behaviour contributors to incidence in healthcare settings.

Human Behaviour Factors	Mean	Std. Deviation
16. In my team, we can address complex or abnormal pregnancy conditions.	2.6954	1.07751
17. In my team, there is a procedure for verifying patient information before attending to them.	2.7529	1.02673
18. In my team, successful intervention measures are taken to handle critical conditions and emergencies.	2.8046	1.05172
19. In my team, care delivery tasks are allocated based on staff's knowledge and expertise.	2.6897	1.00070
20. In my team, we have clear understanding of what to do to achieve quality care.	2.9368	1.05979
21. In my team, proper health assessment is done by clinicians before diagnosis of an illness.	2.9368	1.09730
22. In my team, adequate planning and preparation is done before any health care delivery.	2.8678	1.06429
23. In my team, we have suitable monitoring systems and procedures to keep up to date with changes in patient's care plan.	2.7299	1.00376
24. In my team, adequate measures have been put in place to prevent data entry errors	2.7874	1.00614
25. In my team, adequate measures have been put in place to prevent test result errors.	2.7184	.97127
26. In my team, adequate measures have been put in place to prevent prescription errors.	2.8046	1.02387
27. In my team, tripping and slip incidents are discussed in meetings.	2.8218	.98977
28. In my team, we have adequate health and safety measures in place to minimise or eliminate trips and slips at work.	2.7989	.97944

5.1.4.4 Patient-Related Factors

These are active failures in the system based on patients' characteristics or conditions beyond the control of the clinical staff. Based on the literature review, 12-point items (29-40) were developed to answer questions on the following topics; 29. Access to advice 30. Antenatal care

attendance 31. Formal-traditional care mix 32. Self-medication 33. The consequence of health care choices 34. Existing chronic conditions 35. Illness during pregnancy 36. Managing illness 37. Affordability of care 38. Religious beliefs, 39. Cultural values, and 40. Family interference. Figure 5.9 shows the respondents level of agreement and disagreement with items in this category.

Figure 5.9: Respondents Distribution of Patient-Related Factors contributing to MCH Outcomes

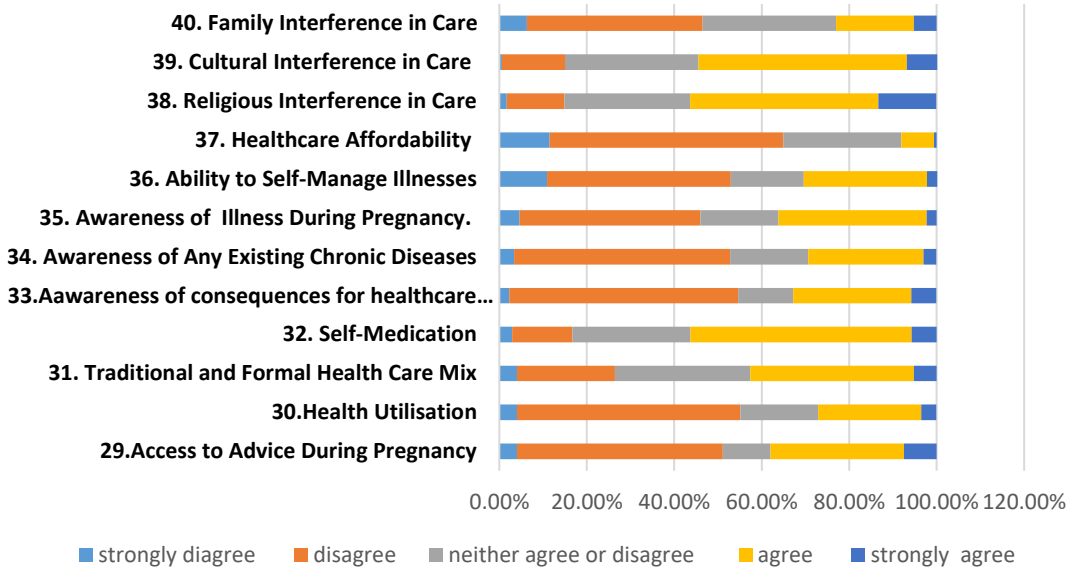


Table 5.8: Distribution of respondents perceived patient -related contributors to incidence in healthcare settings

Patient-related Factors	Mean	Std. Deviation
29. The women in our care have access to advice and support on maternal care and pregnancy related issues.	2.9023	1.11048
30. The women in our care attend heath care appointments sufficiently.	2.7126	.98436
31. The women in our care mix formal healthcare prescriptions with other forms of traditional care practices.	2.8276	.97015
32. The women in our care take medication not prescribed by the doctor.	2.5747	.90128
33. The women in our care are aware of consequences of their healthcare choices.	2.8161	1.04277
34. The women in our care are aware of any existing chronic disease(s) before pregnancy.	2.7586	.97915
35. The women in our care are aware of any illness they develop during pregnancy.	2.8793	1.00997
36. The women in our care understand how to manage illness on their own, as recommended by the doctors	2.6897	1.06777
37. The women in our care have sufficient money to pay for their care expenses.	2.3218	.79731
38. The women in our care make health care choices based on religious beliefs.	2.4713	.94152
39. The women in our care make health care choices based on cultural values other than religious beliefs.	2.5402	.84395
40. The women in our care are able to make their own health care decision without other family members interfering.	2.7529	.99238

The findings revealed that patients could pose many risks to their maternal health. Only fifty-three per cent of the respondents suggested that women were aware of their existing chronic diseases, while 51% disagreed that patients had access to advise and support on maternal care issues. The findings further suggest that about 46% of women were not aware of pregnancy-related illness and that only 30.5% could manage their illnesses even if they were aware. Fifty-five per cent of the respondents said that women did not utilise health facilities sufficiently, with a significant 65% suggesting that poverty and inability to pay healthcare costs might be the reasons for low utilisation. The respondents also found the role of culture (54.3%) and religion (56.3%) in healthcare choices as patient-related risk attributes that impact maternal health outcomes, with a small margin of 23% agreeing that women could make their own healthcare decision without other family members interfering.

It is evident from the research findings that multiple factors are contributing to MH outcomes, as indicated in the first part of the PRMQ. The complexity of these factors will make it challenging to prioritise failures in the order of significance. The EFA was applied in this study to analyse further these factors presented in the next section.

5.1.5 Factor Extraction Result

Section 5.1.3 presents a descriptive analysis of forty (40) items under investigation. However, a more sophisticated instrument is needed to identify and prioritise underlying factors within the system, such as the factor analysis tool. The EFA was used rather than the default Principal Component Analysis (PCA) because it assumes a causal relationship and is not just a factor reduction or simplification tool (Costello & Osborne, 2005). The EFA interprets the most difficult interpretable correlation between variables (Reio & shuck, 2015). Despite the usefulness of the EFA, it is crucial to verify the factorability of the variables. The determinant value, Bartlett's test of sphericity, Kaiser-Meyer-Olkin (KMO) test of adequacy for assessing the suitability for factorising variables (Beavers et al., 2013).

5.1.5.1 Reliability and Validity of Data.

The factorability of data was considered suitable based on the test of significance shown in Table 5.9. KMO measures of adequacy (0.927), Bartlett/s test of sphericity (X=7692.774, df=780, Sig.= .000) and determinant (9.243E-22). Following the multiple rule of thumb, the inspection of correlation matrix >0.3, KMO values close to (one) 1 shows a "marvellous degree" of common variance (Beaver et al., 2013). The test of significance all confirm that variables are factorable.

The suitability of sample size was based on the strength of the data and revealed in factor extraction communalities; where the communalities across variables are majorly 0.8 and above, the data is said to be very strong, and the inconsistencies resulting from the small sample size can be minimised (Costello & Osborne, 2005; Beaver et al., 2013). The degree of communalities is shown in Table 5.10 reveal a high degree of communalities between variables used in this research.

Table 5.9: Measures of assessing the correlation matrix

Measures		**Value**
Determinant		9.243E-22
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.927
Bartlett's Test of Sphericity	Approx. Chi-Square	7692.774
	Df	780
	Sig.	.000

Table 5.10: Factor extraction communalities

Communalities		
	Initial	Extraction
1.Bottom -top communication flow	.855	.714
2.Quick Response by line Manager	.865	.833
3.Advice from more experienced practitioners	.903	.859
4.Prioritising Complex care	.876	.782
5.Shared Values	.815	.699
6.Consistent Approach for Incidence Report	.880	.820
7. Inter- department information transfers	.819	.762
8. Continuous Professional Development	.813	.737
9. Regular patient safety meetings	.874	.751
10.Regular gas and Power supply	.726	.625
11.Adequate resources, equipment and materials	.787	.751
12. Equipment and Monitoring Checks	.869	.847
13. Technical knowledge and skills	.532	.446
14. Accessibility of Equipment and Tools	.848	.808
15.Equipment Design	.875	.763
16.Complex / Abnormal Conditions	.722	.607
17.Verification of Patient Information	.884	.768
18.Effective Intervention during emergencies	.917	.842
19.Allocation of Tasks	.821	.712
20.Understanding of Quality measures	.847	.799
21.Health Assessment	.854	.742
22.Health Planning	.881	.865
23.Appropriate Monitoring Systems	.876	.814
24.Data Entry Errors	.893	.773
25.Test Result Error	.881	.824
26.Prescription Error	.777	.639
27.Trip/Slip Incidence	.927	.860
28.Health and safety measures to prevent Trips	.867	.748
29.Access to advice	.813	.764
30.Health Utilisation	.673	.540
31.Traditional and formal health Care Mix	.410	.364
32. Self – Medication	.607	.644
33.consequences of Healthcare choices	.856	.789
34. Existing Chronic diseases	.874	.884
35. Illness during Pregnancies	.784	.695
36. Management of illness	.665	.510
37.Affordability of care	.682	.585
38.Religious Beliefs	.756	.661
39.Cultural values	.797	.813
40.Family Interference in Care	.656	.528
Extraction Method: Principal Axis Factoring.		

5.1.5.2 Factor Correlation Matrix.

Potential factors were extracted using the principal-axis factoring followed by an oblique rotation. In contrast to orthogonal rotation methods, the oblique rotation accounts for correlations between variables and is more suitable for social research (Fabrigar et al.,1999). Although the rotation methods do not influence the percentage of variance, the oblique rotation produces an overall more accurate and representative value (Costello & Osborne, 2005). The following criteria were also considered for extraction; Screen test plot, eigenvalue >1 (Kaiser, 1960; Costello & Osborne, 2005), cumulative per cent of variance and parallel analysis (Horn,1965; Garson, 2010). Missing values in the data set were managed by excluding cases listwise, coefficients were sorted by size and suppressed to 0.10 as set by default SPSS version software. Analysis of 40 items revealed a 7-factor structure with eigenvalues greater than one, representing 77.666% of the total variance shown in Table 5.11, and a scree plot produced a graphical representation of Eigenvalues > 1 (See Figure 5.10). Items loading greater than or equal to 0.3 significantly impacted each category. Table 4.13 shows the correlation mix pattern, which shows seven factors loading.

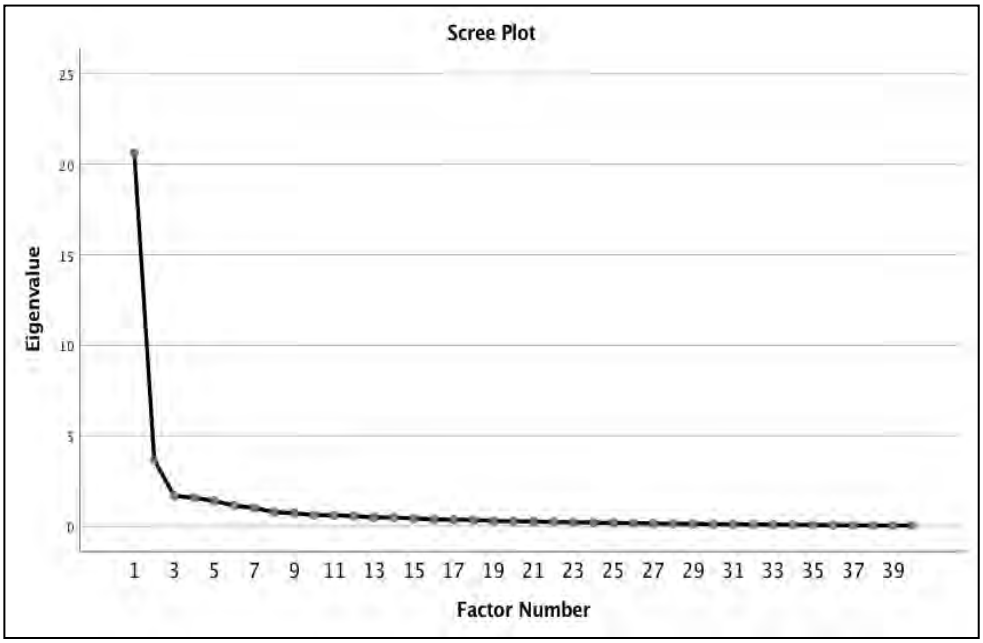


Figure 5.10: **Scree Plot of extracted factors**

Table 5.11: Initial total variance of extracted factors

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	20.603	51.507	51.507	20.364	50.910	50.910	13.047	32.616	32.616
2	3.650	9.126	60.632	3.342	8.355	59.265	5.143	12.857	45.473
3	1.684	4.211	64.843	1.426	3.565	62.830	4.818	12.045	57.518
4	1.569	3.922	68.765	1.239	3.096	65.926	2.061	5.152	62.670
5	1.408	3.520	72.286	.995	2.488	68.414	1.655	4.136	66.806
6	1.137	2.843	75.129	.868	2.170	70.585	1.261	3.154	69.960
7	1.015	2.537	77.666	.736	1.840	72.424	.986	2.464	72.424
8	.779	1.949	79.614						
9	.727	1.818	81.432						
10	.616	1.539	82.972						
11	.610	1.524	84.496						
12	.568	1.419	85.915						
13	.489	1.223	87.137						
14	.484	1.210	88.348						
15	.433	1.082	89.430						
16	.380	.949	90.379						
17	.365	.913	91.292						
18	.350	.876	92.168						
19	.298	.745	92.913						
20	.279	.696	93.609						
21	.258	.645	94.254						
22	.243	.607	94.861						
23	.223	.558	95.419						
24	.203	.508	95.927						
25	.190	.475	96.402						
26	.176	.440	96.842						
27	.161	.402	97.243						
28	.147	.368	97.611						
29	.136	.340	97.952						
30	.113	.282	98.233						
31	.112	.280	98.513						
32	.102	.256	98.769						
33	.092	.230	98.998						
34	.084	.211	99.209						
35	.072	.180	99.389						
36	.060	.149	99.538						
37	.057	.142	99.680						
38	.046	.114	99.794						
39	.043	.108	99.902						
40	.039	.098	100.000						
Extraction Method: Principal Axis Factoring.									

Table 5.12: Initial pattern matrix of extracted variables

Pattern Matrix[a]							
	Factor						
	1	2	3	4	5	6	7
22. Health Planning	**.831**						-.206
19.Allocation of Tasks	**.800**				.181		
20.Understanding of Quality Measures.	**.798**		.111			.184	.146
18.Effective Intervention During Emergencies	**.739**			.146	.163		
17.Verification of Patient Information	**.721**			.208			
27.Trip/Slip Incidence	**.706**		.234			-.113	-.192
23.Appropriate Monitoring Systems	**.626**	.126		.263			
21.Health Assessment	**.623**		.233			.192	.137
25. Test Result Error	**.622**	.255		.237	-.107		.140
16.Complex / Abnormal Conditions	**.608**	.177		-.128		.186	
26.Prescription Error	**.540**	.316	.101		-.157		
24.Data Entry Errors	**.528**		.206	.220			-.133
28.Health and Safety Measures to Prevent Trips	**.493**		.286			-.123	-.291
15. Equipment Design	**.424**		.397	.114	.119	-.161	-.205
9. Regular Patient Safety Meetings	**.377**	-.120	.363	.266			-.225
34.Existing Chronic Diseases		**.835**		.106	.181		.126
33. Consequences of Healthcare Choices		**.832**	.127				
35.Illness During Pregnancies	.206	**.698**					
30.Health Utilisation	.131	**.547**				.135	-.142
37.Affordability of Care	-.279	**.476**		.382		.204	-.205
29.Access to Advice	.229	**.472**	.215	-.238		.174	-.272
36.Management of Illness		**.430**		.136		.123	-.393
3.Advice from More Experienced Practitioners		.155	**.919**				
2.Quick Response by Line Manager			**.911**				
1.Bottom -Top Communication Flow			**.844**			.198	
8. Continuous Professional Development			**.762**	.225			-.135
6. Consistent Approach for Incidence Report	.136		**.691**		-.102	.102	
4. Prioritising Complex Care	.191	.271	**.618**				.147
5. Shared Values	.147	.123	**.580**	.150			
14.Accessibility of Equipment's and Tools	.213		**.546**	.289	.213		
7. Inter- Department Information Transfers	**.314**		**.494**			-.103	-.362
11. Adequate Resources, Equipment and Materials	.257		.105	**.647**			-.134
12. Equipment and Monitoring Checks	**.369**		.151	**.576**			
10. Regular Gas and Power Supply	**.310**		.228	**.396**	-.180		
13.Technical Knowledge and Skills	.125	.150	.267	**.362**			.174
32. Self – Medication	.183	.110		-.122	**.650**	.164	
31. Traditional and Formal Health Care Mix					**.608**		
39.Cultural Values			.104			**.885**	
38.Religious Beliefs					.132	**.763**	
40. Family Interference in Care					.180	**.362**	**-.443**

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.
A. Rotation Converged in 24 Iterations.

The pattern matrix analysis for the extracted variable produced a 7-factor loading, as shown in Table 5.12. It is essential to discuss the seven (7) factors loading in terms of the PRISMA classification of factors; organisational (items 1-9), technical (items 10-15), human behaviour (items 16-28), and patient-related (items 29-40) factors.

Factor 1 loadings: the following items loaded strongly with factors ranging from 0.831-0.377, which accounts for 51.507% of the total variance; 22(Health Planning), 19(Allocation of Tasks), 20(Understanding of Quality Measures), 21(Effective Intervention During Emergencies), 17(Verification of Patient Information), 27(Trip/Slip Incidence), 23(Appropriate Monitoring Systems), 21(Health Assessment), 25(Test Result Error), 16(Complex/Abnormal Conditions), 26(Prescription Error), 24(Data Entry Errors), 28(Health and Safety Measures to Prevent Trips),15(Equipment Design) and 9(Regular Patient Safety Meetings) ranked in order of most significant contributing factor.

In terms of the PRISMA classification, factor 1 consists of human behaviour factors (16-28). These are active factors within the health care system, and loading confirms strong correlations within this category. Health planning (Item 22) is the most highly ranked. Also, Item 15 (Equipment design) and 9 (Regular patient safety meeting), which are classified as technical factors and organisational factors, respectively, have loaded onto the human behaviour category (Factor 1). It shows that equipment design issues and meeting frequency towards patient safety improvements are linked to human behaviour. However, items 15 and 9 also

loaded to the Factor 3 category (Cross-loading) and are the least when ranked among other items on the factor 1 category.

Factor 2 loadings: the following items loaded strongly with factors ranging from 0.835 to 0.430, which accounts for 9.126% of the total variance: 34(Existing Chronic Diseases), 33(Consequences of Healthcare Choices), 35 (Illness During Pregnancies), 30 (Health Utilisation), 37 (Affordability of Care), 29(Access to Advice) and 36 (Management of Illness). Using the PRISMA classification of factors, Items 29, 30, 33, 34, 35, 36, and 37 falls under patient-related factors.

Further evaluations show that some patient-related items were not in the Factor 2 category: 31, 32, 38, 39 and 40. The finding shows that factors listed in the Factor 2 category have shown a more reliable correlation when compared to other patient-related characteristics.

According to Factor 2, loading the woman's medical condition influences her healthcare choices. Likewise, health utilisation can be influenced by the development of illness during pregnancies while access to advice, affordability and management of illness are more closely related. Notably, affordability of care influence health-seeking behaviour, and existing chronic condition (Item 34) ranked the highest factor contributor in this category.

Factor 3 loadings: the following items loaded strongly with factors ranging from 0.919-.0494, which accounts for 4.211% of the total variance; 3 (Advice from More Experienced Practitioners), 2(Quick Response by Line Manager), 1(Bottom-Top Communication Flow), 8(Continuous Professional Development), 6 (Consistent Approach for Incidence Report), 4

(Prioritising Complex Care), 5(Shared Values), 14(Accessibility of Equipment's and Tools), 7 (Inter-Department Information Transfers).

This category reveals a very high factor loading compared to other categories, and more experienced practitioners' advice is the most significant contributing factor. According to the PRISMA categorisation, the category relates to organisational factors, latent factors within a system. Finding shows that an efficient communication structure and supervision/advice from experienced practitioners correlate to staff development, influence consistency in reporting and recording information, health prioritisation, and shared values towards achieving organisational goals. Also, Item 7 crossed load to the human behaviour category (Factor 1). It shows that regardless of organisational policies and procedures on inter-departmental information sharing, a human behaviour element interferes with such procedures.

Factor 4 loadings: the following items loaded strongly with factors ranging from 0.647-0.362, which accounts for 3.922% of the total variance; 11(Adequate Resources, Equipment and Materials), 12(Equipment and Monitoring Checks), 10(Regular Gas and Power Supply), 13(Technical Knowledge and Skills). According to the PRISMA classification, factor 4 are technical factors with Item 11 supply of resources and equipment most significant contributing factor in these health settings and technical knowledge the least contributing factor. Items 11 and 12 have a more significant correlation. Also, items 12 and 10 have cross-loaded with human behaviour functions, which imply item 12 (equipment and monitoring checks) is influenced by human behaviour such as their skills and general attitude towards patient safety and Item 10(supply of power and gas), also a function of human behaviour/characteristics. However, both have a very weak loading and correlations compared to other human behaviour functions and technical factor 4 loadings.

Factor 5 loadings: the following items loaded strongly with factors ranging from 0.650-.0.608, which accounts for 3.520% of the total variance; 32(Self-Medication), 31(Traditional and Formal Health Care Mix). This category consists of patient-related characteristics-based health care choices. Based on research findings, it can be said that women who self-medicate have more tendencies towards using traditional remedies in conjunction with orthodox intervention. Also, self-medication is the most highly ranked contributor in this category.

Factor 6 loadings: the following items loaded strongly with factors ranging from 0.885-.362, which accounts for 2.843% of the total variance; 39 (Cultural Values), 38(Religious Beliefs), 40(Family Interference in Care). This consist of other patient-related characteristics based on socio-economic factors with the highest-ranked Item 39. Findings show that the culture of the people, religious beliefs, and family dynamics are significantly correlated, but Item 40 is the lowest factor in this category, which also has a negative value in factor loading 7.

Factor 7 loadings: A single factor (Item 40) loaded in this category represents a patient-related characteristic and accounts for a 2.537% total variance and a negative loading value of -0.443. EFA shows no significant correlations with other items.

In summary, the EFA pattern matrix extraction consists of the following: Factor 1 (Human behaviour factors), Factor 2, 5, 6, 7 (patient-related factors), factor (technical factors), and factor 3 (organisational factors). A large proportion of loadings <0.3 can be seen on factors 4,5,6,7. Therefore, further parallel analysis is required to reduce the factors loadings to understand the correlations. Also, for complex variables producing high volumes of cross-

loadings where an item is loaded on two or more factors at ³0.32, a significant loading cut-off will simplify interpretations (Yong & Pearce, 2013).

Jolliffe (1986) recommends factor retention at values greater or equal to 0.7, while the Kaiser (1960) criterion is at Eigenvalue at >1, but they both produce extreme values (Field, 2009). According to Yong & Pearce (2013), the screen test should be used together with the Eigenvalue to determine factors to retain. The scree test shown in Figure 5.10 reveals Seven-factor loadings, but further analysis of scree shows a two-factor loading is ideal. However, a parallel analysis using the Monte Carlos simulation determines the statistical significance values for factor analysis as recommended by (O'Connor, 2000) and for better interpretations of items and correlations that exist between them. See Table 5.13 for parallel analysis extraction values.

5.1.5.3 Parallel Analysis

Parallel analysis using Monte Carlo simulation produced a two (2) factor loading rather than the 7-factor loading from initial extraction loading. The specification for the simulation is shown in Table 5.13, which includes simulation run at 90th percentile for a normally distributed data generation and a principal component analysis option as this has no difference with variance extracted through the principal axis method. The simulation was run unto the syntax on SPSS software to produce tabulated extracted result and simulation plot shown below in Table 5.13, and graphical representation shown in Figure 5.11.

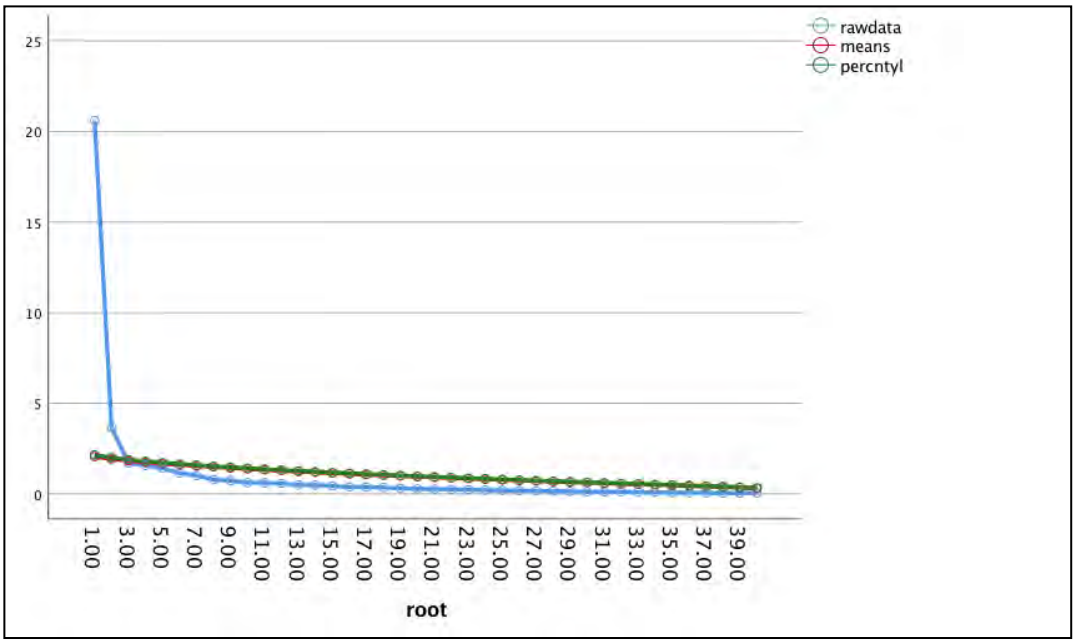


Figure 5.11: Carlo simulation plot based on percentile values

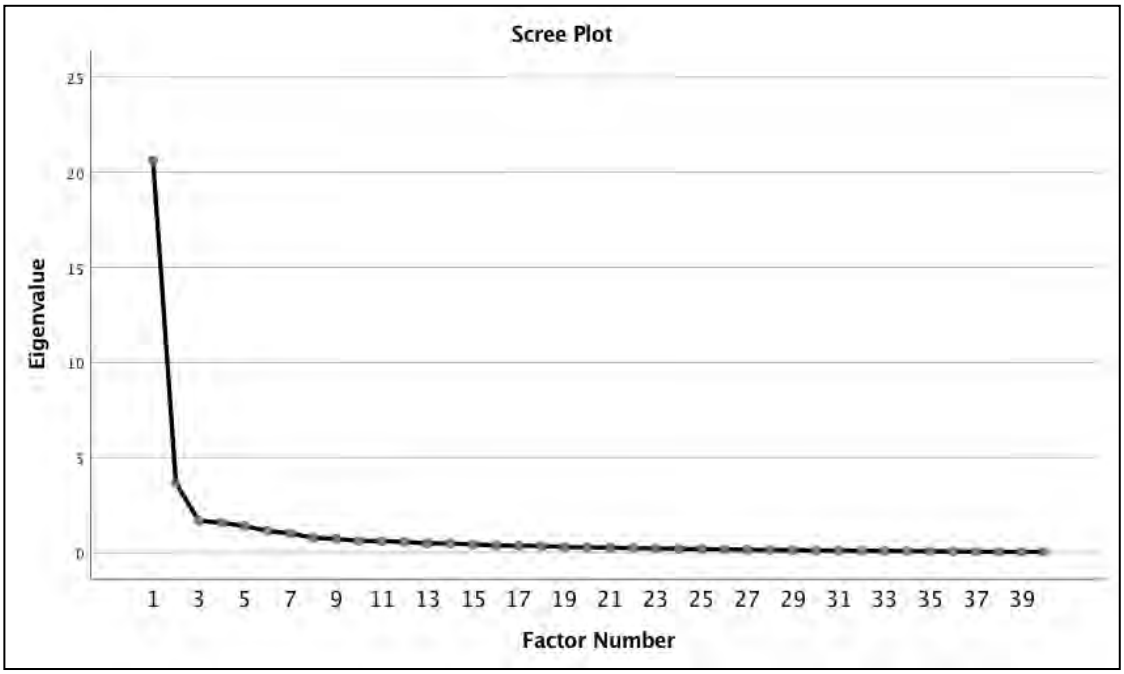


Figure 5.12: **Scree plot based on two (2) factors analysis**

Table 5.13: Monte Carlo simulation of extracted variables

Run MATRIX procedure:
Parallel Analysis:
Principal Components & Random Normal Data Generation
Specifications for this Run:
N-cases 174
N-variables 40
N data sets 1000
Percent 90

Raw Data Eigenvalues, & Mean & Percentile Random Data Eigenvalues

Root	Raw Data	Means	Percentile
1.000000	20.602756	2.055818	2.150605
2.000000	3.650213	1.925517	1.997962
3.000000	1.684323	1.825936	1.884432
4.000000	1.568837	1.742529	1.794708
5.000000	1.408161	1.668062	1.718648
6.000000	1.137133	1.602864	1.648761
7.000000	1.014819	1.542948	1.585291
8.000000	.779433	1.484485	1.522586
9.000000	.727202	1.428994	1.468070
10.000000	.615794	1.376124	1.411854
11.000000	.609586	1.325853	1.362322
12.000000	.567559	1.276577	1.310379
13.000000	.489151	1.230504	1.263977
14.000000	.484100	1.186390	1.218668
15.000000	.432802	1.141694	1.172533
16.000000	.379720	1.101325	1.133106
17.000000	.365199	1.060996	1.091840
18.000000	.350363	1.021547	1.050691
19.000000	.298075	.983696	1.011004
20.000000	.278556	.945190	.972017
21.000000	.258010	.909892	.937657
22.000000	.242622	.874806	.903081
23.000000	.223010	.839202	.866423
24.000000	.203380	.805472	.832820
25.000000	.189846	.773029	.799972
26.000000	.176078	.739964	.764342
27.000000	.160655	.708051	.732764
28.000000	.147125	.676328	.700471
29.000000	.136159	.644500	.669358
30.000000	.112660	.614237	.637389
31.000000	.111858	.583569	.607005
32.000000	.102260	.554000	.578340
33.000000	.091864	.524451	.548368
34.000000	.084438	.496254	.518513
35.000000	.071950	.466765	.490571
36.000000	.059573	.436491	.461926
37.000000	.056771	.406952	.429351
38.000000	.045560	.375895	.400726
39.000000	.043097	.342305	.367294
40.000000	.039300	.300789	.328690

------ END MATRIX -----

5.1.5.4 Exploratory Factor Analysis Using 2 Factor Loadings.

The parallel analysis produced a two-factor loading, and this was used to perform an EFA using the principal-axis factoring followed by an oblique rotation. The Eigen >1 criterion was changed to two-factor criteria for a two-factor loading based on the parallel analysis result. Two-factor loadings were produced from the EFA, as shown in the pattern matrix in Table 5.15. The 2-factor loadings account for 60.632% of the total variance (see Table 5.14), which is acceptable (Costello & Osborne, 2005), and the graphical representation of variance is also shown in the scree plot (See Figure 5.12).

Table 5.14: Total percentage variance for 2 factor loadings extraction

Total Variance Explained							
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	20.603	51.507	51.507	20.253	50.632	50.632	19.753
2	3.650	9.126	60.632	3.159	7.897	58.530	9.327
3	1.684	4.211	64.843				
4	1.569	3.922	68.765				
5	1.408	3.520	72.286				
6	1.137	2.843	75.129				
7	1.015	2.537	77.666				
8	.779	1.949	79.614				
9	.727	1.818	81.432				
10	.616	1.539	82.972				
11	.610	1.524	84.496				
12	.568	1.419	85.915				
13	.489	1.223	87.137				
14	.484	1.210	88.348				
15	.433	1.082	89.430				
16	.380	.949	90.379				
17	.365	.913	91.292				
18	.350	.876	92.168				
19	.298	.745	92.913				
20	.279	.696	93.609				
21	.258	.645	94.254				
22	.243	.607	94.861				
23	.223	.558	95.419				
24	.203	.508	95.927				
25	.190	.475	96.402				
26	.176	.440	96.842				
27	.161	.402	97.243				
28	.147	.368	97.611				
29	.136	.340	97.952				
30	.113	.282	98.233				
31	.112	.280	98.513				
32	.102	.256	98.769				
33	.092	.230	98.998				
34	.084	.211	99.209				
35	.072	.180	99.389				
36	.060	.149	99.538				
37	.057	.142	99.680				
38	.046	.114	99.794				
39	.043	.108	99.902				
40	.039	.098	100.000				
Extraction Method: Principal Axis Factoring.							
a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.							

Table 5.15: Pattern Matrix for 2 factor loadings extraction

Pattern Matrix[a]		
	Factor	
	1	2
27. Regular Slips and Trip Meetings	**.927**	
15. Equipment Design	**.879**	
14.Accessibility of Equipment and Tools	**.872**	
9.Regular Patient Safety Meetings	**.869**	
18.Effective Intervention During Emergencies	**.860**	
24. Data Entry Errors	**.857**	
23. Appropriate Monitoring Systems	**.855**	
17.Verification of Patient Information	**.850**	
25. Test Result Error	**.839**	
12. Equipment and Monitoring Checks	**.828**	
28.Health and Safety Measures to Prevent Trip/slip	**.821**	
22.Health Planning	**.816**	
8.Continuous Professional Development	**.815**	-.113
6.Consistent Approach for Incidence Report	**.812**	
7.Inter- Department Information Transfers	**.811**	
2.Quick Response by Line Manager	**.803**	
20.Understanding of Quality Measures	**.790**	
3. Advice from More Experienced Practitioners	**.770**	.105
21.Health Assessment	**.761**	
5. Shared Values	**.753**	.100
10. Regular Gas and Power Supply	**.753**	
16.Prioritising Complex Care	**.740**	.165
11.Adequate Resources, Equipment and Materials	**.736**	
19.Allocation of Tasks	**.727**	
26.Prescription Error	**.690**	.101
1.Bottom -Top Communication Flow	**.638**	.137
13.Technical Knowledge and Skills	**.597**	
16. Complex / Abnormal Conditions	**.552**	.259
34. Existing Chronic Diseases	.208	**.719**
35.Illness During Pregnancies	.166	**.703**
33.Consequences of Healthcare Choices	.194	**.690**
29.Access to Advice	.292	**.654**
30.Health Utilisation	.139	**.654**
38.Religious Beliefs		**.636**
39.Cultural Values		**.634**
37.Affordability of Care		**.606**
40.Family Interference in Care		**.575**
36.Management of Illness		**.535**
32.Self – Medication	.117	**.450**
31.Traditional and Formal Health Care Mix		.218
Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.		
A. Rotation Converged in 4 Iterations.		
Factor Correlation Matrix		

Factor	1	2
1	1.000	.455
2	.455	1.000

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

The pattern matrix for the two-factor loadings extraction is shown in Table 5.15. Findings from 2-factor loadings show different correlations than seen in the 7-factor loadings. In this case, cross-loading has been significantly minimised and shows a more precise interpretation of variables and ranking. With the PRISMA categorisation, organisational factors (Items 1-9), technical (Items 10-15), human behaviour (Items 16-28), and patient-related (Items 29-40) factors.

Factor 1 loadings show strong correlations between organisational, technical and human behaviour factors. Twenty-nine (29) items loaded in this category ranging from 0.552 to 0.927, with 50.632% explained variance. The essential items were Item 27(Regular Slips and Trip Meetings), and the least significant were Item 16, the team's inability to manage complex and abnormal conditions and item (13) technical knowledge of the staff. Finding suggests that clinical staff have the technical knowledge required to perform their jobs and address complex medical cases but often face some limitations within the Factor 1 category. Such as technical issues due to inaccessibility and difficulty with the use of specialised equipment were also noted here, including several human behaviour problems like ineffective intervention during emergencies and test and data entry errors. All Issues highlighted in this category are preventable with the implementation of appropriate improvement measures at the organisational level. Therefore, Factor 1 loading can be further classified as 'preventable or avoidable causes of maternal mortality.

Factor 2 loadings were mainly patient-related factors. Eleven (11) items loaded in this category ranging from 0.450- 0.719 with 7.897% explained variance. The topmost is item 34, 'The women in our care are aware of any existing chronic disease(s) before pregnancy' and the least item 32: 'The women in our care take medication not prescribed by the doctor'. The result

shows that women in this region have poor health-seeking behaviour as there are not aware of existing chronic conditions or illnesses developed during pregnancy. These constitute direct and indirect medical factors influencing outcomes which have also been highlighted by Say et al (2014). Several factors contributed to poor healthcare choices and weak obstetrics intervention based on Factor 2 Loadings, such as culture, affordability and religious practices. The least factors in this category were; family interference, self-medication, and the inability of patients to manage illness. However, these factors are significant to the overall delivery system based on the cut-off recommendation of value greater than or equal to 0.32 (Yong & Pearce, 2013). Unfortunately, the care providers are unable to control the activities of patients most of the time, and their condition can be very unpredictable as well. Therefore, Factor 2 loadings can be classified as 'unavoidable' causes of maternal mortality.

5.2 Qualitative Data Analysis-Phase 2

Phase 2 of the study, a semi-structured interview was conducted with twelve (12) health experts. The first part captured participants' demographics. Then the participant was asked to provide insight into the general state of the healthcare system in Nigeria, internal and external factors contributing to poor outcomes, followed by a more structured questioning on each PRISMA category of risks and recommendation on how to enhance the MH system. The open and pre-coded parts of the interview were transcribed into the PRISMA sub-categories, and three (3) overarching themes were generated from the initial coding. These were; (a) Theme 1: Root causes of maternal mortality, (b) Theme 2: Health experts' proposed plan of action for improving outcomes and (c) Theme 3: Strategic approach for implementing the action plan and responsible authorities, which is the Phase 4 of this study. The previous chapter shows an overview of the health experts profile in Table 4.1

5.3 Root Causes of Maternal Mortality in Rivers State, Nigeria

5.3.1 Technical Factors contributing to MM in Rivers State.

The analysis of the semi-structured interview revealed severe technical issues in the MH delivery system, which is consistent with the quantitative findings. The most highlighted technical issue that the health experts echoed was the lack of clinical equipment and infrastructure in hospitals. Banfield & Roberts (2015) pointed out that without adequate tools to work with, medical practitioners cannot identify complications on time and monitor the progress of the mother and the baby, especially during active labour. In agreement, Dr Rey cited a typical case of a foetal death that could not be prevented because there was no specialised equipment to detect the cord around the baby's neck. Here is his response:

"In the organisation, most of the equipment is obsolete. I am in Port Harcourt, and most ultrasound scans, a good number of them are obsolete. We are talking about acquiring 3D ultrasound scans while the world now is 4D. I referenced some of my publications where we had intrauterine foetal death resulting from a cord around the baby's neck. If we had an ultrasound scan, it would have picked up that there was a problem with the pregnancy, and we might not have had the perinatal death. I will emphasise that obsolete equipment is a challenge." (30/05/18, 9.41 AM).

Findings suggest that there is no basic facility across primary and secondary facilities in hospitals. Also, clinical equipment and tools were not well maintained and were dilapidated with continuous use over time. So, the tertiary hospitals which are more equipped are overburdened with a massive influx of women seeking quality care. Some of the participants said they had to rely on private practices or borrow necessary tools to carry out medical intervention leading to further delays in patient management. Here are what two consultants had to say:

"The basic equipment, simple machine, simple ultrasound scans we do not have. The ones we had have all broken down. They cannot maintain them. We do not have an x-ray machine and hysteroscopy machine; we don't have them. We tend to bring from outside if you want to do a hysteroscopy. Things as simple as that, hysteroscopy, you bring your machine if you want to do that. This is a tertiary centre, not to talk of the primary and secondary centres. For example, I don't think we are talking about equipment in primary centres because they are not even there". (Dr Jon 30/05/18, 23.08 PM)

"At present, I, I will be surprised if we find centres if we have up to two centres, two public health centres in Nigeria with a CT, functioning CT scan. Because they don't. So, we will have to send them outside" (Dr Cal 7/06/18, 21.33 PM)

Likewise, clinical equipment is not readily available for use due to the overburdened hospitals or delivery suite as obtainable in participating settings. There are more women assigned to one monitoring equipment. Unfortunately, in this case, the doctor is left with no choice but to sacrifice one woman for another, as described by one health expert. He said:

"And then for other equipment that we work with, like the CTG machine, for example, we do not have enough. We may just have 1 or 2 functioning in the labour ward. Maybe we have 2 or 3 patients that are highly dependent on this equipment and need them. We would have to sacrifice one for the other in terms of monitoring" (Dr Dex 2/08/18, 20.54)

Some doctors had to improvise to save women's lives. As described by Dr Sam, they used foil paper to construct an incubator as there were no functioning incubators at the hospital. He said:

> *"I do not have an incubator; I do not have, but surprisingly that paediatrician I employed is skilled. There is a way she fabricates, improvise to get almost the same environment as the incubator. She uses foil, puts them around the bed, covers the bed with a bedsheet and leaves a space for the head. Water is poured inside the hot water bottle and placed by the side of the bed to provide warmth." (20/07/18, 22.03PM).*

However, technical issues are not limited to material defects and essential tools and equipment inaccessibility. In some cases, technical failures in healthcare are due to human factors and ergonomics, as the equipment design can easily enable some errors in readings (Mao et al., 2015). In this context, some doctors are inexperienced in using technical equipment such as CTG scan because it is not available in their practice. Findings show that because the equipment is not always available, some people may not have the required practice to use it correctly. Dr Jon expressed this concern:

> *"Now many of this equipment we do not have them in Nigeria. Even as simple as CTG, you know when, for example, I cannot even operate the CTG. It is that bad. I cannot because we do not have very functional ones." (30/05/18, 23.08PM)*

Also, material defects have been identified with the CTG scan as the equipment did not produce the full report necessary to make an informed diagnosis because there was no CTG paper as indicated by Dr Ben:

> *"I use CTG, and we do not have CTG paper. If you do not have a paper to get the full report." (20/07/18, 21.03 PM).*

In this case, the equipment design must support full onscreen reading without necessary printing or other providing alternatives to ensure the report's accuracy as much as possible.

Likewise, a hospital bed with manoeuvrable functions will support surgical operation than a static bed because surgeons can lift or turn beds position to gain access to inaccessible body parts while conducting a surgery. Dr Sam described how purchasing a new manoeuvrable bed improved surgical operation in his practice, although this is not often obtainable in many settings due to the high cost of purchase. He said:

> *"For instance, I nearly lost a patient some time ago who has [TPH]. I had a bed bought from ABA [City in Eastern region of Nigeria], which has no manoeuvrability. After that incident, I had to go and buy a foreign-made bed that cost me, it cost me five times the same size as the one I bought from ABA, but it has improved my practice, ever since". (20/07/18, 22.03 PM)*

As discussed above, the most common technical issue in the participating hospitals is material defects, lack of equipment and inaccessibility of tools and material when needed. The root cause of the technical problem is funding issues, which is beyond the hospital management. The government is responsible for providing funds to purchase and maintain clinical tools and equipment. Unfortunately, there are problems with healthcare funding in Nigeria due to highly bureaucratic funding channels from the Federal Government, through the State Government to the Local Government, and the lack of financial accountability (FMOH, 2010). Dr Dex expressed this concern. He stated:

> *"There are challenges quite all right, but the main challenge is the poor funding of the department. Sometimes, we require some things or have some faulty equipment and tools that they need to fix." (2/08/18, 20.54 PM).*

On the other hand, to minimise errors due to equipment design, the healthcare management is responsible for providing relevant training and support for staff and purchasing devices or IT systems with a high level of usability, especially in a busy hospital environment (Swanton et al., 2009).

5.3.2 Organisational Factors contributing to MM in Rivers State.

The study identified organisational risk factors contributing to poor MH outcomes in Rivers State; (i) organisational risk factors beyond the control and responsibility of the investigation organisation, (ii) organisational failures relating to inadequate measures taken to transfer essential obstetrics care knowledge to new or inexperienced staff, (iii) failure relating to quality or protocols for dealing with obstetrics cases or complications, (iv) management decision making in prioritising patient safety when faced with conflicting demands and (v) failures resulting from organisational culture or collective approach or behaviour within the system.

5.3.2.1 Organisational External Factors

Organisational external risk factors contribute to the high rate of MM in Rivers State. Based on research findings, these are issues due to overburned tertiary institutions, lack of human resources, security, support services, infrastructural setbacks, poor healthcare fundings and the lack of political will to strengthen the MH delivery system. These are discussed in the following sub-sections.

5.3.2.1a Overburdened Tertiary Institution

The tertiary institutions are extremely overburdened due to the lack of functional primary and secondary health care centres; as a result, women who are unable to afford private care use the tertiary institution for minor obstetrics cases that should have been better dealt with at a primary care level within proximity of their homes. The vast migration of patients to these tertiary institutions has caused a strain on the MH delivery system leading to poor outcomes. As a result, patients have been deprived of necessary care and bed spaces and left devastating consequences. Dr Rey paints a scenario of the inadequacy of the healthcare system. In terms of capacity and their obligations to the populace, he said:

"The facility cannot carry the patients, and many babies have been turned down because of the number of beds. One prenatal care-intensive unit to capture UPTH and one, I think at the BMSH. Those are the two tertiary hospitals in Rivers State, and I also mention that the population of people in Rivers State is about 5 million. So, you can imagine just two tertiary institutions and just two prenatal intensive care units to cater for such a huge population". (1/06/18, 9.47 AM).

Similarly, the health experts asserted that the inefficiency at the primary and secondary contributes to a weak referral system from the lower levels of care to the tertiary hospitals:

"All other places are not working, so they come to UPTH and BMH. Having only two tertiary hospitals lead to delay and malfunction in our systems, a poor referral system. Yes, they put much burden on the tertiary hospital, that is in Rivers State" (Dr Jon 30/5/18, 23.08).

Consequently, more complications arise when the patient gets to the tertiary institutions, and interventions are unsuccessful.

5.3.2.1b Lack of manpower

The lack of skilled personnel has a significant impact on the MH delivery system, and statements from the health experts reveal a critical human resource crisis in hospitals. The human resources are insufficient to meet the high demand for healthcare leading to MM. There are very few specialists or consultants in Rivers State to manage complex chronic disease in obstetrics care, as clearly stated by Dr Rey. He said:

"I think the ratio of obstetricians and gynaecologists compared to the population of about 5million people is small, and we don't have up to 2000 or 1000 gynaecologists in Rivers State." (*1/06/18, 9.47 AM)*

So, the available doctors are pushed to their limits and work very long hours, which makes them prone to costly medical errors:

> *"When you are supposed to have three different shifts, and you have just one person on duty because there is a shortage of workers, and this person is already tried, and emergency is coming at a time when this individual is exhausted, of course, they will be prone to making mistakes that will cost lives". (Dr Cal 7/06/18, 22.40 PM)*

The lack of human resources was linked to medical practitioners' inherent lack of accountability. Some of the health experts expressed this concern. They claim that although human resources are associated with the inability of the government to implement staff deployment schemes, the clinicians currently employed show a lack of commitment towards delivering quality care, and this is a major societal issue that needs to be addressed, as stated by Dr Ben:

> *"Look at Rivers State, for example; the truth of the matter is that you have a hospital that is supposed to be secondary care scattered throughout the state, but the manpower is not there. If they are there, the commitment to serve the people is not there. Is not only the problem of the manpower, but it is also the problem of society" (20/07/18, 21.03PM)*

A further investigation to understand why there is a lack of human resources in the healthcare system in Rivers State revealed a more complex problem. Another major problem identified was the faulty educational system leading to unmerited admissions into medical schools. Due to societal pressure from parents, children are forced into the medical profession because it is considered a high-profile job, and they pay their way to get the highly sought admission into the medical schools. As a result, the healthcare system is faced with a dysfunctional structure where a nurse or pharmacist will refuse to take instructions from a doctor and doctors who are incapable of performing their duties. Dr Cal expresses his dissatisfaction with the educational system:

> *"Some of the workers are not happy with what they do. We have a lot of problems with our educational system, where you have someone who wants to read medicine. He has passed all the pre-requite exams and thinks he is qualified to read medicine. The institution that oversees his admission does not offer him admission because he does not have money. Also, we have medical doctors who do not want to read medicine because politicians push their children to the institution, pay money, and take the spot that belongs to other people to study and become doctors. They end up graduating people who do not want to be doctors." (7/06/18, 21.33 PM)*

Also, the inability of the government to initiate skill-based programs directed towards recruiting, training and developing healthcare professionals, especially as specialists and deploy them to high need areas or healthcare centres. The government is not doing enough in this regard:

> *"There are times in all these tertiary hospitals they do not have any house officers. Most of the ones there are the doctors doing an internship. The government is not employing them, but they are needed in all those places. What is wrong to send them to those places to improve those facilities where they do deliveries or at least if a consultant oversees 1 to 3 facilities, they can go around and see what is happening and mentor the other health workers" (Dr Ada 16/08/18, 15.08 PM).)*

Furthermore, there is a vast migration of healthcare professionals to other countries such as the UK, US and other European countries seeking better working conditions, further depleting human resources capability in the health sector

> *"We do not have enough manpower in Nigeria because most of our staff, our doctors are out of the country, so we have some challenge. We are still not so many in Nigeria and Rivers State" (Dr Rey* 30/05/18, 9.41 AM).

According to Omer & Aziz (2016), government incentives and schemes will help facilitate better retention of healthcare workers. However, Dr Ben believes that people management should not only be attributed to failures by the government to acquire and retain clinicians but rather an internal management problem due to the inability of managers to maximise human

resources available through better coordination by healthcare providers at the different levels of care. He said:

> *"It is not just that the manpower is not there, but there has to be manpower re-orientation. So that we maximise the human capital that we have, there are many obstacles and challenges in that respect. One, the primary health care system that we have that should be the closest to the people should be strengthened and streamlined." (20/07/18, 21.03PM).*

5.3.2.1c Support Services

The support services include the blood bank, ambulance and medical laboratory services. How these services interact and work collaboratively is vital for reducing the MM. Therefore, support services need to be well regulated and closely monitored to ensure that their roles sync with the MH delivery system (Mora et al., 2018). However, the laboratory services in Rivers State are poorly regulated and unreliable:

> *"There is a major problem with our private laboratories in this country, and they are not well regulated. Anyone can start providing services, write whatever name on their laboratory practice and the next day people bring samples to in, there is no regulation" (Dr Cal 7/06/18, 22.40 PM).)*

Hence, Dr Jon called for strengthening private practices to ease the burden of laboratory services on tertiary institutions to meet the high demand for laboratory services and ensure results are delivered on time. He said:

> *"We need to strengthen laboratory services. Apart from UPTH, there are very few places. Sometimes we need to go out or wait for three hours to get blood tested". (*30/5/18, 23.08)

Similarly, since one of the significant causes of death is haemorrhage, an efficient blood supply system can prevent deaths. Unfortunately, in this context, the blood supply system is

inadequate, especially at night; the patient is left unattended for a very long period, as indicated by Dr Ali. He said:

> *"I had near misses with some patients. We had an emergency case in which we had to move the patient from BMSH to UPTH in the middle of the night, and from both hospitals, we were told that we could not get blood. The patient we were treating would have died in the middle of the night, and it was just by the stroke of luck that the patient did not die." (12/06/18, 16.43 PM).*

Family members must donate blood to save their loved ones, and in most cases, doctors providing care are left with no choice to give their blood to save lives. The time taken to liaise with several people, extracting the blood and transfusion could result in deaths. Dr Nat and Dr Ada described their experiences working in hospitals. They said:

> *"In an ideal situation, when a patient is brought in bleeding, what happens immediately, we call the blood bank and blood is made available. Now I have patient bleeding in front of me, and there is no blood. The patient's relative must provide blood in some cases. It takes 2hrs or maybe 3hrs or 4hrs or sometimes it will take them up to 6hrs to get that blood" (Dr Nat 20/07/18, 22.03 PM).*

> *"I go the blood bank, and they say there is no blood for the surgery. Sometimes we doctor or medical students have to volunteer to donate blood" (Dr Ada 16/08/18, 15.08 PM).*

Due to the poorly regulated laboratory services and insufficient laboratory services in the state, much burden is put on the laboratories situated in tertiary institutions. Dr Ali called for expanding services outside of the major hospitals to strengthen the system. He said:

> *"For me, I think there is a problem with the blood transfusion services in the health care sector in Rivers State. Almost all the blood banks are located either in BMH, Teaching hospital or the Military hospital. I think that is a big problem to MH in Rivers state for me, and I believe that there should be a functional blood transfusion services establishment that is operated outside of these three major hospitals, but that can accommodate more than a hundred pints of blood, and it is made available so that private sectors can access blood at the shortest time." (12/06/18, 16.43 PM).*

The time taken to collect blood from medical doctors or family relatives, do screening on the spot before transfusing the patient is an obstacle to any successful outcome. Also, the blood supply in the hospital is dependent on out of pocket payments which means patients need to pay for their supply and blood screening before transfusion. In cases where the patient has no money, the waiting time is further extended. It is an unfortunate situation affecting maternal outcome expressed by Dr Dex:

> *"Getting blood has been a disadvantage in the blood bank. It is a current problem, especially with the demand. It is a big problem, and we are often called in the middle of the night with blood issues. The patient does not have blood, and the hospital does not. You have to call the head of the department of haematology to request for her to release blood, but sometimes the patient comes without any kobo, no money in their pocket to do the screening of blood."* (2/08/18, 20.54 PM)

Apart from the shortcomings of the laboratory services, there is a weak ambulance service in Rivers State. Women are expected to transport themselves to the hospitals during emergencies despite the logistic and transport problems. As a result, many die before they get to the hospital. The Abiye project initiated by the Ondo State Government employed call centres and air ambulances to minimise delays due to lack of transport, which drastically reduced maternal mortality (Love, 2013). Perhaps, the Rivers State Government can take such exemplary initiatives to ensure timely access to the health facility. The statements by these health experts highlight this perception:

> *"There are systems where they have numbers, and women can call in cases of emergency and all that. These are ambulance services, even air ambulances. In this country that is another area government will need to do something about, to provide ambulances. However, when they provide an ambulance, they will tell you that there is no fuel and no money to fuel. There are many problems in this country." (Dr Cal 7 /06/18, 22.40 PM).*

5.3.2.1d Security issues

The insecurity issues were expressed by several of the health experts. It was the reason for poor service, the lack of deployment of midwives and nurses to many communities in the state for fear of being kidnapped. Likewise, patients cannot access healthcare facilities at night for the same reason. Here are statements from two health experts that depicts this problem:

> *"Even here in Port Harcourt, there is still much kidnapping. The security problem needs to be resolved because it targets health personnel and patients. We must tackle the issue of insecurity. It should be drastically reduced so that health workers posted to those areas will stay. It will go a long way; half of the problem will be solved because virtually most of the places are not working because nobody goes there to work" (Dr Jon* 30/5/18, 23.08)

> *"If a woman has a contraction at 11 PM, she can come outside, to take a taxi, to get to the hospital. She is not afraid for her life" (Dr Mya 15/05/18, 16.55 PM).*

Dr Mya indicated that due to the security issues, the transportation system is also problematic at night. It is, therefore, the responsibility of the government to provide a safe means of transport for women to the nearest hospital. Although contact with women through mobile phones is essential to call for support when needed. Also, air and car ambulances will help facilitate support services at night. Nevertheless, as discussed earlier, our support services have a significant problem, which has contributed majorly to MM. Currently, some doctors like Dr Sam recommended building accommodation clinicians or encouraging them to rent apartments close to the hospital as this will ensure timely access when needed, especially during emergencies:

> *"I have also tried to discuss with some of my colleagues. Senior personnel that leave around on the possibility of living closer to where the hospital is so that I will not have any security concerns with inviting them to come anytime I have surgery because right now, as the election is drawing near, security concern is becoming an issue".* (20/07/18, 22.03 PM)

5.3.2.1e Lack of basic amenities and Infrastructure

There is massive rural-urban migration to tertiary hospitals in Port Harcourt. Especially in the event of complications. Also, as discussed in the previous section, mobility and logistics issues hinder access to care which further compounds the issue of migration. Therefore, the provision of basic amenities and infrastructure is necessary for timely intervention in an obstetric emergency as women can go into labour unexpectedly and at odd hours. These include gas supply, water, power, road and transport system. These are necessary to prevent delays in accessing care and efficient hospital running.

Road and Transportation System

There are no doubt accessibility issues in Rivers State, contributing to maternal mortality as women cannot get to the hospital on time due to bad roads. Also, there is a significant defect with the transportation system, including the cost of mobility. Dr Cal asserted that the wrong road contributes to delays in accessing care and more complications for women resulting in MM. He said:

> *"Primary delay is where the patient has decided to come to the hospital but is not able to come over on time because of either unavailable transport or poor roads and all that. For instance, while as a gynaecologist, we have a case of obstructed labour coming from remote villages. Sometimes before they get to the hospital, you find that other complications have set in. You either lose the mother, the baby or both in most cases because of the problem of delay." (Dr Cal 7/06/18, 21.23 PM).*

Power, Water and Gas Supply

However, there are cases where women have accessed care, but they could not get the desired care because of the lack of basic amenities such as power, water or gas. For example, power is vital in using clinical equipment and tools in theatre. However, during medical procedures,

electricity is not always guaranteed. Alarmingly, doctors have resulted in the use of torchlight for surgical operation:

> *"For instance, you want to do a caesarean section. Mostly common in public hospitals if you want to do a caesarean, for instance, and we do not even have light at night. We have used torchlight to do a caesarean section, phone light, not even torchlight. Three people put on the phone light to be able to do an emergency surgery" (Dr Cal 7/06/16, 21.23 PM).)*

There is no provision for petrol or gas to power generators as an alternative source of electricity. The problem is significant and has an unimaginable high patient safety risk. Dr Ada vehemently expressed this frustration. She said:

> *"At the point that you have gotten everything ready and just ready to start and the generator, and the light goes off, and they say there is no diesel. I had to use torch lights to operate in the theatre. From the beginning of surgery to the end. Torchlight from the phone. I have had to use a rechargeable lantern. So, these our organisation are not putting things in place." (16/08/18, 15.08PM).*

Also, fluctuation in electricity has caused several types of equipment to pack up, leaving the hospital with even fewer clinical facilities:

> *"Power is important, and when it keeps fluctuating up and down, there was a time we had MRI, CT Scan and all the rest before we knew it, they all packed up because of the fluctuation of the current or the electricity. So, this a basic problem that can be sorted out" (Dr Joe 31/05/18, 21.54 PM).)*

The lack of electricity is a root cause or one of the primary causes of failures in the system because monitoring equipment is not helpful without electricity to power them. Furthermore, as earlier discussed, monitoring equipment will enable clinicians to detect complications on time, and whereby there is electricity, it is as good as not having any equipment. Hence, tackling electricity is considered more critical than purchasing tools and devices. Dr Jon shared this perception, he said:

"You even have to address power. That is the electricity problem. The CTG [Cadioghraphy machine] and all those things are not available because of no funding. I am not even talking about these because we have not tackled the major problems. The major problem is electricity and all other amenities, but we need to get that sorted out that first before equipment." (30/5/18, 23.08)

Women's perceived quality of care promotes health utilisation (Evans et al., 2013) and the availability of necessary facilities and resources portray the right image of the hospital. In agreement, Dr Mya asserts that women are more likely to utilise healthcare if the place is clean and tidy, there are electricity and gas required to conduct medical operations:

> *"To ensure that the health care delivery facilities are in the position to deliver the services it intends to deliver; that the hospital is clean, there is light, there is water. The skilled personnel are there, ready to work, the equipment for checking blood pressure, checking the patient's weight, and doing everything that we need to do to give adequate antenatal care is available and on the ground. There is water running, and there is electricity, the buildings are beautiful the women want to come there." (1/05/18, 12.21 PM).*

Hence, health utilisation is influenced by the availability of an excellent healthcare facility, proper equipment and tools, and the quality of delivery. The importance of specialised or advanced equipment obstetric emergencies has been discussed in Section 5.3. Also, the hospital buildings cannot shoulder the enormous demand for obstetric services in the state because some buildings are dilapidated and not repaired. There is no infrastructure to manage complicated cases like intensive care for premature babies:

> *"When you come to the tertiary hospital where we are, the UPTH and BMSH, you will discover that so many things have run down. As I was leaving, 2013, 2012, in our antenatal clinic, we can see more than 150, 200, 250 patients. Now we can hardly see even 60, 70 people. That is the way it is now. Services have gone down, so many things have happened in the system". (Dr Ben 20/07/18, 21.03 PM)*

"I am not sure in the teaching hospital, and the other government hospitals have enough resources for the special babies, especially the antenatal intensive care unit. (Dr Rey 1/06/18, 9.47 AM).

Also, essential surgical equipment such as suction machines is unavailable in the theatre, and the condition of the theatre makes it unbearable for doctors to do their job. For example, doctors perform a surgical procedure in a hot environment, which should usually be done in an air conditioner to prevent infection, and there is no equipment to support the medical operations, as explained. Dr Jon said:

"We don't have simple air conditioners in the theatre; you sweat while operating. I had to cancel many cases not too long ago because I sweat a lot while operating. Sometimes even at the operating desk, you see them falling apart. You know, sometimes things as simple as pull-ups we don't have them. These are meant to hold the patient's legs up during the delivery, and that is teaching hospital not to talk about secondary and primary hospitals". (30/5/18, 23.08).

It is evident from the health experts' statements that most healthcare facilities are not equipped to manage complications. The medical procedure was cancelled due to a poor working environment or essential tools. There are instances where the patients were asked to purchase surgical equipment before an operation can be performed, and, in many cases, delays could lead to death in obstetrics care. Dr Ada site a scenario where she had faced several obstacles with getting blood, suction machines to perform surgery and had to involve the patients in purchasing the essentials or post-pone the surgery. She said:

"Some of these facilities are not equipped to manage complications. One of us will go and donate the blood at the blood bank, and after donating the blood, we get to the theatre, and they will tell us there is no suction machine. Maybe a pack of 60 is 2000 naira, and that is if it is a minor surgery, and you tell me it is not available. So I cannot do my surgery. Sometimes we have to write [prescription] for the patient to go and buy" (16/08/18, 15.08 PM).

5.3.2.1f Emergency Medicine, Drugs and Blood Supply

Dr Ada stated that hospitals are not prepared to manage complications in the previous section. Because medical factors such as haemorrhage, sepsis, preeclampsia, ruptured uterus, obstructed labour are responsible for maternal deaths (Say et al., 2014; Machu, 2017, APHRC, 2017), moreover, these conditions are unavoidable in many cases and present themselves unexpectedly (Mackintosh & Sandall, 2016; Faye et al., 2014). Therefore, the availability of emergency medicines and blood supply in our primary health and tertiary institutions is key to tackling complications, such as magnesium sulphate for treating preeclampsia (Tukur et al., 2013), anti-retroviral medicines for preventing mother to child transmission of HIV (Hill, 2012) and misoprostol for abortion or haemorrhage care (Millard et al., 2015). However, several health experts have expressed frustration with the system because of essential obstetrics supplies. There is no blood supply, general anaesthesia for operating. Two health experts stated the following;

> *"Like even ordinary blood, to get blood in the teaching hospital, most of our women die of haemorrhage" (Dr Joe 15/05/18, 22.29 PM).*

> *"You will want to carry out surgery, and the patient requires general anaesthesia, and then you find that there is no anaesthetics in the theatre. Okay? Sometimes there is no oxygen in theatre" (Dr Cal 7/06/18, 21.23 PM)*

It is the role of the government to ensure drug supply at an affordable cost to enable prompt access when required. The lack of availability or commercialisation of MgS04 by the Kano State Government was a significant setback for the treatment of preeclampsia (Tukur et al., 2013). Similarly, in this context, patients are asked to purchase emergency medicines, blood and even surgical material as the valuable time required to save her life is lost:

> *"Emergency drugs are usually not available, and you have to ask the patient to go and buy, but why are we telling them to go and buy. To tell you the truth, I know it is difficult for them. At times they come, and there are no drugs we will have to prescribe for the patients. We know that time is of the essence" (Dr Dex 2/08/18, 20.54 PM)*

5.3.2.1g Health Care Funding

Previous sections have linked the ability to access healthcare to affordability. Patients must pay for services, emergency medicines and surgical equipment before treatment. The finding shows that running to the healthcare system depends on out-of-pocket payment, which is a significant setback for timely intervention and smooth hospital running. Dr Sam depicts a scenario where doctors are unable to proceed with a surgical operation in an emergency until the patient has provided all necessary surgical material:

> *"For instance, if a patient comes as an emergency, the patient will first go and pay for herself. The patient will have to pay for materials for surgery like sutures. The patient will have to provide clinical packs. If the patient cannot provide any of these things, they cannot intervene because the theatre will demand some of them". (20/07/18, 22.03 PM).*

The government has made several efforts to tackle the healthcare funding problems in Nigeria. The National Health Insurance Scheme was initiated to solve the problems of out-of-pocket funding (Onoka et al., 2014). However, unfortunately, the insurance is inaccessible to most low income and indigent members of the community, such as petty traders, farmers and builders. Several health experts stated that only a very insignificant number of people benefit from the current insurance scheme, and an overhaul of the system is required to accommodate more as the scheme is not effective in the state. Two health experts made these comments about the funding issue and the current insurance system:

> *"One of the problems we face, let me say mainly in Rivers State or the UPTH, is the out of pocket payment. It works against us. I know the NHIS, the National Health Insurance Scheme that we have right now. Some people go through that, but less than 5% of the attendees come through those health services. Nevertheless, many of them still pay out of their pockets and with the economy, it is bad, especially in the Niger Delta area" (Dr Dex 2/08/18, 20.54 PM).*

"The insurance, the health insurance scheme that we have, is mainly for the working-class citizens who can afford to pay for themselves. The poor people who should benefit from the scheme are not benefiting from the government rule. So, there is a non-efficient health scheme to be able to assist the people" (Dr Cal 7/06/18, 21.23 PM).

One key informant of the government was asked about the current payment system and how it can be improved. He suggested that an indiscriminate payment system is the main problem as patients were overcharged, advocating for affordable health cost and instalments payments over a period:

"You see some of the health staff, maybe overcharging the patient, and they may not be wealthy. So, by the time you now start overcharging them and charging astronomical, um, fees. I mean, that will dampen the patient's zeal to come to the clinic, and of course, they will not go to the traditional birth attendant that they can easily afford. Or to people that can offer them instalment payment to pay half of the money and pay the balance" (Dr Ian 30/5/18, 23.08 PM)

The economic situation in Nigeria contributes to the high cost of goods and services, including drugs and medical supplies. Notably, in most cases, patients will have to buy their clinical supplies as previously discussed, they are left with a huge medical cost. Spreading the cost into instalment for an indigent patient might not be feasible, especially as some items are needed before treatment is undertaken. Notwithstanding, reducing the cost of goods and services suggested by Dr Ian is viable. In agreement, Dr Jon stated the cost of care should be reviewed, and prices of essential drugs are reduced to enable ordinary citizens to gain access to healthcare;

"The cost of drugs in our pharmacist. We need to do a review before we fix the cost. The cost of drugs and consumables are expensive—for example, a caesarean section in UPTH, an ordinary caesarean section. We have surgery fee #50,000. People spend #50,000- #200,000, which is far too expensive for the ordinary civil servant. The ordinary Nigeria civil servant earns #50,000 a month. The cost of services and consumables are high". (30/5/18, 23.08PM)

The funding issue in Nigeria is highly problematic and have contributed to MM in Rivers State. The government is responsible for implementing policies that will strengthen the insurance system and address the out-of-pocket payments by patients. However, there is a highly bureaucratic funding channel from the top government to the lower level of government, resulting in embezzlement of funds:

> *"So, you find out that generally in Nigeria, I am not talking about other countries. Lack of funds is an issue. It might not be there, but even when it is there, even when it is there, a few persons will embezzle the funds. Therefore, it is important to implement changes related to funds" (Dr Joe 15/05/18, 22.29 PM).*

Understandably this is an external issue, but other concerns about the distribution of resources by hospital management. The State Government has the responsibility to remit funds for the management of hospitals while the management oversees allocated resources to critical areas and departments in the hospital. There appears to be a lack of clarity and accountability of financial resources:

> *"There are challenges quite all right, but the main challenge is the poor funding of the department. There are times we require some things like we have some faulty equipment and tools that need to be fixed and we go to the management of the hospital, but they will say we don't have funds, but often when we complain to the management, they send us some funds". (Dr Dex 2/08/18, 20.54 PM)*

It is evident from these statements that funding is both an internal and external issue, and this research acknowledges internal management priorities. However, the lack of funds is first an external government priority rather than a management problem, but politics plays a vital role in healthcare management.

5.3.2.1h Politics and leadership in Health Care

Politics or political affiliations influence health policy formation, promotion and implementation (Walt & Gilson, 2014). Previous research has indicated that Nigeria lacks the political will to reduce maternal mortality ratios (Gill-Gonzalez et al., 2006; Shiftman, 2007). The lack of political will shows in the weak implementation and sustainability of health policies, poor healthcare accountability or stewardship, lack of human resource development and deployment, inadequate amenities and infrastructure, and effective monitoring of health care practices in Rivers state. This opinion is consistent with several of the health experts:

> *"It is not a question of policy; it is the question of implementation. It is not because we cannot implement, but we do not have the political will to do something. It is not just the lack of policy, but our problem has been implementation. Yes, the problem has always been the problem of implementation, not a problem of policy" (Dr Ben 20/07/18, 21.03 PM)*

In other states in Nigeria, where there were commitments and political will to reduce maternal mortality, such as implementing the Abiye project in Ondo states proved to be very successful in reducing maternal mortality ratios. Dr Joe makes references to this project in his statement as a blueprint to how political ideologies can help shape the MH system:

> *"Ondo State once had a governor called Dr Mimiko, a medical doctor who made a policy to monitor the women as if they were eggs, to the extent there was an ambulance assigned to the project. When women registered for antenatal care, they were given a special number. They call the program Abiye. Yes, it is in Ondo State, and they reduced maternal mortality to almost zero because they had that political will. All these basic issues were prevented, and as I said, it did not cost much. The only thing that cost much is the ambulance and helicopter. So that, no matter wherever you are, the helicopter will come and pick you and drop you at the hospital" (Dr Joe 31/05/18, 21.54 PM).*

However, there is no accountability in the healthcare system in Nigeria. For example, efforts to improve outcomes through Maternal Death Review were hindered by a lack of commitment towards MH projects (Hofman & Mohammed, 2014; Mathai et al., 2015; Bandali et al., 2016). Research participants clearly stated that money allocated to the hospitals could not be

accounted for due to corrupt practices amongst the leaders. As a result, the hospital does not have basic amenities and infrastructures. Essential clinical tools like syringes are not readily available. This concern was depicted by several health experts, as seen below from statements provided by Dr Jon and Dr Cal:

> *"Of course, we need to get the right leadership. We have leaders who are not committed and responsible. People become leaders to enrich themselves and are not fighting for the system. This siphoning of funds is a major problem. A lot of money for hospital gadgets goes into the private pocket. I don't know how they get that; I don't know how they do it. It just does not go to the right channel. It does not go to the hospital. We must address the issue of corruption." (Dr Jon* 30/5/18, 23.08)

> *"3.2 million Naira was budgeted for that National Hospital Abuja for the fiscal year. It was the president's wife that raised an alarm that there were no needles and syringes [pause] in, in that national hospital. The larger part of the money has been siphoned along the line" (Dr Cal 7/06/18, 21.23 PM)*

Furthermore, politics plays a crucial role in the deployment and training of healthcare professionals to meet MH needs in the state, such as the midwives service scheme (MSS), where qualified midwives were deployed to rural areas to ensure skilled birth attendance (Abimbola et al., 2012. However, the sustainability of such a scheme is still dependent on political affiliation, which is continuously changing with the election of a new political leader (Smith, 2014). More so, training and retraining of health care professionals are required to ensure they can tackle complications effectively. According to Dr Jon, funding has not been available to fund training. Notably, the government stopped the regular funding for training medical doctors. He said:

> *"We are trying to improve on training and retraining of staff to improve team performance. It is a problem because the government will not fund you. They will say there is no money which I don't think is true. We sponsor ourselves, acquire the skill and knowledge, and return with all our training. For example, in some specialities, you must organise it, travel aboard, and pay from your pocket." (Dr Jon* 30/5/18, 23.08)

Also, the government is responsible for setting up an independent regulatory body to monitor health care practices in the state. The regulatory bodies are to establish healthcare standards, ensure healthcare providers follow the procedure in the management of hospitals across the state at the different levels of care by doing announced and unannounced checks; revoke licences for inadequate providers that fail to comply with standards as well as support providers through delegated regulatory teams to understand and implement the standard. As stated by a government representative Dr Ian, the Rivers State Government has not fully met its monitoring obligation. He said:

> *"The Rivers State Government is doing its best to ensure that some of these facilities are maintained. Of course, it does not mean that we are there yet. We still have room for improvement. Of course, that is where the people in charge need to come in to ensure that things are working well" (Dr Ian* 30/5/18, 23.08 PM)

The two central healthcare regulatory bodies are the Federal Ministry of Health, responsible for monitoring tertiary or federal institutions and the State Ministry of Health at the state level. Their roles are vital in delivering quality care across the state. Unfortunately, research conducted by Mora et al (2018) revealed that regulatory bodies in Nigeria could better serve their purpose with adequate funding and increased human capacity. The research finding shows that external organisational factors contribute to poor MH outcomes. This section covers internal organisational failures in the system, which ultimately influences hospital management and decision-making issues. However, politics plays a huge role in hospital management since the government appoints hospital directors. Regardless, there is a direct impact of organisational practices, culture and values on patient outcomes**.**

5.3.2.2 Transfer of knowledge

In-house training is highly recommended for new healthcare practitioners such as junior doctors, nurses, midwives to keep abreast of clinical practices. Training enables clinicians to gain confidence during medical procedures with minimum supervision and build human resource capability. Unfortunately, the health experts indicated that clinicians in need of training do not get the required training due to money-making schemes as senior staff put themselves forward for training planned for new or junior staff to gain financial benefits for undertaking training. Dr Joe said:

> *"In my department, I have been there for some time. I requested training and retraining. It is hardly done, and the culture is not there. So, it is a challenge. The second challenge is that even when the hospital organises that training, older staff who has the knowledge reserve, which should nominate younger ones for training will always come and still be training because of maybe the monetary involvement and all the rest". (31/05/18, 21.54 PM).*

Prosser-Snelling (2015) indicated that consultants and general practitioners embark on their careers with little or no further training on completing medical training. Okonofua et al (2017) recommended constant training in obstetrics care to equip healthcare practitioners to manage obstetrics emergencies. Also, learning and development through clinical supervision are mandatory for patient safety and quality improvement (Tomlinson, 2015). However, a lot still must be done to enhance knowledge transfer from experienced clinicians to inexperienced ones in this context. Dr Dex suggested proper management of inexperienced clinicians and taking them through induction training. He said:

> *"It is difficult to work with people, whom you do not regularly work with, people unfamiliar with particular procedures. In our environment, they are welcomed but not trained. Maybe, when they come, we should teach them from your own experience, we should learn how to manage them, do a presentation on what can be done to carry out the job". (2/08/18, 20.54 PM).*

5.3.2.3 Organisational Protocol

The design and implementation of the organisational Protocol in the management of obstetrics complications have improved MH outcomes in other countries, such as the Belize Health Information (BHIS) system, where artificial intelligence was used to provide a protocol or unified approach for dealing with preeclampsia and a decline in mortality seen all through the country (Graven et al., 2012). Similarly, a Safety System Management was used in Dutch hospitals focused on crucial improvement (patient safety) themes such as; early detection of post-surgery wounds, critical illness, medication administration, discharge, transfers and sepsis prevention. In Africa, the inability of the hospital to implement policies, protocols and guidelines contributes to maternal deaths (Madzimbamuto, 2014). In the Rivers State, there is a lack of quality control measures or Protocol for dealing with complicated obstetrics complications in some hospitals in Rivers State as stated by Dr Ali:

> *"There is no structure in dealing with situations effectively, as in complex situations. There is no structure in place, not at all from the tertiary to the primary level; there are no structures in place. That is a simple truth. No protocol for the management of preeclampsia." (12/06/18, 16.43 PM).*

However, several participants indicated a protocol but not often enforced or implemented. Some experts recommended putting up Protocol on the wall for managing preeclampsia to promote its use amongst clinicians, but this is not the case in the participating hospitals, as explained by Dr R and Dr Ian:

> *"Protocol for procedures and standards might be in place in some facilities. They are supposed to be protocols in place, but you will realise that these protocols are not implemented if you go around. They are not at the fingertips of the healthcare provider. Sometimes it does not mean that the provider is not following Protocol. If I am managing a patient people come in with, let us say preeclampsia, I should follow the Protocol, but the Protocol is not hanging on the wall. "(Dr Mya 1/05/18, 12.21 PM)*

"Like in my department, we have a guideline for the management of issues like eclampsia or preeclampsia. These guidelines should be pasted on the walls may be in the labour ward and all that." (Dr Ian 30/5/18, 23.08 PM)

These remarks highlight the need for a standardised approach in hospitals, which needs to be enforced by an external regulatory body. Management oversight is needed to ensure all clinicians are working on set guidelines.

5.3.2.4 Management Priorities

The decision and actions taken by the management are indicative of its priorities. So, internal failures in the system could be linked to management prioritises. Cowper (2015) stated that Patient safety should be the first management priority. Arguably, the well-being of the staff should precede patient safety because the staff must be well to deliver quality care. This is a health care dilemma, and every organisation must take a stand to know where to draw the line for the sake of humanity. However, during industrial strike actions, the safety-first approach is challenged.

5.3.2.4a Industrial Strike Action

Industrial strike action is one of such instances where management is required to prioritise patient safety over trade union instructions. There have been cases where clinicians abandon patients to die because they require changes in the healthcare system, such as better working conditions or increased payments. Dr Rey shared a case of a pregnant woman who was left unattended due to industrial action:

"A pregnant woman, how she was abandoned in the hospital till morning by the health care provider because of industrial action and strike action. Thank God for one of our colleagues that helped her and delivered her baby". (30/05/18, 9.41 AM)

However, several health experts believe that industrial actions are conducted in good faith to prevent deaths due to poor infrastructure, lack of human resources and resources because the main reason for the strike is to bring attention to these issues. For example, Dr Ada insinuated that a strike would force women to seek care in private practice. She said:

> *"If there is not enough manpower, eventually people will go on strike. This same strike is another contributor to maternal mortality, but rather than watch people die, and they can go to private places and live". (16/08/18, 15.08PM).*

Statement from Dr Ada might seem logical, but in cases of emergency, time is of the essence, and patients could be put in a life-threatening situation; patients that have registered for antenatal care and their medical conditions and history is being monitored closely by their preferred doctors, will have to seek care elsewhere. This situation is particularly disadvantageous to women in their late trimesters. A study conducted by Oleribe et al (2018) indicates that strike action increases mortality and morbidity, including the loss of confidence in the healthcare system. Also, the cost of healthcare increases during hospital strikes (Aturaka et al., 2018) and considering that most low-income patients rely on tertiary or government hospitals as to the private hospital, there could be financial challenges and logistics issues. Therefore, the decision to go on strike should not be taken lightly, healthcare must first explore all other interventions or solutions, and the government must engage with healthcare providers on matters of concern abruptly to avoid disruption to MH services.

5.3.2.4b Resource Allocation

The government plays a vital role in the funding of healthcare. Likewise, the management has the responsibility to allocate resources appropriately in the hospital when given a budget by the government. Resource allocation or what the money is spent on reflects the management prioritises, whether focused on patient safety and outcomes or superficial things. For example,

spending money on decorating the hospital rather than purchasing investigatory clinical tools and equipment as indicated by Dr Joe:

> *"There is also a problem which is not prioritising things well. You go to the ward, and most machines do not apply to what we practice. The equipment in some hospitals was bought years ago, a long time ago by the hospital management and are not modern. So, they don't prioritise things very well at times." (15/05/18, 22.29 PM).*

Also, clinical tools and equipment are regularly checked and well maintained to prolong its capacity instead of the misuse or mishandling of equipment until ultimately damaged and spending more money to acquire another. Dr Joe said:

> *"So, poor maintenance culture it is a big hell—poor maintenance and everything is just used until it collapses. When you call for things, they will say, it is no longer available meanwhile because it was not maintained that is why it has packed up." (15/05/18, 22.29 PM).*

5.3.2.4c Staffing Issues

Part of the duty of the management is to ensure a balance in patient-staff ratios, that the staff employed have the capacity of delivering quality care to meet the organisational goals such as the reduction of maternal mortality. The research participants have highlighted several staffing issues in the health care system. There has been an account of retired doctors still in health institutions for financial benefits:

> *"You find in our public health system that we have a lot of redundant people, OLD doctors and professors who are neither retired nor offering service. They are taking salaries but not making any input. They come to work occasionally. They are big people, and nobody can talk to them. They are managers, and they are at the highest level of the profession." (Dr Cal 7/06/18, 22.40 PM).*

The management priority is to remove irrelevant workers from the system, such as retired doctors who no longer contribute to the system. Also, to employ new doctors and train them to

ensure that there are enough skilled doctors and consultants in OBYGN medicine to address obstetrics complications. Logistics issues managed to avoid delays in attending to patients by ensuring that doctors employed are near the hospital or can commit to prompt attendance when needed—especially considering security and weak transportation system in the system. Also, to make provision in advance to get support from external sources when needed by liaising with appropriate health care personnel. Including good working hours' schedules to manage health care procedures and emergencies, especially at night, as inadequate hours' intervention is a significant contributor to maternal and child mortality in Nigeria (Okeke & Chari, 2018). Dr Sam discussed how he manages staffing issues in his practice:

> *"I also have a doctor who works with me, and she works in the morning. She is not available at night. If I need something, I call technical manpower from outside, but in the day, she is available to assist me when there is an emergency during the working hours" ((20/07/18, 22.03 PM)*

The management is responsible for creating a conducive working atmosphere and working relationships, resolving conflicts between health care staff equitably, and managing staff behaviour to foster positive MH outcomes. In this context, there is constant strife between different cadres of staff in hospitals:

> *"But the problem we have right now in Nigeria is the friction between different categories of health staff which affects patient care, whether directly or indirectly, and it is not good, especially with the doctors and the nurses fighting among themselves. That is why we have much industrial action. People are going on strike here or there. Even when the strike is called off, the cloud all over the environment is not so friendly. Despite the friction, we are there to work for the patients, but the working environment must be conducive for the patient and not for our different business". (Dr Dex 2/08/18, 20.54 PM)*

There is a lack of understanding and clarity of the organisational structure or authority, job descriptions and individual roles of different health care professionals resulting in conflicts among staff:

"So, we have problems with our organisational structure in the health sector. Especially in the public health sector because nobody wants to report to anybody. A few years ago, I discovered that nurses and other health workers started calling themselves consultants, just as a doctor has consultants. You have a consultant nurse who will refuse to carry out the instruction of the consultant doctor. A consultant nurse who changes alters the decision of the consultant physician or a consultant surgeon because they are all on the same level, and they are all consultants. You can see the trouble, the problem that we have in our hands" (Dr Cal 7/06/18, 21.23 PM).

This also shows there is no shared organisational goals and vision within the organisation for achieving MH outcomes in Rivers State, as clearly stated by Dr Ali:

"They do not have common goals and values and visions that you work towards, not at all." (12/06/18, 16.43 PM)

Because there are no collective objectives to achieve organisational goals, healthcare workers are often unmotivated to perform their duties. Consequently, clinicians require constant reminders or push from managers to do their jobs which is unsustainable in the long run. As indicted Dr Mya, the managers will become overwhelmed:

"For now, the system depends on someone to push it, someone ensuring that things are working. The person will soon go out of breath very soon and get tired and stop. So, we have champions who are pushing things to work for now. What we need is a system that works irrespective of who is there." (15/05/18, 16.55PM).

More so, there are no disciplinary actions for poor practices or behaviour. As a result, a lot of inappropriate actions are condoned, thereby making it an acceptable behaviour within the institution:

"So, people can (...), because people think they can do anything, without anything been done about it. No punishment is attached to it, so other people follow suit" (Dr Ali 12/06/18, 17.11 PM).

There is also a 'God Father system' where some clinicians feel beyond reproach because of their political or social class or affiliations with the top management or directors. This group

of people get unmerited favour and promotion at the expense of hard-working colleagues. Thereby causing disharmony and a very hostile environment; the survival of the fittest working situation:

> *"When you have a system that is not based on merit but based on godfathers or godmothers, which creates a wrong environment. It is a Nigerian situation, and it creates the wrong environment" (Dr Ben 20/07/18, 21.03 PM)*

Management priorities should be directed towards ensuring quality MH delivery by recruiting the right person rather than those recommended by political figures or Godfathers of the state. Dr Cal and Dr Ben explained the failing employment procedures in the health care system where the Godfather references are more important than the information on the CV.

> *"So, what they ask during the interview is, who sent you? Not what is your qualification, what are your abilities, where is your CV? They don't ask about your CV, and they ask who sent you, whom do you know? So that is the problem, and it is happening in our health system. It is terrible". (Dr Cal 7/06/18, 21.23 PM).*

> *"People applied for a job, and they pass through a written test and oral test. However, the best people from those tests are not taken. Other people are taken based on other considerations. When you do that in terms of recruitment of human resources, you are already killing the system. You have introduced the wrong attitude, a virus that will affect the system no matter what you do. Because the system is not based on merit, that is the foundation. (Dr Ben 20/07/18, 21.03 PM)*

Coupled with all the management issues discussed, such as staffing issues, inadequate allocation, industrial strike actions that have besieged the healthcare system, there is also inadequate internal monitoring and audit to improve and inform future practices. Apart from the external regulatory bodies, the hospitals are responsible for auditing healthcare practices to ensure patient safety measures are implemented. Dr R highlighted the irregularities in the auditory process and inability for staff to access the report:

> *"Now, in the department themselves, we do not have any audits. An internal audit is where we get to a solution. I do it in my facility, but they don't do it in other facilities. Also, we didn't get any report when we asked if we could see the report for an audit*

done in the last few years. That is why it should be published to build health management and help maternal mortality reduction." (15/05/18, 16.55PM).

The management priorities for enhancing healthcare quality are misplaced in these settings. If the organisational goal is to achieve a high-performance organisation, its priorities will be align with its goals.

5.3.2.5 Organisational Culture

A culture is a collective approach or way of behaviour in an organisation. The organisation culture influences healthcare performance, patient satisfaction, and quality of healthcare delivery, as demonstrated by Armstrong et al (2018). An organisation's culture is seen in its communication system, decentralised or centralised, incident reporting system or documentation, how information is shared, appraisal system, recruitment, healthcare environment, leadership, and the patient safety culture (Armstrong et al., 2019). In terms of communication, there appears to be a good flow of communication amongst senior consultants, as explained by Dr Dex, but there is some financial setback as consultants do not have official mobile or ICT devices to enable patient-doctor communications or amongst clinicians. Verbal communication is often used depending on the availability of doctors, which can delay interventions:

"Well, there is a good flow of communication among the consultants, but it is usually done through direct means, direct verbal communication within the system. At times, the problem is that you use your phone and your own money to make your calls, and you have not given any communication equipment to call" (Dr Dex 2/08/18, 20.54 PM).

Also, bottom-top communication is still a significant problem in healthcare systems in Nigeria which can affect the implementation of a clinical project or medical procedures. Dr Rey stated that regardless of how good a plan is, communicating the idea to other colleagues will lead to better successful outcomes. He said:

"There is a communication gap, especially with respect to the implementation of projects, maybe I have these projects in the hospital, even in the organisation I run, but sometimes there is still a communication gap. As a leader of the organisation, even if you have a fantastic plan, we should try to pass that information down the cadre" (Dr Rey 30/05/18, 9.41 AM)

The leaders instigate the form of communication adopted by an organisation, whether decentralised or bureaucratic. The leaders are the primary driver of any high performing or achieving organisation. Moonen (2019) observed variations in hospitals performance and its correlation with cultural values, leadership style and innovation. The cultural norms in the Rivers State are not such that is open to innovative healthcare practices to improve the quality MH as indicated by Dr Ali:

"Another major issue is that people are not readily open to changes and when you deal with people who have that kind of rigid tendencies, believing that it can only be like this, that it cannot be changed from one particular approach, you will need to have them removed from the system." (12/06/18, 16.43 PM).

5.3.2.5a Patient Safety Culture

The crucial role of a leader or a healthcare manager is to prevent the occurrence of mishaps, which can be achieved by reorienting staff through targeted training and retraining to keep abreast with new practices to tackle obstetrics complications effectively. Unfortunately, Dr Ali indicated that staff are not well trained in specialised care:

"One of the major problems with us is the fact that we are not people who are privy to training and retraining of people. We should have a policy of training and retraining, and training and retraining people in the organisation to be able to deliver on what we want effectively" (12/06/18, 17.11 PM).

Also, there has been much concern about staff disposition while on duty, especially in obstetrics emergencies. Dr Joe described a scenario where clinicians have shown a nonchalant attitude toward patients compared to what he had experienced in developed countries. He said:

> *"You will notice in the hospital where I work; you see nurses walking around, they work around as if nothing is happening. They walk around lackadaisically like they are in the beer parlour. Unlike what we see in the western world, when healthcare workers work around the hospital, they walk urgently. I mean they pay attention to the patients". (Dr Joe 15/05/18, 22.29 PM).*

Similarly, the nonchalant attitude of clinicians leads to absenteeism in some facilities. Dr Ada reported that clinicians on duty were not present at the hospitals, and considering the unpredictability of obstetrics care as women could go into labour, absenteeism could lead to a very severe consequence. She said:

> *"Then of recent, I noticed that even those places where you have facilities for antenatal care, the workers don't go to work. So sometimes I ask myself, what if there is an emergency. If the woman is in labour, will she be able to wait for you to come from wherever you are coming from to attend to her? Moreover, nobody is making an effort to go to those places to checkmate them, mentor them, and make sure that they are coming to work. Nobody is even doing anything about it" (Dr Ada 16/08/18, 15.08 PM)*

The patients are subjected to insults from clinicians as young adolescent girls are ashamed and fear being abused for assessing sexual and reproductive health care services (Jonas et al., 2017). Research shows that adolescent girls are less likely to utilise healthcare (Olorunsaiye et al., 2018), and they go to traditional homes for fear of being abused. Dr Ada also highlighted this concern, she said:

> *"Then, you have the attitude of healthcare workers. Some say I don't want to go there, those nurses will insult me, and I don't want anybody to insult me. So, let me go to the local traditional home that I can afford. So, these are organisational challenges, and these things are happening daily, in broad daylight. Everybody is seeing, and nobody is saying anything about it" (Dr Ada 16/08/18, 15.08 PM).*

It is apparent based on the above comments that there is a lack of management control over activities of the clinicians, which has contributed to the lack of preparedness by the hospital to address obstetric emergencies:

"Today, for example, let me just give you an example, we had a case, and a very senior colleague was to handle it, but we wasted a lot of time because he was not available" (Dr Ben 20/07/18, 21.03 PM)

These issues have deterred women from utilising and contributed to the high rate of MM in Rivers State.

5.3.2.5b Incidences reporting and management

Several studies indicate that the most effective way to manage incidence in healthcare is to have a no-blame culture (Kirwan et al., 2013). However, the Maternal Death Review process implemented in hospitals in Nigeria was hindered by the blame culture (Hofman & Mohammed, 2014). Likewise, incident reporting is incomplete for fear of being punished (Carson-Stevens et al., 2016). The no-blame culture focuses on who or why the incidence occurred (punitive) and what can be done to prevent reoccurrence (preventive measures). Dr Ali stated that there is a blame culture in the healthcare system, and the organisation misses the opportunity to learn about the incidence. He said:

"When issues are raised, maybe there is no need to talk about the involved individual. It will be better not to mention the individual but address the issue, not the doctor. Yes, without victimising the people involved. To develop an operational system that will cut across everybody and not deal with the people involved" (Dr Ali 12/06/18, 16.43 PM).

The health experts also revealed two fundamental issues; one, the incidences are underreported, and secondly, they are seen as the will of God. So, instead of carrying out a further investigation when an individual die, they are buried without full knowledge of the causes of death. This culture will prevent learning and appropriate mitigation of patient safety risks:

"Our health incidences are largely unreported. Yes, they are unreported, especially in the North, where there is this belief that whatever happened, it is the will of God, and it is in the will of Allah. So, many things go wrong, and nobody wants to know what happened because we are very religious in this part of the world. So, they do not

research, they just carry the corpse and go and bury it, and that is the end of it. So that is a lot what happens in the country" (Dr Cal 7/06/18, 21.23 PM).

Furthermore, every organisation should have a standardised incident report method that includes all relevant information and facts on the incidence, and the leader in the health settings have the responsibility for creating a culture that supports incident reporting. Based on research conducted by Espin et al (2019), team building, valuing all health practitioners in the team and setting a standard for incidence classification will encourage reporting and consistency in the reporting of near misses and adverse events geared towards problem-solving. Also, where there is a simple format for reporting incidence, staff are more likely to complete one, especially where there is a no-blame culture. As stated by Dr Dex, there is no precise format for reporting incidences in the hospital in Rivers State and incidences reported by staff as they deem fit majorly during call hours' handovers. However, casual discussions or verbal feedbacks should not take the place of a full report:

"I don't think there is any particular format for incident reporting, and there is no particular format. What the HOD ask me to do is to present the case in each department. We must be aware of any maternal deaths. Issues are discussed, but mainly during calls and handovers, and all maternal issues have to be reported." (Dr Dex 2/08/18, 20.54 PM).

If incidences are not documented or reported correctly, it hinders future research and studies in healthcare. The organisation promotes a healthy working environment where people can report and learn from incidences (Levisohn, 2012). Arguably, Trbovich & Vincent (2018) assert that incident reports do not necessarily represent the entire adverse event, and a different report across other departments will capture a different picture of the incidence. Therefore, combining various sources of information about a patient creates a better picture of patient safety. However, this can only be achievable with an integrated healthcare system with a high-level inter-department collaboration.

5.3.2.5c Information sharing and Record-keeping

The importance of record-keeping in healthcare cannot be overemphasised. Recording enables quick access and review of patient cases for research purposes and effective patient management between departments, consultants and institutions. At present, the healthcare system in Nigeria has not advanced its information technology capabilities, and manual paper recording is still in use which makes it challenging to retrieve patient information:

> *"If you take their registration numbers and search, search for the records before you retrieve the records from the store, and you will not have up to fifty per cent of them. Even when you see them, it is incomplete data because things are not done well to enter records and safeguard them correctly. We still rely on manual records that are a huge issue and hinder research." (Dr Jon 30/5/18, 23.08).*

Documents are not accessible; paper documents are often incomplete or missing. Doctors have to recall vital information from memory after undertaking a medical procedure and provide a handwritten account where most of this information can be generated electronically as obtainable in advanced settings. In most cases, the authenticity and reliability of healthcare documents are not guaranteed because basic facts might be omitted:

> *"I think we should document things in the folder into the electronic system. It is most effective when the person is there, face to face with the patient. Otherwise, some of the information in the system will be wrong. That is why most of the information generated from third-world countries is all estimates" (Dr Ben 20/07/18, 21.03 PM).*

Also, healthcare professionals cannot access test results from a centralised system for quick patient management. Apart from the delay with the medical laboratory department, doctors are still required to collect test results in person. As stated by Dr Ben:

> *"We have many issues. We have the medical, the nurses, the paramedical, you know. We should use information technology. You have a system where you collect the blood sample; you book patients or relatives to come and carry it; you go and drop it in the lab; you check whether the result is ready. Can't we have a system to access things*

electronically in the different units to access the result easily? So, these are some of the things that are lacking in our system." (20/07/18, 21.03PM).

Based on research, it is evident that Nigeria's healthcare providers cannot integrate and coordinate care to meet all aspects of maternal needs required to improve quality (Izugbara & Wekesah, 2018). Information technology can be used for inter-department information sharing and integrated health care delivery across specialist units, primary and secondary health care services. Porter & Lee's (2013) value-based Integrated Practice Unit recommends the ICT for the effective running of the healthcare system across different departments and institutions. Although several ICT platforms such as the Abiye Project, Mobile Community Based Surveillance and the Use of OpenMRS for management of patients have been employed in Nigeria, Obasola (2015) suggested that such tool should incorporate an integrated approach for the continuum of care.

5.3.2.5d Appraisal and Reward System

An organisation's culture in terms of its leadership styles influences staff appraisal and reward system. The transformational leadership style is synonymous with staff motivation and implementation success (Farahnak et al., 2019), while the transactional leadership focuses on staff performance and appraisal (Fletcher et al., 2018). Ideally, both forms of leadership should be utilised within an organisation. Master et al (2018) showed the balancing effect of resident-teacher interactions with a moderate transactional effect in hospitals for improving performance. Armstrong et al (2018) diagnosis of the organisational culture highlights the importance of staff motivation and reward for good ideas promoting the development of new health care innovations. In order words, when people are appreciated, they want to give their best. Dr Dex said this is not the case in the health system in Rivers State:

"Staff motivation is very poor that is the first thing, and then the working environment is not conducive for both the staff and the patients because they are not encouraged to

put in their best. People are under-appreciated. Some people are working hard and not appreciated, and some are not working and still get paid as those that are working hard." (2/08/18, 20.54 PM).

It is evident from feedback from the health experts that the healthcare system in River state is neither transactional nor transformational but more inclined to an autocratic and bureaucratic system of leadership, often not focused on building a visionary team dedicated to improving MH outcomes. As a result, there is a lack of staff motivation and no appraisals for performance:

"In this place, nobody resigns for non-performance. Even if you shout, nothing is done in most cases about it? Most times we think in terms of person, not in terms of the system because sometimes it depends on who is involved and one is very careful what we say and what you don't say" (Dr Ben 20/07/18, 21.03 PM).

Consequently, where there is no staff appraisal, clinical staff are unaware of their strengths, weaknesses and areas for further development. So, they are unable to engage with internal or external training opportunities. The lack of a helpful appraisal and reward system has negatively impacted the health care workforce and contributed significantly to human behaviour factors influencing MH outcomes discussed in the next section.

5.3.3 Human Behaviour Factors Contributing to MM in Rivers State

The human behaviour factors contributing to MH outcome is classified into four groups; External Human Factors, Knowledge-Based Behaviour, Rule-Based Behaviour and Skilled-Based Behaviour.

5.3.3.1 External Human Factors

These are external factors beyond the control of the investigation organisations, which includes other departments outside the MH services and institutions such as; private facilities, primary healthcare centres, medical laboratory services, x-ray departments, and any other institutions dealing with maternal services as the behaviour personnel at these organisations influence MH outcomes. It includes the inefficiency of the laboratory services in Nigeria and the shortage of blood supply. The problem with the system is not only due to the unavailability of products but issues relating to the poor attitude of staff rendering these services. There is a lack of preparedness to tackle emergencies, resulting in delays and maternal deaths. Dr Rey gives an account of his experience dealing with the blood bank while trying to save a bleeding patient, which resulted in death because the response to the emergency was inadequate. He said:

> *"One night, I lost a patient at about 12 midnights. I had blood in the blood bank, but when an un-booked woman came into the hospital about 11 PM, she was bleeding. I dashed down to the blood bank, and I had blood but the delay, delay in the blood bank. That 45minutes killed that woman. I wept that day as they gave me the blood, and I had a call two minutes before I wanted to leave with the blood that the woman was late. I felt terrible because the response to the emergency was very poor; not just the doctors but the lab scientist" (Dr Rey 1/06/18, 9.47 AM).*

Similarly, it was revealed by the health experts that the behaviour of clinicians performing pathological tests contributes to lengthy waiting times and diagnosis necessary to commence treatments. Primarily, when chronic conditions are suspected, doctors rely on pathological reports to decide on patient care. In a picture depicted by Dr Cal, the pathologist showed lackadaisical behaviour at work and delays in producing test results on time:

> *"You have the public lab where we collect the sample, and you have an old man just put those samples in the fridge and then go to sleep. The result is being awaited to make input in the patient management, and then several days and several weeks these cases*

are not attended to, and this is an emergency issue. Someone is sleeping and snoring at work." (7/06/18, 9.23 PM).

However, laboratory services are not accessible in Nigeria as patients must pay for services, including other costs of care that could be challenging for low-income families, as discussed earlier. The payment system needs to be addressed as it influences all aspects of the MH delivery system (Ekpenyong et al., 2019). Notwithstanding, effective collaboration between the laboratory department, other external services with the OBGYN department is paramount to improving MH outcomes, and this is consistent with the integrated practice unit recommended by Porter & Lee (2013). Also, an integrated system will enhance the referral system between primary, secondary, and tertiary institutions. Likewise, strengthen inter-department referrals, transfers for patients with co-occurring systems and private-public care collaborations. For example, when a pregnant woman is dealing with a heart condition requiring specialist support, an efficient referral will enable proper care across departments.

Unfortunately, the referral system in Rivers State is below the expected standard. The health experts claimed that general practitioners in some cases have failed to refer patients to a specialist as they take on roles outside their area of specialisation:

"There is inefficiency with the referral system from the primary to the secondary and the tertiary health care. I think a lot can be done to get the referral system to become more effective and efficient. I do not think patients are always properly managed. There are chronic illnesses that some general practitioners would rather not refer to people who are specialised in the area. So, there is poor referral within the health sector, and people sometimes go beyond their limit" (Dr Ali 12/06/18, 16.43 PM).

Consequently, further complications set in due to the lack of proper care contributing to deaths which are very common in poorly regulated private practices as women are often brought in from private facilities to the tertiary institutions when their situation has become critical:

"You can't believe that some private hospitals mismanage the patients. I don't mean all of them but some of them. There are good ones, but some mismanage patients, and nobody wants patients to die in their facility. So, they send them off to the teaching hospital or specialist hospital" (Dr Nat 20/07/18, 22.03 PM)

The problem is further compounded where these private facilities cannot provide complete patient history or treatment information to doctors in tertiary hospitals where the patient has been transferred. Dr Ben indicated that efforts to get clarifications were successful during transfers:

"Recently, for example, people have been presented to the teaching hospital. I look at the case and try to call the private hospital from here to get clarifications about the patient. When you get to the private hospital, the person who is there is a medical doctor, and he is not well trained." (20/07/18, 21.03 PM)

Delays in referral have also been associated with the inability of doctors to identify complications on time. It was recommended that clinicians should be trained in risk management to identify risk, prioritise more severe cases and make prompt referrals to higher care facilities:

"A lot of these women come down with all sorts of issues ranging from the ruptured uterus to obstructed labour. They don't know the timeline when to refer to a higher centre, and some of them come down right with maternal death. Also, the healthcare practitioner skilled in healthcare delivery should be tutored to know that if I have a woman with a ruptured uterus and maybe just in early labour. I need to sort out the one with ruptured uterus either by referring to the higher centre where the person can get better care." (Dr Ali 12/06/18, 16.43 PM).

However, it is essential to emphasise the significance of early antenatal care attendance in patient management. As many women present late, during their third trimester or labour, this could affect the referral of that patient. The more serious issues are the referral of patients from rural areas, traditional and spiritual homes to tertiary hospitals. Unskilled birth attendants are

problematic in this context, as many of these practices are not regulated, and most complication comes from such poor practices. Dr Ben described a case of a woman brought in from a rural area but died during the referral process because the tertiary institutions were not prepared to manage the patient transfer.

> *"Somebody delivers in a private hospital, maternity home, or traditional birth attendant. When they run into problems, that is when they start referring them from those places to the teaching hospital. Some years ago, we had a case of somebody that delivered somewhere in Bori and had an obstetric haemorrhage. We referred the person from Bori to BMH, they said there was no space, we carried the person to the military hospital, they said there is no space from a military hospital, by the time we got to the teaching hospital, the woman was dead as we came down to check her in the car that brought her. So, if things are working, that is a needless death" (Dr Ben 20/07/18, 21.03 PM).*

5.3.3.2 Human Knowledge-Based Behaviour

The knowledge-based failures are the inability of healthcare practitioners to apply their knowledge to perform the required task. In terms of the technical know-how required to perform their jobs, the health experts believe that the healthcare practitioners have the required skills to perform their jobs in most cases, but the problem is that the institutions are not keeping abreast with innovative practices to optimise services:

> *"I think that some healthcare providers, patient management practices are outdated. So, their approach to management is probably still at the basic level, and they are not up to date. Therefore, patient outcome is not optimal" (Dr Ali 12/06/18, 16.43 PM).*

While it was acknowledged that training and retraining of clinicians would improve knowledge, there have been instances where the trainers are unable to train because there is no functioning equipment in hospitals, and this is a significant setback to performing simple procedures like laparoscopy and hysteroscopy:

> *"The people have the capacity, intellectual capacity. I will give you an example, and you get a resource person to come and teach laparoscopy. Let me give an example*

laparoscopy, hysteroscopy, all those simple procedures and things like that. The hospital does not have a functioning hysteroscope. It is not a problem of knowledge is the problem of training and retraining and things being available to be used" (Dr Ben 20/07/18, 21.03 PM).

5.3.3.3 Rule-Based Behaviour

The rule-based human behaviour failures are problems relating to qualification, coordination, verification, intervention and monitoring failures in the system:

5.3.3.3a Qualifications Related Failures:

The rule-based human failures result from the lack of competence of clinicians; that the task performed by healthcare practitioners fits the training, they have undertaken or job specification. Challenges in the recruitment system and their impact on the healthcare system was discussed in Section 5.3.2.4**.** The lack of merit-based qualifications has contributed to qualification-related failures in the healthcare system. As a result, some health care practitioners, such as the nurses, midwives, laboratory scientists and even doctors, extend their roles without the approval of appropriate authorities and the required training to carry out such functions, as evident from the comment from Dr Cal:

"Here, you will find a patient will go to the lab scientist for instance for consultation, that scientist will not be humble enough to say no, this is not my duty, you need to see a doctor. A lab scientist will consult and prescribe for the patient. So, you will find that even pharmacists in Nigeria carry out medical procedures. Also, you find a surgeon, a general surgeon or an orthopaedic surgeon doing a caesarean section for a patient. (7/06/18, 21.23 PM).

Complications are common in obstetrics care, and health practitioners must manage complex chronic cases such as cancer, heart conditions, diabetes in pregnancies, and direct obstetrics cases such as preeclampsia, sepsis, obstructed labour, and many others. It is a fact that medical factors contribute significantly to maternal mortality (Fubara et al., 2007; John & Uzoigwe,

2004; Ugal et al., 2012), and although these are unavoidable in many cases, the competence of healthcare practitioners in tackling these cases can prevent deaths. Unfortunately, even though women are utilising care facilities, some healthcare practitioners do not possess the skills or qualifications to manage complications, as reflected in a statement by Dr Ali:

> *"Sometimes, people go beyond their limit. The patient is regularly attending, but they are poorly managed because of the lack of competence; they don't know what they are managing (12/0618, 5.11 PM).*

In which case, the management is responsible for acquiring competent clinicians or developing the skills of their employees through strategic human resource management. Also, put in place monitoring and supervision to ensure clinicians are working within their job description or specialisation.

5.3.3.3b Coordination Related Failures

These are failures relating to poor task coordination between inter-professional healthcare teams. The World Health Organisation (2010) recommends strengthening inter-professional teamwork through educational training as a tool for enhancing patient safety. Team collaboration enhances an integrated patient-centred care plan (Costanza et al., 2014). Adequate team planning is required for task coordination in any successful interdisciplinary team as obtainable in MH. All individuals in a multidisciplinary team such as the nurses, midwives, doctors, paediatrician, medical consultant, pathologist, pharmacist, healthcare manager must understand their role in managing patients; the number of staff required for a given medical procedure, that the theatre, equipment and clinical tools are sanitised, and all resources are made available on time for the procedure. Therefore, effective communication is necessary for task coordination among team members. In this context, there is a lack of communication among the healthcare team. Dr Rey said:

"When people don't have a good interpersonal relationship, we can't attend to our patient care effectively. There is a gap in communication, and complications in pregnancy will not be adequately managed, and this will lead to maternal and perinatal deaths." (1/06/18, 9.47AM).

Also, improper communication among doctors and senior consultants is revealed as some senior colleagues did not attend a pre-booked operation without informing the team on time or doctors forgetting a scheduled operation. Several appointments have been rescheduled, and patients are left to suffer the consequences. Dr Ben highlighted this issue:

"Today, for example, we had a case and a very senior colleague was booked to do the surgery but wasted much time, and this was not done as planned, and we just had to smuggle the person to another team. Also, we had an elective caesarean section booked. For example, we have two (2) abdominal myomectomies, (1) total abdominal hysterectomy for symptomatic fibroid. You expect that, as you have submitted that list, all the other people involved in the execution of the procedure should be ready by tomorrow. You don't want to get to the theatre and look for things. However, in many cases, you come to the theatre in the morning, you are forced to postpone the surgery. In the end, nothing is done, and the patient suffers." (20/07/18, 21.03 PM)

The dysfunctionality among team members in hospitals in Rivers State is alarming. The nurses are not working in collaboration with doctors and consultants. There is conflict about what job should be performed by the nurse and doctors, which highlights the weakness in the organisational structure. Nurses are in a constant power struggle with the doctors and refusing to carry out their instructions. This issue was explained by several of the research participants:

"If you ask the nurses to call a patient for you or where are the patients? They will say I am not supposed to call patients, call the patient yourself. Many times, I have had to go do things because they don't want what to do them" (Dr Dex 2/08/18, 20.54 PM)

"Okay, when a patient comes as an emergency, it is the nurses' responsibility to go and pick the patient up and wheel the patient up. The patient belongs to the nurse when the patient is down. Once they are brought up and handed over to the doctors, the patient

now belongs to the doctors, and the nurses will sit and watch. They show no support". (Dr Sam 20/07/18, 22.03 PM)

Also, the facilities are not prepared and ready for medical procedures. It can be argued that the government has failed to provide these basic amenities and resources. However, proper task coordination and planning will enable the team to ensure that things are available before scheduling an operation. These are feedback from two health experts which depicts a case of poor coordination and planning in the hospital:

"I tried to use the theatre before, and they said there is no sterile gown I am looking and this woman will die of haemorrhage, faster than she will die of sepsis and this is a tertiary institution, the largest tertiary institution in Rivers State. These things need to be made readily available in a tertiary institution, and somebody is there as the hospital's head. They don't know that these things are increasing maternal mortality" (Dr Ada 16/08/18, 15.08 PM)

"For example, you have a situation, you have an emergency caesarean section, you are ready as a doctor and your team everything is ready. There is no gauze, no suture material, and the theatre is not ready. So, who is to be blamed? the management or who?" (Dr Jon 30/5/18, 23.08).

Similarly, poor coordination and planning can impact the clinicians' ability to intervene in obstetric emergencies. Again, management oversight is required to monitor the activities of clinicians. Also, ICT infrastructure in healthcare can help coordinate clinical activities, but in this case, manual records and verbal communication amongst clinicians is still the norm in these hospitals, as already discussed.

5.3.3.3c Intervention Related Failures

In obstetrics care, medical interventions are required to tackle direct complications such as obstructed labour, shoulder dystocia, sepsis, haemorrhage, unsafe abortions and ruptured

uterus. Interventions, in some cases, will require conducting an emergency or elective caesarean section, and timely response is necessary for a successful outcome. However, research has shown that hours' complications often result in maternal mortality or morbidity as the health institutions are not prepared at those times to address obstetrics emergencies (Okonofua et al., 2017). Dr Rey described how he managed a complicated abortion case at night that was successful because members of his team responded promptly:

> *"And the response is not just the doctors alone but all the healthcare workers. We should respond promptly to obstetric emergencies. One of those emergencies we had one of the nights. We had a patient that had an unsafe abortion, but she went to a quack, and she had her uterus perforated, and her intestine was dangling at the emergency. We had to usher her to the theatre at about 1 AM. The surgery lasted for about three hours and 30 minutes; she came out alive." (1/06/16, 9.47AM).*

The attitude of clinicians, including punctuality concerns, influences the outcome of a possible intervention. The health experts revealed devastating outcomes which lead to maternal death because a staff arrived late and even worse, during handover as women are left unattended:

> *"Sometimes the emergency staff starts at 8 O'clock. The woman that we lost, the woman had five children, and she came in at 7 AM on one of those days, and we lost her as she was bleeding. One of the reasons is because there was a changeover, and the nurses to take over did not come on time, and there was a gap, and the woman bled to death. So, I think punctuality is important." (Dr Rey 1/06/18, 9.47AM).*

Similarly, Dr Ali describes the laxity and lack of collaboration among health workers when dealing with obstetrics emergencies which lead to the death of a patient. The health experts indicated that some nurses disrespect junior doctors. A where a better approach will be to share their experiences and expertise regardless of their positions and ranks to achieve a successful outcome:

> *"When decisions are made about the management of patients, they are very sluggish in terms of carrying out doctor's instructions. I had a case of severe preeclampsia, and I gave an instruction, as in things that need to be done, and because the nurses are not*

ready to work in collaboration, they look down on the younger or more junior doctors. Just recently, while they were dragging their feet, the patient died of preeclampsia because there was no attention to the management of the patient." (Dr Ali 12/06/18, 16.43 PM).

However, the late presentation of women contributes to maternal mortality. As indicated by the experts, the time of arrival, in some cases, are responsible for unsuccessful intervention, such as seen in the management of preeclampsia and ruptured ectopic pregnancies. Unfortunately, several patient-related factors are associated with lateness and poor health-seeking behaviour, discussed in subsequent sections. Including infrastructural and transportation problems already explained. Dr Ben shared his experience with a patient that arrived late at the hospital and lost her life almost immediately:

"Now you have eclampsia, for example, and before the patient comes to the hospital, she already had ten fits. Also, two, three days ago, we had 2 cases of post-partum eclampsia. One died within 30 mins of presentation. She came at 11.30 AM by midnight while they are still trying to get a line; the woman died in the hospital." (20/07/18, 21.03 PM)

Dr Ben emphasises the importance of understanding the patient condition and reviewing the patient before any medical intervention, and it also includes anticipating and preparing for co-occurring symptoms. Using a case, he worked on recently, and he gives an account:

"There was a caesarean section that was done today. The woman is 35 years old, and she had Placenta Previa. She also had Schistosomiasis Asherman Syndrome since 2008 and delivered two times, no baby alive; one was congenital abnormally and the other, foetal distress, which leads to perinatal death. It is the third pregnancy, and she had gone into shock and another Asherman Syndrome after the caesarean section. When you look at her folder, the folder is fat. People should sit down and look at patient history. So, they will be able to anticipate complications and adequately prepare for it. We need people that have attention to details, that are analytical in their thinking" (Dr Ben 20/07/18, 21.03 PM)

However, as some health experts portray, one major setback to dealing with complications is the lack of essential tools, equipment, and resources to enable doctors to operate smoothly. Dr Nat recounts how due to lack of an ordinary syringe, he was unable to administer an emergency medicine for the treatment of eclampsia which is one of the deadliest complications in obstetrics care:

> *"So, there was a situation where a patient came in with eclampsia to the hospital and from the referral hospital, they have already given magnesium sulphate. So, we needed to stop the fit by giving another dose of magnesium sulphate, but there was no syringe. So, the doctor is there, the nurse is there, and everybody is there. There is no syringe to give the injection" (Dr Nat 20/07/18, 22.03 PM)*

Furthermore, Dr Ali portrays an interesting religious context to managing the complicated case in hospitals in Nigeria as some complications are not properly investigated and managed but instead considered diabolical or issues of faith. As a result, there is no room for advancement in clinical practice. He said:

> *"A lot of sentiments comes into work issues. Now, when there is a complaint, we don't address complex issues objectively. A lot of times, we connect tribalism with religion to complex cases. I think that organisational wise, we should create a system where issues are dealt with objectively" (Dr Ali 12/06/18, 16.43 PM).*

There are several factors associated with the unsuccessful intervention, as discussed. It is clear that a lot still needs to be done about obstetric emergencies in the health system. Issues ranging from lack of specialised equipment, lack of readiness of the clinicians, especially at night, and the inability of the clinicians to pay attention to details have impacted MH outcomes. Therefore, staff re-orientation was recommended to help strengthen staff understanding and response to patient safety. To develop compassion in care and mental readiness to save lives. In a statement, one health expert said:

> *"So, with the emergency, quite a number of our people needs a lot of re-orientation. Too many people, they see emergency cases more like a disruption to their supposed regular convenient duty. So, they are not mentally prepared for an emergency that is*

the truth. I will say that 60% or more of Nigeria's healthcare workers are not prepared for medical emergencies. It is a serious challenge in public hospitals, even in private hospitals. People are generally not mentally and physiologically prepared for medical emergencies" (Dr Ali 12/06/18, 17.11 PM).

5.3.3.4 Skill-Based Behaviour

There are two skill-based failures in the system specified by the PRISMA categorisation; health care slips and tripping failures. Health care slips result from failures in the performance of developed skills, while tripping is failures in whole-body movement, falling or slipping during a healthcare procedure. Tripping incidence was not a significant concern with the research participant, and it is assumed not to be very significant in this context. However, health care slip failures can be seen in the omitting of vital information by healthcare practitioners. Arguably, Dr Jon considers the lack of electronic devices in health contributing to health care slips. Below are their statements:

"For example, a mere diagnosis, the patient comes with the first diagnosis and the person is referred to the nurses or doctors and then the final diagnosis, which is called the primary diagnosis. We should be able to keep a record of these diagnoses so that when they come in next time, we can refer to the records. Our record entry system is very poor. Why? because there is no electronic record system. (Dr Jon 30/5/18, 23.08)

In this context, apart from slips with documentation, there were no accounts of other health care performance slip by the research participants.

5.3.4 Patient-Related Factors Contributing to MM in Rivers State

According to the PRISMA classification, patient-related failures are due to the patient's characteristics or conditions that the healthcare provider cannot control. In Rivers State, a wide range of socio-economic and medical factors interfere with MH. It is common knowledge that women in Nigeria are not utilising health or have not attended four antenatal care recommended

by international standards (UNFPA, 2017). The health experts also highlighted this concern. Dr Rey said:

> *"In Nigeria, there is a report that those that register for antenatal care is about 57%. Well, to me, it's poor while those that deliver in the health care facility under skill birth attendance is about 37%." (1/06/18, 9.47 AM).*

Based on the responses from the health experts, women are still utilising traditional birth attendants and spiritual homes. It was insinuated that the use of unskilled birth attendants is inevitable in maternal care as they are generally accepted in rural areas, and their services are in high demand:

> *"Pregnancy and delivery happen to be an age-old thing. Therefore, the influence of traditional birth homes is powerful, especially in areas outside the city centre. The traditional birth homes are part and parcel of the management of the pregnant patient; they appear to have a greater number of patients than some of the newly established hospitals owned by a specialist because people believe them". (Dr Nat 20/07/18, 22.03 PM).*

In some cases, women that have engaged in orthodox care and registered with a medical practice still plan the delivery of their baby in spiritual homes. One health experts recount a story of his patients who attended antenatal care regular but resorted to childbirth at the mission centre:

> *"I had a young lady on her national youth service. She started her antenatal care at ten weeks of pregnancy. I saw her on Monday at 39 weeks' gestational period, and she was brought in dead by Wednesday. This was somebody that was attending all the antenatal care clinics faithfully, but when she went into labour, she went to a mission centre to deliver. She started haemorrhaging before they could bring her to the hospital. She has gone into shock and died" (Dr Ali 12/06/18, 17.11 PM).*

Similarly, the experts revealed that some women prefer to give birth in churches or spiritual houses where they can participate in activities such as prayers, singing and listening to sermons

which will motivate them to give birth naturally. Even though these spiritual homes are not skilled in managing obstetrics complications:

> *"Then we also have religious bodies which establish maternity homes manned by poorly trained personnel just to increase the number of converts to their church, and they run maternity homes. Some patients go there because they prefer the religious services they render and the components of the things involved. For instance, they pray, they sing, the pastor will come and preach and encourage them that even a woman can deliver on their own". (Dr Nat 20/07/18, 22.03 PM)*

There are many reasons why these women prefer an unskilled spiritualist or traditional doctor over orthodox care, which are discussed in the following sub-sections.

5.3.4.1 Poverty

The out of pocket payment for healthcare has contributed to delays in accessing care as patients must purchase clinical material and surgical tools before a medical procedure or interventions in an emergency. So, where the patient does not have the means to pay for care and buy clinical resources, they will not be attended to by the doctor regardless of their medical situation:

> *"There is a problem of poverty, people are paying out of pocket, and so many people cannot afford it. When you say do this, and they cannot do it, are you going to start treatment for somebody with placenta Previa who has not made adequate provision for blood?" (Dr Ben 20/07/18, 21.03 PM)*

There are instances where the relatives have abandoned pregnant women without any money or resources, and the doctors had to pay for their healthcare to save them from dying during an emergency or leaving them unattended. It describes the appalling payment policy where the money is at the forefront of patient safety:

> *"And sometimes people dump their relatives in the hospital and the doctor, seeing a pregnant woman dying, transfer money from his phone to the hospital to cover the cost of an emergency procedure. I had to pay for blood, and I had to pay for consumables so that mortality can be avoided in a situation where somebody leaves his wife and runs away, and the woman is bleeding to death" (Dr Jon 30/5/18, 23.08 PM)*

Because of the lack of funds, many of these women prefer to use an unskilled birth attendant as they can afford to pay them, and these are some of the problems contributing to Type 1 delays, which interfere with the woman's decision to seek care. Only to return to the hospital when their case has become very severe:

> *"Many times they utilise traditional birth attendants, healers and maternity homes because they don't even have enough funds to take care of themselves properly and this issue is a very big challenge that causes many issues. Can I call it Type 1 delay? Type 1 delay is a very big issue" (Dr Joe 15/05/18, 22.29 PM)*

> *"Poverty accounts for some of these outcomes. Caesarean section is expensive, so they opt for these other places because they cannot afford the charges, and some of them start and run off along the line. They come to the hospital with no more options when we can't salvage them. (Dr Jon 30/5/18, 23.08 PM)*

Poverty influences the family decision as parents are forced to make the difficult decision to choose between spending money on food, family upkeep or pay for medical care. Thereby, women's survival takes a secondary position to their family needs:

> *"For example, your child is sick, or your wife is sick, and you have 3 or 4 other children. She needs to decide whether to use £2000 to take herself to the hospital or use it on the other children at home. So, the children will not die of starvation. As far as she is not bleeding, and the pain is not much. They don't care because they will have to survive first" (Dr Nat 20/07/18, 22.03 PM)*

5.3.4.2 Cultural and Religious Influences

Several research participants highlight the religious impact on health-seeking behaviour. It was revealed that women substitute prayer with their pastors for medical consultations and procedures, and this action is considered an act of faith:

> *"Some of the patients tell you, pastors prayed for me, and in the church, we were asked to stop taking my medication or drugs anymore, that they are healed by faith" (Dr Dex 2/08/18, 20.54 PM)*

In managing patients with chronic diseases, it was highlighted that faith or religion has contributed to significant delays in dealing with the problem. Many religiously inclined women exercise their faith by not adhering to medical advice or instructions or taking prescribed medication. They live in an alternate reality or state of denial until they are faced with a redeemable life-threatening situation, as depicted by these experts:

> *"Okay, first, I am going to talk about denial. There is a lot of denial of health issues with our people. When it comes to chronic illnesses, religious factors play a major role in our treatment, and our people are living in denial, and they call denial faith. It then progresses to the next stage, which is the late presentation. There is a lot of cases that could have been salvaged if the patient presented early enough" (Dr Ali 12/06/18, 17.11 PM).)*

> *"The same with people with diabetes mellitus in pregnancy, you see some of them also presenting late, coming from the villages, not taking their drugs. And of course, praying with their pastors and sometimes pastor will them to discard all their drugs and you see them coming with diabetic coma in pregnancy. sometimes before you know, the baby dies, the baby will not make it" (Dr Jon 30/5/18, 23.08)*

Also, their cultural norms whereby women undertake a caesarean section are perceived as a sign of weakness or forbidden by other family members. Also, undertaking caesarean has a negative religious connotation as this is considered a lack of faith in God and a disappointment to their pastors:

> *"For example, you see a patient come with gynaecology or an obstetric case whereby after your review during the antenatal care, you say to her, and you need a caesarean section. Out of fear, she will say nobody in my family has done this, and it is not my portion and all those sorts of things. Some of them will say, my pastor, said it is not possible" (Dr Nat 20/07/18, 22.03 PM).*

There are toxic cultures or societal norms that influence MH outcomes, and they are deep-rooted things that are embedded in the culture of the people, which can be very difficult to

change. For instance, in some communities, as stated by the health expert, women will need to be authorised by traditional heads, or specific rituals must be performed before they can access care:

> *"Some culture does not believe you should access medical care, or you are being vetted by traditional or religious groups and the traditional rites performed before the woman is carried to the hospital" (Dr Rey 1/06/18, 9.47 AM)*

Likewise, in a patriarchal society like Nigeria, the man's decision regarding when, how and where to give birth is supersedes the woman's rights. Especially, as men are the breadwinners in the home, as such, women are unable to decide on their care, as seen by the action of a pregnant woman that was waiting for her husband to get back home before she goes to the hospital even when the situation is critical:

> *"The cultural delays simply means; husbands must be home before women attend hospital. A patient was in port Harcourt, but the rural area and her husband was in Lagos. The woman was not willing to come to the hospital even though she had a life-threatening condition, and she was bleeding." (Dr Rey 1/06/18, 9.47AM).*

> *"Husband's play a major role in health care delivery in Nigeria, and patients naturally need them as they are not able to fund their healthcare even though they have the means. So, husbands tend to call the shots, and when the husband is not well off, you see the problems will begin to arise" (Dr Sam 20/07/18, 22.03 PM).)*

Considering the socio-cultural interplay in maternal care, the health experts have acknowledged the need to collaborate with spiritual leaders and traditional leaders to bridge the gap between medical practice, cultural and religious practices:

> *"Recently, we are also trying to ensure that we get the (...), the village heads, some of the religious leaders, we want them to partner with the health providers because when the community open these health facilities, they take it more seriously". (Dr Ian 5/05/18, 10.10 AM)*

5.3.4.3 Illiteracy

Educational attainment has a direct correlation with skilled birth attendance, the women ability to decide on their healthcare and make a contribution towards the family income:

> *"It is unlikely to see an educated person who is having diarrhoea since morning stay in the house waiting for her husband to come back from work" (Dr Joe 31/05/18, 21.54 PM).*

Ignorance and Illiteracy have a significant problem in MH delivery. Research findings show that decision to seek care, utilise services of an unskilled person or participate in harmful practices stem lack of awareness or Illiteracy. Ignorance impairs women decision to choose or differentiate between was safe during pregnancy care or harmful:

> *"Also, they are not aware of the difference between going to skilled birth attendant during labour and using unskilled persons. Even those who go for antenatal care when they want to deliver don't deliver in the hospital because they lack awareness. A lot of women are not educated, and nobody is making an effort to educate our girls. Nobody is making an effort to create awareness of the advantages of good antenatal and skilled birth attendance at delivery. As a result, a lot of our women go to churches as they are not aware of good facilities" (Dr Ada 16/08/18, 15.08 PM).*

In the absence of public education or enlightenment, women seek advice from un-informed family members or friends, and some go on to provide misinformation on maternal care and administer medicines not prescribed by the doctor as stated by Dr Ali and Dr Mya:

> *"Professionals advice and instructions are not taken; our people don't stick to them. They prefer to listen to the counsel of relations more than what the professionals tell them. Sometimes, the patient relatives administer concoctions and medications not prescribed by doctors and health care providers. People take medications that are not prescribed by professionals. (Dr Ali 12/06/18, 17.11 PM).*

> *"They have people who are telling them the wrong things. Don't worry, your date has passed is not a problem, mine passed for one month and nothing went wrong. Ruptured membrane, if you are not having pain, sit down there. They will tell you people told them. They are giving misinformation to pregnant women by their families. This is*

another thing we must do something about, to ensure, women good information, health information. So, they can decide on time" (Dr Mya 15/05/18, 4.55 PM).

Therefore, ignorance in maternal care should be considered a public health issue that must be addressed vehemently by the government and non-governmental organisations to create awareness of harmful practices and promote health utilisation. Hence, collaborations between the healthcare providers and government are recommended to invest in community outreach programs:

"No 1, people are trying to talk about primary prevention, and all that we need to do is start with education, educating boys and girls, men and women about the importance of maternal health". (Dr Mya 1/05/18, 12.21 PM).

"We talk about empowerment, poverty alleviation. I don't know what the government is going to go about it because most deaths are due to poverty. They need the policy to empower women". (Dr Jon 30/5/18, 23.08).

5.3.4.4 Direct and Indirect Medical Factors

The patient's medical condition contributes to the MH outcome. These are direct and indirect medical causes. Indirect medical causes are a pre-existing medical condition that contributes to more than 27% of maternal mortality (Say et al., 2014). These conditions include chronic diseases such as cancer, heart conditions and HIV/ AIDS. According to the response from the research participants, the lack of health utilisation by women prevents early identification and intervention of pre-existing conditions. Although a successful outcome is not guaranteed in some cases, the patient can be better managed, and there is a higher chance of survival. Like in the management of HIV/AIDS in pregnancy, early identification and monitoring will allow for aggressive treatment to improve patient's immunity and anti-retroviral therapy needed to prevent mother to child transmission:

"I have managed a full-blown AIDS in pregnancy, and most cases are very difficult to manage. Yes, because some of the patients come in a very low, feeble state. So, we have managed such but what you will find is that sometimes such patients die a few days. I am helping a woman who has a CD4 count of 9 at presentation with a calm pregnancy but is severely anaemic. She was severely anaemic, and then we had to manage her with blood transfusion and began early anti-retroviral therapy and all that to work things up; treat them on opportunistic diseases. Then, shortly after delivery or thereabout, they have a kind of sudden block in their immunity, and she died". (Dr Cal 7/06/16, 22.40 PM).

Due to the poor health-seeking behaviour of women in this region, most women are unaware of any existing medical conditions before pregnancies. The health experts indicated that women only become aware of the pre-existing condition when pregnant. As a result, they have no medical advice or support before embarking on pregnancies and have not taken the necessary precautions for their survival. Consequently, leaving them open to significant complications which are preventable with medical support:

"Someone who came to the hospital for the first time only when she was pregnant, and this is her first pregnancy. This is an issue where you have pre-existing conditions. I remember managing a case of sickle cell disease. It is a kind of sickle cell; people don't know, SC. The common sickle cell that you know is SS. We were able to diagnose only during her first pregnancy, that she was, in fact, a sickle cell disease patient when she presented with complications during pregnancy. Sometimes we can salvage them. Sometimes we have near misses and then fatality." (Dr Cal 7/06/18, 22.40 PM).

However, healthcare utilisation is influenced by access to health care. There are three dimensions to access to healthcare; acceptability, financial affordability and physical accessibility (Evans et al., 2013). One of the major setbacks with managing chronic conditions is access to quality care. In terms of physical accessibility, the proximity to the healthcare facility is a problem as many women have to travel a long distance to the tertiary institution, and in some cases, they do not make it alive, as explained by Dr Ada:

"Also, sometimes of the patients come from those rural areas, by the time they come to a few urban tertiary and secondary hospitals, they are dead." (16/08/18, 15.08 PM)

The healthcare facilities in Rivers State are not well equipped to manage compilations as indicated by Dr Nat there are un-trained personnel and access to affordable care in rural areas, and this influences the women's decision to seek care:

> *"I am not talking about free; I am talking about accessible; I am talking about available and affordable. Because for example, if you look at the rural area where most of these people stay, there are no doctors, and there are no trained health personnel. Do you understand? So, in cases of obstructed labour, you see it coming from people in those remote places. (Dr Nat 20/07/18, 22.03 PM).*

Also, there is limited or no specialised and investigatory equipment in Rivers State to support the diagnosis of chronic diseases. Women are required to travel to other states to access such a level of care, especially for cancer screening. Moreover, where they cannot afford the cost of transportation, they are left unattended. Thereby resulting in preventable maternal mortality due to accessibility and affordability:

> *"How many cases in Nigeria have you seen that survive cerebral cancer. There are no screening centres in the South-south. It is only in Lagos and Abuja. Now take, for example, a poor woman from her village to Lagos and Abuja to do cancer screening. She can't even afford transport. So, we do have not radiotherapy centres, I think, this is a challenge in managing chronic conditions now" (Dr Jon 30/5/18, 23.08)*

More so, there are also acceptability issues preventing health utilisation. So, regardless of the presence of healthcare facilities, the women's perception of the quality of MH delivery determines if women will utilise health care in that hospital facility. Many women have lost faith in the healthcare system and now resorting to unskilled providers:

> *"A lot of the patients themselves have lost hope in the system. So, they believe whatever the existing medical help says such as, the Traditional Birth Attendants around them, offers because that is the best they think they can have. They need, they need to know that the government cares about them or that the facilities are available" (Dr Cal 7/06/18, 21.23 PM).*

Similarly, direct medical causes contribute to 73% of maternal mortality, and they are a result of the state of pregnancy, such as obstructed labour, preeclampsia or eclampsia, haemorrhage, sepsis and unsafe abortions (Say et al., 2014). The is consistent with the response from the research participants:

> *"Post-partum haemorrhage, which is the commonest cause of maternal mortality in Nigeria but um local studies at the University of Port Harcourt Teaching Hospital one year ago also recorded eclampsia, that is hypertensive conditions in pregnancy, uterine sepsis and uterine rupture" (Dr Rey 30/05/18, 9.41 AM).*

> *"We know the things that cause a greater bulk of maternal death in our environment. Ranging from hypertension, especially eclampsia, haemorrhage, sepsis, obstructed labour, unsafe abortions" (Dr Dex 2/08/18, 20.54 PM)*

The APHRC (2017) revealed that the abortion rate in Nigeria is 33 per 1,000 women aged between 15 and 49 years and unsafe abortions account for 11% of obstetrics mortality causes. Since abortions are illegal in Nigeria, women go to quack doctors to perform the procedure, and they are rushed into the hospitals when complications set in. Without proper regulation and access to pre and post abortions in Rivers State, women will continue to patronise unskilled people:

> *"I mentioned earlier about my experience with that young lady of about 23 years old some few years ago that had an unsafe abortion, and she had her uterus perforated, and she had her intestine dangling. We should emphasise that people that carry out such practices desist from carrying out such practices" (Dr Rey 1/06/18, 9.41 AM).*

In most cases, direct medical causes are unpredictable and unavoidable in healthcare. However, health care providers can be better prepared to manage pregnancy-related complications. Nevertheless, there are several setbacks to the management of obstetric complications, such as the absence of skilled healthcare professionals across primary and secondary health facilities to provide quality care or make referrals on time:

"I am in a specialised unit where we have trained experts, so we don't have many issues here, but where we have the problem is the unspecialised units, like the health centres. They come with all the problems even before presenting to our centre. So, by the time the present, there is much harm or damages done before presentation" (Dr Nat 20/07/18, 22.03 PM).

There is also a lack of infection control measures by the health care providers contributing to life-threatening infections such as sepsis:

"Sepsis is the main issue that's why I mention about this quality control measures" (Dr Joe 31/05/18, 21.54 PM).

Although there is the issue of late presentation and poor antenatal care attendance in River State, several of the research participants stated, which could hinder medical interventions. It has been observed that women come in when the situation is complicated and unsalvageable:

"Most of the problem we have in the developing world is that the patients present late to the hospital; even when they go into labour, they come in when they have lost control like obstructed or ruptured uterus" (Dr Joe 31/05/18, 21.54 PM)

Hence, patient-related factors call for diverse stakeholders to address the socio-economic and medical factors influencing MH outcomes. These include clinicians, doctors, advocates for women, NGOs and the government.

5.3.5 Unclassified (X) Factors –Gross Misconduct

These factors cannot be grouped into any of the above contributing factors. The category X factors in the Rivers State context are deliberate actions by the health institution or health care practitioners to falsify information or records, gross misconduct or negligence by health care workers. There were several accounts of gross misconduct observed by the research participants:

"For instance, a staff who did not measure the vital sign of a woman in labour and tried to misinform me by using the vital sign of another person. I caught her and dismissed her". (Dr Sam 20/07/18, 22.03 PM)

"Many a time you see people hiding files. You see them changing, manipulating the wrong figures. So, lack of sincerity among health caregivers is a very big issue. So, these are inbuilt problems amongst humans, and it is also causing problems" (Dr Joe 15/05/18, 22.29 PM)

5.4 Summary

In Phase 3 of this study, the health expert perception of the root causes of MM was mapped to PRISMA categorisation of risk factors. These were organisational, technical, human-behaviour, patient-related risks and other factors, which cannot be grouped in any of these categories with quotes from the semi-structured interview. It provided an in-depth understanding of the healthcare delivery system and an insight into how the problem can be resolved. External and internal action were recommended for improving the MH delivery system based on Health experts' views. It, therefore, shows that government intervention is required to provide primary facilities and infrastructure, ICT infrastructure, funding for healthcare and improvement in the current health insurance scheme. The internal measure was also identified, including human resource management and oversight, to strengthen workforce capability and build an organisation with shared objectives and goals to improve MH outcomes. The strategic approach, the practical improvement measure for improving the MH delivery system in Rivers State will be discussed (Phase 4 of the study).

Chapter Six: Discussion

6.1 Introduction

The overarching aim of this research is to improve MH in Rivers State, Nigeria, using the PRISMA flow chart model. Hence, achieving the research aim necessitates answering the crucial research questions:

i. What are the main clinical and non-clinical risk factors contributing to MM in Nigeria?

ii. What are the relationships that exist between risk factors?

iii. What are the health professionals' perceptions of risk factors?

iv. How can the quality of MH outcomes be improved in Nigeria?

The research questions informed the research objectives and study design. An explanatory mixed-method research design was employed and conducted in four phases described in Chapter Four and research findings presented in Chapter Five of this report. In Phase 1, clinical and non-clinical risk factors contributing to MM were identified (Objective 1). In the second phase, the relationship between risk factors and their order of riskiness was established using Exploratory Factor Analysis (EFA). Finally, in Phases 3 and 4, an in-depth understanding of risks factors was achieved with the health expert's semi-structured interviews (Objective 3) and recommended improvement measures in MH delivery (Objective 4), respectively. In this Chapter, the research findings are discussed, including the improvement measures recommended for improving the quality of MH in Rivers State.

6.2 Current Clinical and Non-Clinical Risk Factors in the MH Delivery System.

Phase 1 and Phase 2 (Quantitaive Study):

In Phase 1, the descriptive analysis identified technical, organisational, human behaviour and patient-related failures in the healthcare system in Rivers state is presented in Section 5.2. The

interplay between these categories of failures constitutes a very complex problem. A further analysis in Phase 2 using the factor exploratory analysis enabled prioritisation of the most critical factors contributing to MM in the hospital settings. In the EFA result, two distinct categories of maternal mortality emerged. Notably, the first category of risks were intrinsic factors due to health care management issues that are preventable or avoidable.

Based on existing patient safety literature, failures due to technical issues, organisational and human behaviour factors are avoidable. In PRISMA design, Van der Schaaf & Habraken (2005) described avoidable risk factors as latent and active failures. In their approach, latent failures due to organisational and technical failures were considered the most critical and problematic failures that, if addressed, first positions the organisation to resolve active human problems due to human behaviour. For instance, it was noted by Mackintosh & Sandall (2016) that human behaviour issues such as improper coordination and weak healthcare structures lead to avoidable incidences during the emergency intervention (organisational issues). Similarly, in developing countries, avoidable patient safety incidences can be avoidable where there is an adequate supply of clinical tools and resources and resources accessible by professionals on time (Ugal et al., 2012, Ntoimo et al., 2019; Izugbara & Wekesah, 2018). Several other researchers have stressed that poor patient culture and ineffective leadership are intrinsic issues that can be addressed to prevent mishaps in MH delivery (Yu et al., 2016; Cowper, 2015; Mengis & Nicolini, 2010).

This study ranked preventable causes highest on the factor loadings, as shown in Table 5.15. It showed a high correlation between organisational, technical and human factors, highlighting the necessity to tackle latent and active failures in the system.

6.2.1 Preventable or Avoidable Causes of MM.

In healthcare, one in ten people suffers from avoidable adverse events during medical procedures (Mengis & Nicolini, 2010). Avoidable harm in maternal care is associated with severe morbidity issues for women with very significant economic and social implications for their families (Liberati et al., 2019). The strategy for healthcare is first to avoid harm, and where incidence is unavoidable, resort to mitigation (Yu et al., 2016), known as the safety-first approach. However, quality is unsustainable when patient safety is not incorporated into frontline delivery (Cowper, 2015). Patient safety is not a quick fix but requires continuous effort, gradually evolving (Pronovost et al., 2015). Also, Pronovost et al (2015) stated that incidence is not an inevitable occurrence tackled only at the point of occurrence, as obtainable in the healthcare sector but closely monitored, minimised or eliminated like in other industrial sectors.

Based on the EFA, Factor 1 loadings are majorly preventable or avoidable causes of maternal mortality. The analysis of the top 10 factors (Table 5.15) shows a strong correlation between the organisational, human behaviour and technical factors, and these are the highest contributors to poor MH outcomes in this context. For instance, the organisation has a poor patient safety culture as clinicians do not regularly discuss improving safety practices. More so, healthcare incidences were not often discussed in meetings. Also, there are adequate health and safety measures to minimise or eliminate trips and slips at work, lack of essential clinical tools and equipment that are also not readily accessible, inadequate measures to minimise test result error, and weak obstetric emergency interventions. Physical accessibility issues in hospitals in Nigeria influence MH outcomes, such as weak obstetric emergency care and lack of essential resources and infrastructure required to deliver quality care (Okonofua et al., 2017; Izugbara & Wekesah, 2018). This study acknowledges this fact and stresses the need for

healthcare systems to cultivate patient safety culture and promote positive behaviour within the clinical teams through effective leadership, individual and organisational (collective) accountability towards patient safety (Aveling et al., 2016). Hence, improving patient safety requires methodological systems or structures deliberately put in place to mitigate risks.

In this context, major technical failures were highly significant to MH outcomes. These were problems due to the equipment design, inability to access equipment because of its set up, location or construction and the lack of monitoring device necessary for early identification of complications. Mbachu et al (2017) stressed that delays in detecting problems lead to unsuccessful intervention resulting in devastating outcomes for women in Nigeria. In developed countries, tools such as the EW-early warning signs, MEOWS–modified early warning signs, program, and cardiograph help measure and detected problems on time (Mackintosh et al., 2013). In this context, clinical equipment is not readily available.

Although tools require professional judgment, clinical governance, audit, and supervision as MH outcomes are hugely dependent on these contextual factors ultimately (Mackintosh & Sandall, 2016). In essence, the interaction between human behaviour, system design and safety is crucial for an appropriate and successful, responsive action (Mao et al., 2015). Also, monitoring systems require skills, training, and resources (Swanton et al., 2009). In this case, healthcare practitioners are not privy to training.

6.2.2 Unavoidable Causes of MM.

Factor 2 Factor 2 loadings reveal the unavoidable causes of maternal mortality due to patient conditions or characteristics. The unpredictability of patient condition is stressed by Mackintosh & Sandall (2016) as unavoidable. Fagbamigbe et al (2017) also stressed that

patients' refusal to attend the clinic or late attendance contribute to poor outcomes and an unavoidable incidence in low-income settings. In many cases, the medical condition of patients can be problematic and unpredictable as things could change drastically, leading to deaths (Mackintosh & Sandall (2016). Direct medical factors such as haemorrhage, sepsis, preeclampsia, ruptured uterus, obstructed could present during delivery (Say et al., 2014; Mbachu, 2017), and undiagnosed or existing conditions due to lack of health utilisation are avoidable occurrences in MH delivery (Adeniran et al., 2019; Saleem et al., 2013).

Based on the EFA, the factor 2 loadings show that existing chronic condition (indirect causes) is ranked the most significant in this category, followed by illness developed during pregnancy (direct causes). It is evident from research that direct causes are the highest contributors to maternal mortality (Say et al., 2014; Mbachu et al., 2017). However, this study shows that indirect causes are equally problematic in obstetrics care. Adeniran et al (2019) believe that the impact of chronic diseases is very significant in Nigeria but have received much attention as direct causes of MM, especially as many women are not utilising healthcare or do not have access to pre-conception care and reproductive health services (Ahmed et al., 2012). As such, women are unaware of existing chronic diseases before their pregnancy. In this case, where women present late during the third trimester, interventions become ineffective (Fagbamigbe et al., 2017).

Understandably, in obstetrics care, patients' condition is unpredictable, especially in this context where women present late, things can deteriorate rapidly, but the ability to envisage potential risks is critical to the successful intervention. Effective safety management involves identifying, assessing and mitigating risk factors (van Schoten et al., 2014). For example, to tackle obstetrics emergencies such as shoulder dystocia during delivery, adequate planning and

coordination of a dedicated multidisciplinary team are required (Cornthwaite et al., 2015). Unfortunately, critical maternal care is under-researched when compared to other critical conditions (Lapinsky, 2017; Scholefield et al., 2011), and obstetrics emergencies is a severe risk to MH delivery that requires a safety management system, as pointed out by a group of experts in critical maternal care (van de Velde et al., 2013). It involves focusing on the organisation's safety culture, incidence reporting system and learning from past errors as this is a fundamental way to improve patient safety in critical care (Stavropoulou, 2015). There should be an apparent dichotomy between women who require regular care, those that need to be observed strictly but do not pose immediate threats and those critical cases that often require invasive intervention or/and require organ support in other to adequately prioritise care according to risk factors associated with each patient (Scholefield et al., 2011). Where these underlying issues are managed effectively, the organisation takes an advantageous position to address unpredictable and unavoidable failures in the system (Kirkup, 2015).

Several studies highlight the need for efficient health governance, which includes: a strategic and integrated healthcare approach for timely referrals in the management of co-occurring or chronic illness (Erim et al., 2012), effective leadership and management to set collective goals or shared values that will promote a just culture rather than a blame culture (Kringos et al., 2015; Aveling et al., 2016), to foster a healthy working environment and relationship, better staffing to meet healthcare demands (Ball et al., 2014; Kirwan et al., 2013), implementation evidence-based practices (Callister and Edward, 2017; Madore et al., 2017) and ensuring quality control measures (Perry et al., 2017; Spector et al., 2012). Also, government and health provider collaborations for community engagement and enlightenment to improve health utilisations and access to quality care (Burroway & Hargrove 2018; Prata et al., 2012; Smith

& Hunsmann, 2019). However, expert practitioners' contributions in these settings are crucial to improving MH outcomes and providing context-specific recommendations.

6.3 Recommendations for improving MH Outcomes in Rivers State, Nigeria.

Phase 3 and Phase 4 (Qualitative Study):

The quantitative research findings in Phases 1 and 2 revealed severe failures in the system. Section 5.14 shows descriptive and statistical analysis of the problem. Table 5.15 highlights most significant factors were active and latent contributing to failures. In Phase 3 of the study, a semi-structured interview was conducted with health experts, complementing the quantitative study. Section 5.2 presents a detailed account of organisational, technical, human behaviour and patient-related issues based on 12 experts' opinions. The thematic analysis of the interview provided an in-depth understanding of the problem, which was coded into the PRISMA categories of risk. The health experts also provided recommendations on how the MH delivery can be improved in Rivers State, Nigeria.

The improvement measures consist of internal and external actions in MH delivery deduced from the semi-structured interview with health experts, and further inferences were made from existing literature on how to address the problems identified. Table 6.1 shows an overview of recommendations for improvement based on health experts' opinions and extensive literature which provides further justifications.

Table 6.1: Recommendations for improving MH delivery in Rivers State Nigeria

Data Analysis Themes	Health experts' Interview excerpts	Recommendations and inferences from interview data	Key supportive Literatures
Technical Factors	"We starting PPP, private, public partnership. The public man supplying the machines gets 60%, while the hospital 40% for bringing the patient " (Dr Joe 15/05/18, 22.29PM).	PPP-Private Public partnership	Specchia et al., 2015; Torchia et al., 201
	"How many cases in Nigeria have you seen that survive cerebral cancer. There are no screening centres in the South-south. It is only in Lagos and Abuja. Now take, for example, a poor woman from her village to Lagos and Abuja to do cancer screening. She can't even afford transport. So, we do have not radiotherapy centres I think, this is a challenge in managing chronic conditions now" (Dr Jon 30/5/18, 23.08)	Government funding	Okonofua et al., 2017, Izugbara & Wekesah, 2018; Lange et al., 2016
	"In my unit, we have about two CTGs in the delivery unit, and you have like 10-15 or 20 deliveries in a day. So technically, it is inadequate. In the active labour ward, for example, it can take up to 10 hours. So if you have 2 CTGs and we have more than 15 women in a day. Sometimes, technically you are seeing all of them at the same time. So, it is not whether it is available; it is not adequate". (Dr Nat 20/07/18, 22.03PM).		
	"We often depend on recall from your memory, that is if you eventually remember to document it because we don't have machines that save some of the vital signs and information. Writing on memory leads to a lot of medical slips and errors". (7/06/18, 22.40PM).	Implementation of ICT in maternal care	Damayanti et al., 2019; Porter & Lee, 2013; Kim et al., 2017; Bervella & Al-Samarraieb, 2019; Anasi, 2012; Raman et al., 2018
	"We should be able to keep a record of these diagnoses so that when they come in next time, we can refer to the records. Our record entry system is very poor. Why? because there is no electronic record system". (Dr Jon 30/5/18, 23.08)		
Organisational Factor	**Internal Measures /Actions**		
	"We don't have common goals and values and visions that you work towards. Not at all" (Dr Ali 12/06/18, 16.43PM).)	Management Oversight	Izugbara & Wekesah, 2018; Maloney et al., 2018; Bryce et al 2018
	"So, people can (…), because people think they can do anything, without anything been done about it. No punishment is attached to it, so other people follow suit" (Dr Ali 12/06/18, 17.11PM)	SHRM –Strategic Human Resource Management	Caldwell et al., 2011; Green et al., 2006; Jackson et al., 2014
	"Staff motivation is very poor that is the first thing, and then the working environment is not, is not conducive for both the staff and the patients because they are not encouraged to put in their best. People are under-appreciated. Some people are working hard and not appreciated. Some are not working and still get paid as those that are working hard." (Dr Dex 2/08/18, 20.54PM).		
	"For example, training organised both in Port Harcourt and in Abuja, the people I see always are people I have trained previously, so why are they coming in? it is a very big issue that older staff who has the knowledge reserve, which should nominate younger ones for training will always come and still be training because of maybe the monetary involvement and all the rest". (Dr Joe 31/05/18, 21.54PM).		
	"I remember growing up during my residency programme we had an internal audit in the department, where we [review cases] to ensure that they don't happen again, but yes we say it is in place, but sometimes we don't follow it to the core, and they are not very regular. So, the audit that was done in the last few years, we didn't see any report. That is why it should be published to build health management and help maternal mortality reduction" (Dr Mya 15/05/18, 16.55PM).	Internal Audit & Monitoring System	Alhatmi, 2010

Table 6.1: Continuation Recommendations for improving MH delivery in Rivers State Nigeria

Data Analysis Themes	Health experts' Interview excerpts	Recommendations and inferences from interview data	Key supportive Literatures
Organisational Factor	**External Measures /Actions**		
	"We have a lot of problems with our educational system, where someone, has passed all the pre-requite exams and thinks he is qualified to read medicine but the institution that is in charge of his admission decline to offer him the desired course because he has no godfather or money to pay to the system. As a result, we have pharmacist, that want to do the job of a doctor or nurses that will not take instructions" (Dr Cal 7/06/18, 21.23)	Educational sector Intervention	Millward, 2018; Fairall et al., 2016; Crimlisk, 2019
	"So, you find out that generally in Nigeria, lack of fund is an issue. It might not be there, but even when it is there, a few persons will embezzle the funds. Therefore, it is important to implement changes that relate to funds". (Dr Joe 15/05/18, 22.29PM).		
	"Power is important, and when it keeps fluctuating up and down, there was a time we had MRI, CT Scan and all the rest before we knew it, they all packed up because of the fluctuation of the current or the electricity. So, this a basic problem that can be sorted out	Government Intervention to provide funding, infrastructures, universal insurance system and	Shiftman, 2007; Smith & Hunsmann, 2019; Ntoimo et al., 2019; Onoka et al., 2014;
	"The insurance, the health insurance scheme that we have is mainly for the working-class citizens who can afford to pay for themselves. The poor people who should benefit from the scheme are not benefiting from the government rule we have. So, there is a non- efficient health scheme to be able to assist the people" (Dr Cal 7/06/18, 21.23PM).	For effective leadership	Onoka, 2016
	"Of course, we need to get the right leadership. We have leaders who are not committed and responsible. People become leaders to enrich themselves and are not fighting for the system. This siphoning of funds is a major problem." (Dr Jon 30/5/18, 23.08)		
	"There is a major problem with our private laboratories in this country, and they are not well regulated. Anyone can start providing services, write whatever name on their laboratory practice and the next day people bring samples in". (Dr Cal 7/06/16, 22.40PM).	Effective Healthcare Regulatory Bodies	Welcome, 2011; Onwujekwe et al., 2009; Beaussier et al., 2016; Iyioha et al. 2015; Liu et al., 2016
Human behaviour factors	"I want to see a person that has a fellowship in the field of obstetrics and gynaecology establishing a private institution run by themselves um and having them site close to where they have health centres. This will enable collaboration between private practitioners who are specialist in the field of maternal and child health to assist the health centres. Thereby remitting the time lost on referral from the health centres to the tertiary or secondary health care". (Dr Sam 20/07/18, 22.03PM)	PPP- Collaborations between providers	Oluwole & Kraemer, 2013; Sharma and Seth, 2011; Oluwole & Kraemer, 2013; Oluoha et al., 2014; Lei et al., 2015; Lal et al., 2011
	"There is no structure in dealing with situations effectively, as in complex situations. No structure in place, not at all from the tertiary to the primary level there are no structures in place. That is a simple truth. No protocol for the management of preeclampsia." (Dr Ali 12/06/18, 16.43PM).	SOP-standard operating procedures Management Oversight	Maloney et al., 2018; Perry et al., 2017 Liberati et al., 2019; Kabongo et al., 2017
	"There is inefficiency with the referral system from the primary to the secondary and the tertiary health care. I think a lot can be done in getting the referral system to become more effective and more efficient. I don't think patients are always properly managed. There are chronic illnesses that some general practitioners will rather not refer to people who are specialised in the area. So, there is poor referral within the health sector and people sometimes people go beyond their limit" (Dr Ali 12/06/18, 16.43PM).	1CT- for referrals	Porter & Lee, 2013; Omo-Aghoja et al., 2010; Blank et al., 2013; Anstey Watkins et al., 2018; Damayanti et al., 2019)

Table 6.1: Continuation Recommendations for improving MH delivery in Rivers State Nigeria

Data Analysis Themes	Health experts' Interview excerpts	Recommendations and inferences from interview data	Key supportive Literatures
Continuation Human Behaviour Factors	"I think that some healthcare providers, patient management practices are outdated. So, their approach to management is probably still at the basic level, and they are not up to date. Therefore, patient outcome is not optimal" (Dr Ali 12/06/18, 16.43PM).	SHRM	Perry et al., 2017; Ostroff and Bowen,2016; Jake Messersmith, 2018; Harrison & Bazzy, 2017
	"When people don't have a good interpersonal relationship, we can't attend to our patient care effectively. There is a gap in communication, and complications in pregnancy will not be adequately managed, and this will lead to maternal and perinatal deaths." (Dr Rey 1/06/18, 9.47AM). "And the response is not just the doctors alone but all the healthcare workers. We should respond promptly to obstetric emergencies." (Dr Rey 1/06/16, 9.47AM).	Effective Collaboration and coordination using ICT	Mackintosh & Sandall, 2016; Dixon et al., 2010; Stoffers, 2018; Anstey Watkins et al., 2018; Fico et al., 2016; Kuruvilla et al., 2014; Say & Raine, 2007
Patient-related Factors	"Recently, we are also trying to ensure that we get the (…), the village heads, some of the religious leaders, we want them to partner with the health providers ". (Dr Ian 5/05/18, 10.10AM)	Traditional Birth Attendant (TBA) Training & Collaboration	WHO, 2012; Schack et al., 2014; Aborigo et al., 2015; Yarney 2019; Morris et al., 2014
	"I went to my neighbourhood to discuss with them on the possibility of their coming over to donate blood. Should we run out of blood from our blood bank and on one occasion, we were able to retrieve blood from a woman with which we were able to rescue a woman from placenta Previa. So, I have that collaboration with them and its working". (Dr Sam 20/07/18, 22.03PM)	Community Intervention	Adjiwanou et al., 2018; Burroway & Hargrove, 2018; Ensor et al., 2014; Prata et al., 2012
	"Husband's play a major role in health care delivery in Nigeria. Husbands tend to call the shots, and when the husband is not well off, you see the problems will begin to arise" (Dr Sam 20/07/18, 22.03PM).)	NGO/Religious Groups Intervention	Dotsey & Kumi, 2019; Hembling et al., 2017; Widmer et al., 2011
	"Most of the problem we have in the developing world is that the patients present late to the hospital; even when they go into labour, they come in when they have lost control like obstructed or ruptured uterus" (Dr Joe 31/05/18, 21.54PM) "There is a problem of poverty, people are paying out of pocket, and so many people cannot afford it" (Dr Ben 20/07/18, 21.03PM) "No 1, people are trying to talk about primary prevention and all that we need to do is start with education, educating boys and girls, men and women about the importance of maternal health". (Dr Mya 1/05/18, 12.21PM). "We talk about empowerment, poverty alleviation. I don't know what the government is going to go about it because most deaths are due to poverty. They need the policy to empower women". (Dr Jon 30/5/18, 23.08).	Government intervention for education, empowerment and to improve health utilisation	Burroway & Hargrove, 2018; Ensor et al., 2014; Ononokpono et al., 2014; Brunson, 2019; Smith & Rodriguez, 2016; Ahmed & Khan, 2011

6.3.1 Internal Measures or Action Plan

The analysis of the qualitative inquiry suggests internal improvement measures such as setting and promoting the implementation of standard operating procedures, management oversight, strategic HR management (SHRM), internal audit & monitoring, use of ICT in MH (m-health) for recording, sharing, and storing clinical records.

6.3.1.1 Standard Operating Procedures (SOP)

Previous research indicated that direct and indirect medical factors contribute to maternal-child mortality (Say et al., 2014; Mbachu et al., 2017; Adeniran et al., 2019). Therefore, hospitals in Rivers State must develop and implement SOP for managing obstetric complications such as postpartum haemorrhage, eclampsia, ruptured uterus, sepsis and unsafe abortion. Dr Ali expressed his concern for the lack of SOP for tackling complications as stated:

> *"There is no structure in dealing with situations effectively, as in complex situations. There is no structure in place, not at all from the tertiary to the primary level. There are no structures in place, and that is a simple truth. No protocol for the management of preeclampsia." (12/06/18, 16.43 PM).*

Several researchers have also emphasised the importance of Setting SOPs because it guides clinicians' behaviour and conduct, especially during obstetrics emergency intervention and managing complicated cases. (Cornthwaite et al., 2015). Also, the verification process is enhanced, where clinicians are careful to assess the situation before commencing a procedure (Dohbit et al., 2019). In obstetrics care, the Safe Child Checklist for assessing, monitoring the patient condition and taking responsive actions is highly recommended (Sageer et al., 2019; Spector et al., 2012; Kabongo et al., 2017).

As discussed above, there is no doubt that the use of SOPs has many benefits in the MH delivery system. However, the adoption of evidence-based practices or standardised quality control approach is challenged with the inability of the management of healthcare organisations to provide effective leadership and staff motivation required to facilitate the implementation of SOP (Maloney et al., 2018; Perry et al., 2017). Also, contextual factors such as staffing level and working environment influence the implementation of quality measures (Liberati et al., 2019), as seen in the inability of clinicians to implement the active management of the third stage of labour guidelines for the prevention of postpartum haemorrhage in three hospitals in Ghana due to staff shortage (Schack et al., 2014). More so, Perry et al (2017) pointed out the need to adopt universal tools or Safe Child Checklist to the local context, including adequate training of clinicians to use tools correctly. It implies, setting and implementing an organisational protocol for the management of obstetric complications requires management oversight, which includes; a constant reinforcement of standardised practices, technical proficiency of clinicians, control and coordination of clinical practices and behaviour of staff for improving patient safety and quality of MH delivery (Liberati et al., 2019).

6.3.1.2 Management Oversight

The main objective of the management oversight is to ensure that the institution is committed to achieving organisational goals and delivering quality care through effective leadership (Bryce et al., 2018). Bryce and colleagues discussed the role of responsible appointed officers towards healthcare professionalism which includes oversight of clinical activities, and performance management of doctors, the setbacks with doctor-manager hybridisation and the complexities of the interplay between these relationships as non-medical officers or doctor-managers responsible for oversight are perceived as an elite group leading to a division in the working environment and resistance to change. However, regardless of who is in charge, the

doctor-manager or non-medical appointed officer, an oversight is vital for improving health care practices (Liberati et al., 2019; Kabongo et al., 2017).

The research finding shows management oversight is crucial in Rivers State to ensure that health care equipment is well maintained, checked, and regularly serviced as accessibility issues contribute to maternal-child mortality (Okonofua et al., 2017). The organisational priorities are aligned to patient safety, especially during industrial strike actions, night-time health care services (Okeke & Chari, 2018) and during regional conflict regions such as the Boko Haram Insurgency (Chukuma & Ekhator-Mobayode, 2019).

Management oversight is necessary to ensure proper distribution and management of financial and HR since there are improprieties in this regard (Izugbara & Wekesah, 2018), to develop an organisational culture that supports innovation and change, the implementation of evidence-based practices (Callister & Edward, 2017; Madore et al., 2017), and to promote a no-blame culture for incidences but maintaining a just culture geared towards collective accountability for patient safety (Kringos et al., 2015; Aveling et al., 2016) and a decentralised system of communication (non-bureaucratic) necessary for teamwork, integration and coordination of healthcare to enhance intra- department and inter-department or organisational relations (Kuruvilla et al., 2014; Say & Raine, 2007)

The management oversight role is to liaise and strengthen healthcare activities with external services such as other departments outside the gynaecology and obstetrics department, other private-primary practices, specialised health care services, and support services such as blood bank, laboratory and ambulance services (Izugbara & Wekesah, 2018). In which case, timely referral and effective treatment of patients is enhanced, multidisciplinary teamwork and inter-

department collaborations for patient management can be achieved (Erim et al., 2012). Ensuring staff have the skills and knowledge to deliver specialised and quality care through well-defined performance indicators and assessment indicators to ensure standards are met (Lega & Vendramini, 2008; Lutwama et al., 2013).

Training and re-training clinicians to understand and use safe practices (Perry et al., 2017), appointing a floor manager to coordinate activities on the floor and enforce standard healthcare practices or protocols (Maloney et al., 2018; Bryce et al 2018). Furthermore, implementation of disciplinary measures for deliberate acts of insubordination like not compiling to record keeping and operating procedures, thereby creating a just culture and an environment of accountability (Hofman & Mohammed, 2014; Aveling et al., 2016; George & Branchini, 2017). An effective HR management team is required and must work hand-in-hand with healthcare managers to achieve a high-performance organisation (Sikora et al., 2015).

6.3.1.3 Strategic Human Resource Management (SHRM)

Serious human behaviour failures were identified in the healthcare delivery system in Rivers State, such as lack of enthusiasm for patient's lives, disregard for authority, poor implementation of obstetrics intervention and lack of skills and qualification to perform jobs. Hence, human resources (HR) management is vital to improving clinical practices. However, the role of HR should be optimised from the usual support function to aligning clinical activities to specific healthcare goals and objectives, which should lead to a high-performance organisation (Caldwell et al., 2011; Green et al., 2006). The optimised HR role is referred to as SHRM with dual functions; it vertically integrates business functions with its horizontal HR functions to gain a competitive advantage for the organisation (Green et al., 2006). Studies have linked SHRM to positive outcomes such as; individual performance, organisational

performance, organisational commitment and job satisfaction of HR professionals (Green et al., 2006). However, arguably, SHRM should go beyond providing a competitive advantage for the organisation to incorporating sustainability agenda to its function by paying close attention to the negative impact of HR practices on several stakeholders (human and social groups) (Kramar, 2014) and the external environment (Jackson and Seo, 2010). A broader definition of SHRM now includes sustainability dimensions. Notably, Jackson, Schuler, and Jiang (2014) defined SHRM scholarship as

> *"The study of HR management systems (and/or subsystems) and their interrelationships with other elements comprising an organisational system, including the organisation's external and internal environments, the multiple players who enact HRM systems, and the multiple stakeholders who evaluate the organisations' effectiveness and determine its long-term survival" (p. 4).*

The moral or ethical dimension to SHRM practices is developing and includes a multidisciplinary approach to HR management in these capacities; supporting employees' work-life balance, managing carbon footprint, assessing workforce capabilities and multiple stakeholder engagement (Kramar, 2014).

Molineux (2013) argued that a systematic approach to SHRM is more likely to facilitate the change process in organisational change discourse. These include a partnership approach to employee relationships, open communication between stakeholders, strategic job matches and distributions, aligning team performance to organisational goals constitutes a strategic approach to HR management (Molineux, 2013). Although, arguably, the systematic approach is not easily adhered to in a real environment with the complexities and unpredictability of human interaction (Flood, 1999). However, the simplification of the HR implementation system or mechanism will affect the attitude and behaviour of the workforce positively (Ostroff & Bowen 2016; Bowen and Ostroff, 2004). Also, for the effectiveness of the SHRM process,

there ought to be line managers' involvement (oversight) to facilitate the change process in collaboration with the HR professionals (Den Hartog et al., 2013; Sikora et al., 2015). It is evident from research findings that there are multiple failures in the system relating to the incapability of the HR personnel to manage the workforces effectively. There are no shared organisational goals, as such HR activities were not tailored to specific MH objectives as indicated by a health expert:

> *"We don't have common goals and values and visions that you work towards. Not at all" (DR Ali 12/06/18, 16.43 PM).)*

The recruitment process was not based on merit, and staff were not privy to training and professional development. The attitude or behaviour of clinicians does not portray an institution focused on cultivating a patient safety culture. An overview of organisational and human behaviour issues has been discussed extensively in Chapter 5. Hence, based on these inadequacies, there ought to be a strategy for HR management to facilitate desired changes for better outcomes for women and children. As shown in Table 6.1, SHRM will facilitate knowledge transfer for promoting an organisational culture focused on patient safety, managing knowledge-based human behaviour, qualification-related human behaviour and intervention-related failures.

SHRM should improve the organisational culture, primarily in clinical ethics, performance, and patient safety (Harrison & Bazzy, 2017). However, organisational culture, beliefs and values influence the SHRM strategy (Jackson et al., 2014), and the external culture of the people dictates the direction taken by the organisation (Sheehan et al., 2007). For example, many African women culturally accept traditional or spiritual healing home practices, contributing to late or unsuccessful intervention and maternal-child deaths (Yarney, 2019). Therefore, to improve obstetrics intervention and skilled birth attendance, a task-shifting

strategy is necessary to train the traditional healers to identify risk factors and timely refer to hospitals (Aborigo et al., 2015). The role of SHRM is to facilitate such external collaborations to improve MH outcomes as recommended by sustainable-SHRM authors (Kramar, 2014; Jackson et al., 2014). However, Jackson et al (2014) pointed out that the dynamics between organisational culture, business strategy, and SHRM are under-researched, which constitutes a grey area in SHRM. However, the role of the SHRM is essential for developing, implementing policies to achieve organisational goals (Caldwell et al., 2011).

Becker et al (1997) first linked HR to a high-performance work system and the organisational market values (profit & growth). Becker and colleagues proposed a model that aligns business strategies to the design of an HR system focused on; recruitment, training, the motivation of human capital to improve productivity. Since then, several SHRM theoretical approaches have been developed focused on organisational practices that influence human capital rather than the people (Wright & MMahan, 2011). Wright and MMahan (2011) argue that investing in human capital does not automatically result in high productivity. Instead, employee behaviour bridges the gap between human capital and organisational performance proposed by Becker et al (1997). For example, a highly skilled employee will not produce the best if mistreated or used as a mechanism to produce profit without considering the impact of the job role on his work or personal life. In which case, there could be a decline in financial value despite the investment in human capital (Kramar, 2014).

There are several theoretical perspectives in SHRM, and it is debated among theorists which model embodies the critical functions of HR management, whether the chosen approach will ultimately produce the desired productivity and financial value. Therefore, diverse SHRM has been widely employed and analysed in HR literature such as the Ability –Motivation-

Opportunity (AMO), Behavioural Perspective, Human Capital Theory, Resource-Based View and Social Exchange Theory (Jiang & Messersmith, 2018).

The behavioural perspective is consistent with Wright and McMahan's behaviour-performance concept in SHRM. In consensus, MacKenzie et al (2011), in their study, showed that proper management of staff behaviour resulted in the development of employee awareness, influential ethical culture, compliance with set standards and good HR governance. Therefore, it is evident that management oversight is critical to ensure that internal and external healthcare standards are met. Typically, this can be achieved by setting and enforcing key performance indicators–KPIs for monitoring staff effectiveness and the HR function is responsible for the task (Jackson et al., 2014). Also, conduct direct observation and supervision during healthcare activities to ensure standardised protocol in MH (Perry et al., 2017). However, effective monitoring and supervision by the HR personnel cannot be achieved without collaboration with the line or floor managers (Sikora et al., 2015; Mackintosh & Sandall, 2016).

Traditionally, a high work performance system constitutes a comprehensive recruitment and selection process, robust appraisal system, compensation plan and specific or targeted training (Takeuchi et al., 2009). However, in a large-scale evaluation of unit-level organisational performance, Messersmith et al (2011) showed that job satisfaction, commitment and psychological workforce empowerment were crucial drivers of high performing system and contributed to Organisational Citizenship Behaviour. The behavioural dimension to SHRM led to developing a broader AMO framework that covers three primary HR responsibilities; skill-enhancing, staff motivation and creating opportunities (Jiang et al., 2012) however, if the cost of delivering the AMO model (human capital investment) outweighs the estimated business investment returns, productivity declines (Kaufman, 2015a).

Based on the Social Exchange Theory, providing the right motivation & reward system is associated with a higher level of productivity because employees tend to reciprocate rewards with positive behaviour (Messersmith et al., 2011). In contrast, Kaufman (2015b) argues that incentives could lead to staff motivation and high performance in theory, but incentives are ineffective where the employee has specific unmet needs (need-based theory). The initial model by Becker et al (1997) was transparent that employee reward could only produce the expected productivity when designed around the business's needs (strategy).

Nonetheless, SHRM approaches focused on human capital are still viable and valuable for improving organisational productivity. The two main SHRM approaches associated with human capital development are the resource-based perspective (Kaufman, 2015a) and human capital theory (Polyhart et al., 2014). A study conducted by Wang & Chen (2013) using structural equation modelling revealed human intellectual capital as a mediator between a high performing work system and innovative capabilities for competitive advantage. However, Crook et al (2011) meta-analysis of sixty-six (66) studies on human capital or resource-based theory revealed that human capital development only leads to productivity where the skill set is not readily tradable in a competitive labour market, and performance criteria are linked to profit. Crook and colleagues further suggested that firms should only invest and retain specific human capital for competitive advantage. In agreement with Becker et al (1997) to link reward to business strategy.

The human capital approach starts with assessing the organisational needs in terms of human capacity, recruiting the high calibre staff and developing staff competence in line with business strategy (Kaufman, 2015a). Also, creating an individual staff development plan (CPD) is

essential to enrich the workforce, engage clinicians with international, local training and conferences, and a practical plan for knowledge transfers from experienced clinicians to new and inexperienced employees through targeted and induction training.CPD will be particularly effective in the Nigerian health system because a knowledge assessment study by Okonofua et al (2019) involving three-hundred and seventy-one providers showed that emergency obstetrics' knowledge and reporting skills were lower than average. Therefore, they require a plan for human capital development for better MH outcomes.

Several studies have seen the positive impact of human capital development on organisation productivity. For example, an investigation by Subramony et al (2018) into two-hundred and twenty-three (223) organisations in a developing economy showed a positive impact of leadership development practices (skill and ability enhancement) and human capital on organisational performance. However, the measurement of human capability could be problematic and, in both cases, limited (Wright & MMahan, 2011); whether the measurement is based on individual human capacity (Ployhart and Moliterno 2011) or human capability (Takeuchi et al., 2007). Researchers like Nyberg et al (2014) have called for multi-level integration of both SHRM perspectives as the different approaches will affect individual or unit performance.

Therefore, the SHRM approach recommended in this study constitute a bundle of HR practices and diverse perspective as recommended by Ostroff and Bowen (2016) and Jiang and Messersmith (2018) to meet different categories of the workforce, external stakeholder, patients' needs (customers), as well as the general organisational goals. SHRM is particularly useful as the HR management in hospitals in Nigeria faces complex and multifaceted internal and external factors influencing the healthcare delivery system. Vo and Bartram (2012)

highlighted failures by Vietnamese hospitals to adopt HR practices in sync with external stakeholders (government), which negatively impacted clinicians and the quality of patient care. Thus, the most effective HR system approach incorporates all SHRM dimensions into MH in this case. Nevertheless, SHRM practice must commence with a clear understanding of the MH delivery strategy for improving outcomes, defining healthcare goals and objectives for competitive advantage where competition in healthcare is based on improved patient value or quality (value-based system) and just for profits (reducing healthcare cost at the expense of quality) (Porter & Teisberg, 2006). The HR system must embed internal and external clinical standards that guide the health care delivery process and adopt innovative practices through human capital developmental practices (Ostroff and Bowen, 2016) and behavioural management approaches but in line with business strategy (Wright & MMahan, 2011).

6.3.1.4 ICT in Maternal Care

The role of SHRM and management oversight have been discussed extensively in previous sections of this Chapter, and the significance of their functions toward creating a high performance or value-based work system cannot be overemphasised. A value system utilises an integrated system is to manage clinical activities, human resources, internal and external stakeholders (Porter & Lee, 2013). Porter and Lee's value-based system suggest that the desired productivity cannot be achieved without an integrated ICT system for recording, sharing information and engaging with women throughout the treatment trajectory instead of an isolated, simplistic delivery system. In MH, the treatment trajectory is from the pre-pregnancy or marriage, during pregnancy, labour, delivery, post-natal to the infant and toddler stages (Damayanti et al., 2019).

Based on an extensive study by Damayanti and colleagues, an integrated information system approach through the patient trajectory led to early identification of maternal risk and better management of the patient condition. Similarly, Stroetmann (2013) asserts that the ICT system focused on improving quality measures led to more sustainable healthcare and reduction in healthcare costs. For example, the ICT system was used to predict diabetes symptoms helped to avert the cost of hospitalisation and treatment (Brisimi et al., 2019). ICT was implemented in nursing care for the frail and elderly to enforce person-centred, cost-effective, and quality-controlled care (Kim et al., 2017) and coordinate chronic disease management care (Fico et al., 2016).

The use of ICT has two main functions; mobile-health (m-health) to support treatment and disease prevention through text message reminders such as the Abiye project schemes used in Nigeria (Love, 2013) and the electronic-health (e-health) devices which are more advanced tools for data acquisition, patient record management (Bervella & Al-Samarraieb, 2019). The e-health tools implemented in Nigeria include the Malahfiya Project, Mobile Community Based Surveillance (mCBS) and the OpenMRS system useful for enhancing referrals, treatments and support diagnosis of illnesses (Obasola et al., 2015). Although several ICT systems were implemented in some regions in Nigeria, it is yet to gain prominence in Rivers State (Obasola et al., 2015). The research finding shows that hospitals in Rivers State rely on paper or manual records that contribute to misinformation during healthcare activities and healthcare slips due to missing information and data errors. As a result, it affects the delivery of timely and effective obstetrics interventions and MH outcomes. The research participant highlighted this concern. Dr Cal said:

> *"We often depend on recall from your memory, that is, if you eventually remember to document it because we don't have machines that save some of the vital signs and information. Writing on memory leads to a lot of medical slips and errors". (7/06/18, 22.40 PM).*

ICT in MH is needed to strengthen the organisational culture, disseminate information among clinicians, prevent healthcare slips, manage direct and indirect medical conditions, coordinate healthcare activities, and strengthen intra-and inter-organisational relationships (Table 6.1).

Apart from HR Practices and the role of the manager towards cultivating a patient safety culture and a decentralised communication system among healthcare workers, ICT platforms will help in these endeavours to bridge the bottom- top communication gap among clinicians; for the shared decision-making process (Blank et al., 2013), better doctor-patient relationship and patient management (Stoffers, 2018; Anstey Watkins et al., 2018). Doing so leads to proper healthcare coordination among clinicians, nurses, doctors, midwives and consultants, strengthening the referral system and managing external relationships between primary, secondary and tertiary healthcare systems, specialised care and private practices (Dixon et al., 2010). However, Dixon and colleagues pointed out that patient autonomy is a vital element of the ICT referral system, as their ability to choose their preferred practice is lacking, including information on waiting times and the impact of the ICT system on the consultation time.

E-health will ensure minimal health care slips due to paper or manual record systems contributing to data entry and medication errors (Jindal & Raziuddin, 2018). Hess et al (2019) analysed incidence in oncology care due to medication error pre and post-implementation of e-health, and it was revealed that data errors and health risks were minimised with the introduction of e-health. Also, e-health provides a central health recording system for easy access and dissemination of patient information and supporting evidence-based research and practices (Anasi, 2012; Raman et al., 2018). In MH, m-health helps book antenatal, post-natal

appointments, send reminders, follow-ups on sexual health and social care issues for better engagement with women all through the pregnancy trajectory (Anstey Watkins et al., 2018; Damayanti et al., 2019). Although, technological limitations such as data protection or security issues, lack of interoperability, and system functionality must be resolved to benefit from ICT innovations in healthcare (Steele Gray et al., 2018). Including implementation issues highlighted by Lau et al (2012), such as incompatibility of e-health with clinicians, healthcare practices and patients due to the complexity of the design.

Blank et al (2013) recommended that clinicians' careful planning and early involvement eliminate barriers using the computerised Clinical Decision Support System (CDSS) for maternal and prenatal care in rural Sub-Saharan Africa. Smilarly, Nyame-Asiamah (2020) revealed manager-clinician tensions in adopting ICT infrastructure and telemedicine in a Ghanian hospital. Nyame-Asiamah recommended collaborative efforts in the ICT design process, balancing the power dynamics preventing active participation in ICT use, thereby enhancing all parties' general acceptability.

However, in developing countries, the shortcomings with ICT infrastructure (e-health and m-health) includes; poor infrastructure, low IT skills, and non-multilingual text messages and voice messages (Bervella & Al-Samarraieb, 2019; Anstey Watkins et al., 2018). Also, the use of ICT is not an end; ICT systems must integrate multiple stakeholders in the continuum of care (Obasola et al., 2015; Porter & Lee, 2013; Raman et al., 2018). In agreement, Barkman & Weinehall (2017) assert that collaboration between policymakers, the healthcare system, community health workers, private sectors and educational sector is a precondition for the successful implementation of ICT based on an observational study in three low-middle income countries; Ethiopia, Ghana and Sweden. A national agenda is required to strengthen

collaborations and address issues implementing ICT platforms in all three countries. In this context, first, the government must provide ICT infrastructure to support MH delivery, train and provide support for IT use, and ensure proper maintenance of ICT systems. An ICT system tailored to key improve outcomes or organisational protocol with solid functionality is recommended to provide the platform for change in low-resource settings (Blank et al., 2013). Internally, health care managers must provide supervision and SHRM to facilitate the correct use of ICT platforms (Murray et al., 2011)

6.3.1.5 Internal Audit & Monitoring System

Globally, there is an increasing amount of pressure on healthcare providers, policymakers and stakeholders to improve the quality of MH delivery and patient outcomes following the new launch of United Nations' Sustainable Development Goal (3.1); to reduce the mortality ratio to 70 deaths per 100000 live births by 2030 (Alkema et al., 2016). The previous sections addressed the role of management oversight, SHRM, SOP, and the integrated ICT platforms to enhance the system's MH delivery and product quality. However, it is impossible to achieve quality without an adequate and continual internal audit and monitoring system.

Regular audit acts as a conduit for improving healthcare practices as weaknesses are identified, and further actions plan to be put in place can be re-evaluated (Alhatmi, 2010). In Rivers State, one of the major setbacks with the MH delivery system is the irregularity with internal audit and monitoring system. The frustration with the dysfunctional auditory system was expressed during the interview by the research participant: She said:

> *"I remember growing up during my residency programme we had an internal audit in the department, where we [review cases] to ensure that they don't happen again, but yes we say it is in place, but sometimes we don't follow it to the core, and they are not very regular. So, in the audit done in the last few years, we didn't see any report. That*

is why it should be published to build health management and help maternal mortality reduction" (Dr Mya 15/05/18, 16.55 PM).

The ISO standard provides a blueprint for total quality management and its process, which includes; a well-documented procedure, conducting a planned audit at regular intervals, transparent reporting of information, safeguarding of information, taking appropriate actions on nonconformities, verification and reporting the result of actions implemented to improve quality (ISO, 2018, Russell, 2003).

It is clear from the above statement that participating hospitals do not conform to the auditory process stated in the ISO 31000 standard. Russell (2003) stated that conformity with the ISO audit process validates audit finding because it is focused and aligned with the key processes. In this context, there was inconsistent documentation of medical incidences report in Section 5.1.2.3, coupled with the lack of an ICT system for active recording and sharing of information resulting in misinformation. Regardless of the audit approach or standard adopted, the inaccuracy of healthcare information is a challenge to the validity of the audit process in Rivers State. More so, the characteristics of the audit team determine the acceptability of the monitoring process, whether the selection is from independent non-medical professionals or medical practitioners. In both cases, a negative perception of the audit team could be problematic (Bryce et al., 2018). Grant et al (2015) recommended a balance between the two-counterpoising governance, the healthcare management oversight and external professionals. Their roles can be re-stratified to achieve a hybridised audit team for better acceptability and coordination.

The audit team is responsible for identifying the aspect of the MH system to be audited. Based on research findings, all internal components of the system should be audited, as shown in

Table 6.1. Non-conformities due to technical issues, organisational issues, human behaviour and medical or patient-related factors and mal-practices within the system should be audited. To identify weaknesses and strengths of the system, put in place action plan to improve practices such as displaying protocol for infection control and management of preeclampsia in the staff areas and closely monitoring improvement using document trail (ICT platform) to ensure the hospital is working according to set standard or organisational protocol.

6.3.2 External Measures or Action Plan

The healthcare system is influenced by environmental activities (external factors) impacting the quality of care. Therefore, external measure towards improving MH outcomes is inevitable. Based on research findings, a network of actions is needed. It can be achieved through the Educational Regulatory Body, Government Intervention, Community Intervention, Non-Governmental Organisations, Public-Private Partnerships, Collaborations with The Traditional Birth Attendants and the External Healthcare Regulatory Bodies.

6.3.2.1 Educational Sector/ Regulatory Bodies

A recent publication in the Health Foundation by Dr Helen Crimlisk (2019) highlights the long-term plan to address workforce issues (staff shortage) in the National Health Service, United Kingdom, through a partnership with the education sector. The educational provider is to work in collaboration with the local organisation to create new healthcare roles, recruit people, train or be equipped to carry out specific clinician assignments. This model has successfully bridged the knowledge gap in microbiology, standard precautions and infection prevention regulatory requirements as there was no prior educational program developed in these areas, as demonstrated by Millward (2018). In the study, twenty-five matrons participated in infection prevention educational program across hospitals in the UK, and a qualitative inquiry into the

impact of the program on patient safety and the quality of healthcare delivery in participating hospitals revealed a reduction in infections, adherence to clinical standards by clinicians and an upscale of matron's role to include leadership in infection prevention.

Similarly, in South Africa, educational outreach on management tools in non-communicable chronic disease and mental healthcare showed the feasibility of expanding nursing role in prescribing without any side effects (Fairall et al., 2016). Likewise, partnerships between the educational sector and the health provider for targeted workforce training and intervention should be adopted in Rivers State. Unfortunately, the fragile state of medical colleges in Africa, as well as Nigeria, is visible. A health consultant in one of the participating hospitals in this research described the malpractice in the educational system in Nigeria. In a statement, he said:

> *"We have a lot of problems with our educational system, where someone has passed all the pre-requite exams and thinks he is qualified to read medicine, but the institution that is in charge of his admission decline to offer him the desired course because he has no godfather or money to pay to the system. As a result, we have pharmacists that want to do the job of a doctor or nurses that will not take instructions" (Dr Cal 7/06/18, 21.23).*

From the above statement, it is evident that the dysfunctionality in the healthcare system in terms of staff competencies and internal conflict between cadres of health care staff stems from the educational and hospital recruitment system. The role of the educational sector (medical colleges) towards enrolling and training the right student based on merit is essential as it is ultimately responsible for the quality of clinicians and MH outcomes. It is essential that a standard recruiting and screening process be maintained, such as using multiple skill and competence assessments to validate the selection process, training of nurses and community

workers to take on more advanced roles (task-shifting strategies) and the provision of specialist training for physicians.

Due to the massive migration of workers to urban regions and out of the country to developed countries, attraction and retention initiatives will enrich the workforce in developing countries (Omer & Aziz, 2016). Although, Omer and colleagues acknowledge that contextual factors such as security issues in conflict regions, poor living and working conditions would deter retention efforts. A typical case is seen in the impact of Boko Haram Insurgency on hospital facility opening times, causing a reduction in skilled birth attendance in Nigeria (Chukwuma & Ekhator-Mobayode, 2019). In consensus, Snowden (2018) states that expanding medical colleges and practices as a tool for improving health outcomes is far-fetched and complicated in a fragile economy. He argued that quality intervention requires well-trained clinicians and infrastructural and technological development for medical colleges in a developing economy. Hence, national economic development is more important than medical education because it leads to an efficient health system. In conflict regions, Kruk et al (2010a) advocate for policy commitment to providing essential health services and building social programs and healthcare accountability. However, national agendas and developmental design must not be left to policymakers but should include educational institutions, the health sectors and other stakeholders (Smith & Hunsmann, 2019). Several researchers have also suggested the integration of diverse network development partners for strategic change (Smith & Rodriguez, 2016; Shearer et al., 2016).

6.3.2.2 Government Intervention

The public health service consists of the primary, secondary and tertiary healthcare system. Nigerian Health Sector Market Study Report (PharmAccess Foundation, 2015) provides an

overview of healthcare funding conduit; the Local Government is responsible for funding the primary healthcare, the State Government provides secondary healthcare, and the Federal Government is responsible for tertiary healthcare provision, policy development, regulating healthcare practices and ensuring accountability or stewardship. The role of primary, secondary and tertiary care is not well-defined, leading to the dysfunctional healthcare system without proper accountability and weak health integration among the levels of care (FMOH, 2010). There is also a highly bureaucratic funding distribution channel, such as the lack of collaboration between Federal and State governments to effectively implement the National Health Insurance System in the grassroots (Onoka et al., 2014). In many cases, money allocated for clinical projects is siphoned through the funding conduits, as indicated by the research participant. He said:

> *"So, you find out that generally in Nigeria, lack of funds is an issue. It might not be there, but a few persons will embezzle the funds even when it is there. Therefore, it is important to implement changes that relate to funds". (Dr Joe 15/05/18, 22.29 PM).*

This study calls for healthcare accountability and political will in Rivers State for strengthening and improving the MH outcomes in Nigeria. In consensus with the FMOH report (2010), for accountability in healthcare and improvement in Nigeria and several researchers such as Shiftman (2007), Smith & Shiftman (2016), Hofman & Mohammed (2014), Izugbara & Wekesah (2018) and Oknonofua et al (2017). In which case, healthcare providers must engage with the Federal Ministry of Health, State and Local government to bring transformative change (Smith & Hunsmann, 2019). For example, Millard et al (2015) used social network analysis to examine the socio-political interactions between organisations and individuals involved in misoprostol (used to prevent postpartum haemorrhage) in Africa and South Asia. The effective distribution and use of misoprostol had a strong interdependency between funding bodies, healthcare providers, researchers, and interested parties in the society (non-

governmental organisations). In agreement, having conducted a synthesis of studies in low to middle countries, Ciccone et al (2014) established a governance mechanism that supports a decentralised healthcare system, diverse stakeholder involvement, community engagement, and strengthening of the social capital has a positive impact on health outcomes.

Using the three-delay framework associated with maternal mortality by Thaddeus and Maine (1994): Type 1 delays relate to the decision to seek care; Type 2 delays is due to the inability to reach hospital facility and Type 3 delays associated with accessibility issues. Government intervention is required to address all three types of delay influencing MH outcomes.

Type 1 Delay Intervention:

Type 1 delays are patient-related factors influencing health-seeking behaviour. This research finding highlights multiple patient factors such as illiteracy, poverty, the role of cultural and religious practices on health-seeking behaviour discussed extensively in the previous Chapter. The impact of socio-economics factors on MH outcomes is also well documented in several studies (Adjiwanou et al., 2018; Yarney, 2019; Pratley, 2016; Kaiser et al., 2019; Ntoimo et al., 2019). The literature review (Chapter 2) shows clinical and non-clinical factors contributing to maternal-child mortality in Sub-Saharan Africa, including Nigeria.

There should be public engagement programs to create awareness (education) on MH issues and financial empowerment schemes to encourage women to seek healthcare (Burroway & Hargrove, 2018; Ensor et al., 2014; Ononokpono et al., 2014). Local and state governments are the main drivers of effective grassroots healthcare interventions and educational programs based on the government distribution of power. For instance, providing access to contraceptives at the local level is a primary intervention for preventing unwanted pregnancies

and reducing the rate of maternal death (Ahmed et al., 2012). Access to contraceptives is said to empower women, improve family finances and lead to economic development (Brunson, 2019).

Also, financial empowerment schemes such as vouchers or cash transfer programs led to facility based-deliveries, bridging wealth-related inequalities associated with MH (Ahmed & Khan, 2011). Although Community intervention targeting both men and women resulted in better outcomes, as seen in a study by Kusuma et al (2016), household cash transfer had the highest impact on health-seeking behaviour. However, community cash transfer was more encompassing as it improved maternal health knowledge, nutritional intake and led to integrated healthcare at the grassroots. Community education will empower and motivate men to participate in women's reproductive health, helping women make informed MH decisions and promote contraceptives (Adjiwanou et al., 2018; Ensor et al., 2014).

Likewise, providing universal health insurance will facilitate health care utilisation (Onoka, 2016). WHO (2013) stresses the need for countries to achieve universal health insurance coverage for their citizens, which aims to reduce out-of-pocket payments and guarantees access to healthcare when needed. Nigeria has sought universal health coverage over the years by introducing the National Health Insurance Scheme in 1966 through the federal government appointed Health Management Organisations in charge of insurance distribution (financing) across states in Nigeria (Onoka, 2016). However, the National Insurance Scheme has been unsuccessful in providing universal coverage, as the current system covers only 0.3% (0.48 million) of the entire population. At the same time, grassroots citizens like the local farmers, traders, and labourers cannot access insurance (Awosika, 2012).

Onoka (2014) pointed out that the weak mechanism between the State Government and Health Management Organisations contributed to the inefficiency of the national insurance system. Therefore, Onoka (2016) recommended an overhaul of the current insurance system through effective regulation and governance to control inflation and prices, the introduction of independent organisations to minimise conflict of interest and the proper display of price plans to guide consumer choices.

It is clear from several studies that financial schemes will empower women, and women's empowerment is linked to antenatal care attendance, skill-birth attendance, use of contraceptives and ultimately improved MH outcomes (Kusuma et al., 2016, Ahmed and Khan, 2011; Ahmed et al., 2010). However, Kuwawenaruwa et al (2019) revealed that despite the availability of financial support, women still registered late or did not take up take insurance on time, and the quality of MH outcomes did not improve. Similarly, an investigation into large-scale job guarantee programs for women did not increase facility-based delivery among poorer households (Parmar & Banerjee, 2019). This indicates the conceptual issues associated with definitions of empowerment that are more inclined towards economic empowerment rather than the underlying societal constructs.

Pratley (2016) highlighted the multifaceted dimensions to empowerment that could influence the decision to utilise healthcare, such as social, psychological, economic, political, legal and health-related empowerment. For example, in many African countries, men are considered the breadwinner of the family and their involvement in maternal care is perceived to dominate women's healthcare choices (Ganle et al., 2016). Also, their masculinity is criticised in female spaces as they are considered weak in a patriarchal society, which undermines the legitimacy of the men's involvement in antenatal care (Atkins et al., 2015). Therefore, community

intervention targeted at breaking such societal norms will improve the social dimension of empowerment.

According to Pratley, psychological empowerment is the ability of women to actualise their goals; politically, for women to be well-positioned in government to promote women's rights and agenda in a male-dominated society; and legally, being able to take possession of her husband's estate when he passes. Therefore, a strategic government initiative for women empowerment should cover all dimensions for a sustainable MH outcome. Brunson (2019) suggested that rather than provide access to contraceptives, women should be supported to make an informed decision through public awareness, which asserts women's reproductive rights and autonomy. To achieve this, Ahmed & Khan (2011) recommended a system-wide approach to understand the socio-economic disparities associated with improving women's health. It includes; improving the quality of MH delivery, managing patient-related issues and providing infrastructural development to improve health access and utilisation.

Type 2 Delay Intervention:

Type 2 delays constitute the hospitals' external environment issues, significantly impacting MH outcomes. A lack of primary obstetrics care in some rural areas contributes to a large scale rural-urban migration in situations, especially where more advanced treatment is needed to save a life (Nnebue et al., 2016; Kuuire et al., 2017). In many regions, there are infrastructural issues such as bad access roads to hospitals, scarcity or high cost of fuel for using vehicles to hospitals and a weak transportation system (Moore et al., 2011). Where there are no means of transportation and the proximity to healthcare centres is far, women walk miles to access skilled care (Ntoimo et al., 2019). In which case, many women present late with severe complications or an outright instance of maternal death before getting to the hospital. Okeke

& Chari (2018) revealed that the inability for women to get transport at night, between 8 PM - 8 AM, contributed to additional ten deaths per 1000lives. It is evident from research that timely access and intervention are essential for any successful outcome, especially in emergencies (Mbachu et al., 2017). Therefore, logistics and transportation to the hospitals are as crucial as any medical intervention (Evans et al., 2013). Because logistics involved in accessing facility-based care is very complex, many women resort to their traditional birth attendants or spiritual homes managed by unskilled personnel for fear of dying before getting to the hospitals (Ntoimo et al., 2019). Tukur et al (2010) indicated that 35% of women tried herbal medicine during emergencies while 20% waited for their husbands to return. Consequently, unskilled births attendance and delays in accessing facility-based care have a significant negative impact on MH outcomes in Nigeria (APHRC, 2017). It is evident in a case-control study involving 375 patients by Adeoye et al (2015), where complications were identified late during antenatal care bookings, and late referrals contributed to maternal morbidity in a tertiary institution in Nigeria.

There are also security issues in Rivers State because of the rise of Boko Haram Insurgency and the economic downturn (Amalu, 2015; Enaikele et al., 2017). Based on the Foreign and Commonwealth Office (2017) situation report, there is a high threat of kidnap and violent crimes throughout Nigeria, including Rivers State. Alloh & Regmi (2017) report problematic security issues in Nigeria, affecting the deployment of medical practitioners to conflict regions and access to primary care. Clinicians object to placements in certain regions for security concerns, leaving the pregnant women unattended (Chukuma & Ekhator-Mobayode, 2019; Enaikele et al., 2017). According to Kruk (2010), in conflict regions, accountability to the citizens is paramount; political will and commitment by the government to provide essential health services and build a social program for positive outcomes. Chukuma & Ekhator-Mobayode (2019) suggested that social programs in conflict regions should include; providing

safe means of transportation at a reduced cost to hospitals in areas of conflicts, extending hospital time, reinstating public service structure and adopting telemedicine for remote intervention (e-health).

Therefore, government intervention targeted at improving Type 2 delays such as providing infrastructural development; sound transportation system, roads, basic amenities (gas, electricity, water) and a high level of security will enable both women and clinical staff to get to the hospital on time, including an efficient ambulance system to convey women to the hospital, including air transport for rural to urban migration such as seen with the Abiye project where enhanced transportation increased health utilisation, timely intervention and reduced maternal mortality ratios by 30% in Ondo State, Nigeria (Obasola et al., 2015). Studies show that timely access will result in a more successful MH intervention because of the timely detection of complications (Fagbamigbe et al., 2017; Okonofua et al., 2017).

Type 3 Delay Intervention:

Researchers have indicated that antenatal care attendance (health utilisation) is a primary intervention for managing obstetrics complications (Morisaki et al., 2017; Kuuire et al., 2017). However, health utilisation does not guarantee better outcomes for women, rather the quality of healthcare delivery (Lange et al., 2016). Studies revealed that the quality of obstetrics care in the Nigerian healthcare system is inadequate due to inadequate clinical facility, resources and tools contributing to Type 3 delays (Okonofua et al., 2017, Izugbara & Wekesah, 2018). In low-income countries, Type 3 delays are considered as the highest contributor to maternal death, as many women try to reach the hospital but die due to lengthy waiting times, shortage of drugs and unavailability of competent clinicians (Mgawadere et al., 2017; Ntoimo et al., 2019; Gunawardena et al., 2018). Omo-Aghoja et al (2010) revealed that 61% of deaths were

associated with Type 3 delays, 28.6% Type 1 and non-associated with Type 2 delays in participating hospitals in Nigeria. The study showed that Type 3 delay was primarily due to a weak referral system between care providers, inadequate medical staff, intensive care facilities, blood and oxygen supply. Also, a detailed analysis of maternal death and obstetric care audits in studies from 2000–2014 showed significant delays in conducting caesarean section, lack of safe blood transfusion and unavailability of magnesium sulphate for the treatment of preeclampsia in hospitals in Nigeria (Hussein et al., 2016). Likewise, the inadequacy of the healthcare infrastructure in Nigeria is consistent with quantitative and qualitative findings in this study which has been discussed extensively in Chapter 5 of this report.

The state of clinical infrastructure and quality of care can influence women's perception of maternal care, preventing health care utilisation (Lange et al., 2016). The APHRC (2017) report revealed that less than half of the women did not attend the recommended four prenatal care during pregnancy, and only 35.8% of women had facility-based deliveries in 2013. Moreover, poor healthcare-seeking behaviour substantially negatively impacts obstetrics interventions and contributes to maternal mortality and morbidity (Barker & Mate, 2012). Hence, this study calls for improvement in the quality of healthcare delivery in Rivers state. According to Mezie-Okoye et al (2012), the local and state government should upgrade healthcare facilities and deploy medical staff to improve the quality of obstetrics care services. Piane (2019) conducted an extensive analysis and synthesis of research conducted in Nigeria relating to maternal care and revealed a convergence of recommendations for improvement in emergency obstetric care through adequate provision of clinical resources, essential drugs and medicines, blood supply, and upgraded clinical equipment. Several researchers recommended the scaling up HIV testing and antiretroviral drugs for women in West Africa to prevent mother to child transmission (Hill, 2012; Msellati, 2009).

Direct medical factors contribute to 73% of maternal deaths, such as haemorrhage, sepsis, preeclampsia, abortion, ruptured uterus contributed major death in Nigeria (Say et al., 2014; Mbachu et al., 2017; Omo-Aghoja et al., 2010). To better manage medical emergencies, Akinola et al (2010) recommended blood storage within the OBYGN department for easy access during medical intervention rather than depending on the central storage.

Likewise, commercialisation of essential drugs like magnesium sulphate to manage hypertensive conditions (Tukur et al., 2013; Hussein et al., 2016), distribution of misoprostol for postpartum haemorrhage and pre-abortion care (Prata et al., 2012) and provides adequate clinical equipment and resources will help to manage direct and indirect obstetrics medical factors. For example, in post-abortion care, the use of a technological device like the non-pneumatic anti-shock garment was effective in hypovolemic shock and haemorrhage management (Awoyemi & Novignon, 2014).

Research finding reveals an overburdened tertiary institution due to weak primary and secondary healthcare in the state. Government intervention is required to strengthen and expand primary and secondary healthcare services to minimise the burden on tertiary hospitals (Kruk et al., 2010b). To establish several specialist clinics in Rivers state and provide access to pre-conception care (Prata et al., 2012, Callister & Edward, 2017), sexual and reproductive health care (family planning & contraceptives) (Ahmed et al., 2012). Lassi et al (2014) showed pre-conception care and management of epilepsy and phenylketonuria improved MH outcomes as anti-epileptic drugs were changed six months before conception. Including post-abortion care (Awoyemi & Novignon, 2014). Erim et al (2012) suggest an integrated MH service that includes pre-pregnancy, intrapartum and postpartum stages of care. Integrated care will enable timely referral and management of obstetric emergencies (Omo-Aghoja et al., 2010). Also,

monitor and regulate support services such as blood bank services (Akinola et al., 2010) and laboratory practices to meet the high demand in obstetrics care.

Furthermore, human behaviour issues are highlighted in the research, such as poor attitude towards patients (Ntoimo et al., 2019; Jonas et al., 2017), lack of urgency, and preparedness to manage obstetrics complications contributing to Type 3 delay (Ogu et al., 2017). Based on a study conducted by Ogu et al (2017), involving eight secondary and tertiary institutions across eight geopolitical zones, an overburdened workload in hospitals contributed to an unpleasant working environment, weak performance and inappropriate response from clinicians. Including delays in the caesarean section during obstetric emergencies (Hussein et al., 2016). Therefore, large-scale medical staff deployment programs will improve workforce capability and minimise staff shortage problems regarding competence management. This impact is likely to improve women's perception of the quality of care and is directly linked to improved health utilisation and better MH outcomes (Lange et al., 2016).

Also, a weak external relation between care providers influences the referral systems discussed in Section 5.3.2.1. Late referrals delay obstetrics intervention and contribute to maternal mortality and morbidity (Adeoye et al., 2015). Therefore, the Federal Ministry of Health is responsible for developing policies and laws to regulate activities of the healthcare providers in terms of how MH coordinated among private, public and support services. The developed policies will help manage external behaviour or relationships, strengthen the referral system and enhance primary and specialist care (Omo-Aghoja et al., 2010).

To ensure standardised practice across hospital settings, a government-assigned independent regulatory body is mandatory to maintain a standard of care and keep care providers

accountable. Section 6.3.1.1 elaborated on the role of standardised practices. Also, effective government and management oversight leadership is needed to combat crime and corruption by ensuring allocated healthcare funds are not embezzled but used appropriately in the hospitals, as discussed in Sections 6.3.2.2 and 6.3.1.2, respectively. Likewise, the role of ICT in MH is significant to achieve a highly functional system (Section 6.3.1.4). Government support is required to provide funding for the design and development of an efficient ICT infrastructure for proper coordination and control of healthcare activities, which supports healthcare integration, early identification of risk factors and facilitate a risk mitigation process and timely referral. There should be maintenance funds for the ICT system and clinical infrastructures allocated to hospitals for sustainability. Most importantly, funding for innovative research and international collaborations to foster technological advancements and all can be achieved through SHRM previously discussed (Section 6.3.1.3).

6.3.2.3 Community Intervention

Region Region disparities in MH outcomes are evident in studies. Using the decomposition analysis of the NDHS conducted in 1990 and 2008, Adeyanju et al (2017) identified MH inequalities in terms of place of residence (North-east, North-west, South-east and South-west), urban and rural communities, religion (Muslim and Christians), level of education and wealth index as community characteristics that impact significantly on the health-seeking behaviour of the women. Likewise, a multilevel regression analysis of the survey showed that women in the northwest and northeast had a lower post-natal attendance (Ononokpono et al., 2014). Adedini et al (2014) suggested that a region or community has a peculiar way of life (culture) and religious preferences that dominate healthcare utilisation and choices. Also, wealth-related disparities are seen among women with no formal education, and low-income families were less likely to take up healthcare resulting in very high mortality rates (Adeyanju et al., 2017).

Despite these evident MH disparities in regions in the Nigerian communities, Ononokpono et al (2014) stated that indicators for poor health-seeking behaviour are often attributed to the individual and household factors while the impact of community characteristics are overlooked.

This research calls for specific community interventions for improving MH outcomes. In agreement with several other studies, such as Kusuma et al (2016), they advocated for community cash transfer programs rather than household schemes because it will lead to a stable community economically and facilitate better healthcare integration at the grassroots. Community involvement in the health policymaking process gives the local people and their representatives a place on the table during discussions about their care (Ciccone et al., 2014). Community support and networks are highly efficient for implementing health policies such as the distribution of essential medicines to prevent postpartum haemorrhage (Millard et al., 2015; Prata et al., 2012), also, implementing community health strategies that integrate the role of the traditional birth attendant in risk managing women like identifying maternal risks on time and making prompt referrals (Callister and Edward, 2016). However, the role of traditional healers in orthodox medicine is controversial (See Section 6.3.24). Most importantly, community education and public enlightenment are necessary to highlight the demerits of harmful cultural and religious on MH outcomes (Yarney, 2019) and provide helpful information on the use of contraceptives and advice on women's and public health issues.

This study also advocates for community intervention relating to external organisational factors shown in Table 6.1. Postpartum haemorrhage is one of the highest contributors to mortality. Twenty-three per cent of women suffered heavy bleeding, leading to deaths in Nigeria (APHRC, 2017). Therefore, the availability of blood for transfusion is a significant intervention

in obstetric emergencies. Regardless of this apparent medical factor, the blood supply shortage is still a significant problem in Nigeria, as many women have lost their lives due to the unavailability of safe blood transfusion services during emergencies (Hussein et al., 2016). The lack of voluntary blood donation leads to a considerable dependency on family blood donation and remunerated donors, often at the point of intervention with a high risk of infection transmission during a medical emergency (Nwogoh et al., 2013; Salaudeen et al., 2011)

There are society myths in the Nigerian communities deterring voluntary blood donation. According to Umeora et al (2005), some people decline to donate blood because they consider themselves not strong enough or do not have enough blood, loss of sexual drive or libido and exposure of blood to witchcraft. Some are deterred for fear of HIV screening (Salaudeen et al., 2011). Umea and colleagues considered this to be rooted in illiteracy in rural areas. Among more educated people like health workers, Nwogoh et al (2013) found out that there is no association between level of education and voluntary donation but the general disposition towards the practice of donating blood. However, the level of education was linked to donation and use of umbilical cord blood, which is a valuable source of blood where there is the shortage of allogeneic blood as prevalent in under-developed countries (Okocha et al., 2017).

These issues constitute external organisational factors that can be improved through community engagement. First, with the support of local and state governments, the care provider must provide community education to demystify myths around donating blood in communities and paint a picture of its importance to saving lives (Zanin et al., 2016). Also, to create awareness for voluntary blood donations through social media, radio and television broadcasts and provide incentives for blood donation to encourage community participation (Zanin et al., 2016). However, Obi (2007) stated that many people were aware of blood

donation but were not informed about it, advocating for including men in antenatal care and providing necessary information on blood donation. Salaudeen et al (2011) suggested free medical services for voluntary donors. A research participant described a practical account of community collaboration for blood donation. His private hospital adopted this approach to resolve the blood supply shortage and is helpful for public healthcare. He said:

> *"I went to my neighbourhood to discuss with them the possibility of their coming over to donate blood. Should we run out of blood from our blood bank and on one occasion, we were able to retrieve blood from a woman with which we were able to rescue a woman from placenta Previa. So, I have that collaboration with them, and it is working". (Dr Sam 20/07/18, 22.03 PM)*

Community intervention is also necessary to tackle patient-related factors such as cultural and religious norms. In communities in Nigeria, men are considered the head of the family and responsible for purchasing resources, and it puts them in the position to decide where the woman attends antenatal care and how the baby is delivered (Ganle et al., 2016). In a patriarchal society, community-based initiatives focused on providing relevant education will enable men to support women in making an informed decision (Adjiwanou et al., 2018; Burroway & Hargrove, 2018). Also, it helps women plan their delivery better regarding transport support during emergencies and household chores (Kaiser et al., 2019). Based on a study conducted by Ensor et al (2014), Community intervention will lead to better knowledge on maternal risks in pregnancy, skilled birth attendants and the use of emergency transportation.

Religious and cultural sensitivities in MH can require community partnerships between health care providers, religious leaders and traditional heads. Prata et al (2012) engaging community resource persons had a significant impact on the uptake of healthcare and distribution of misoprostol for postpartum haemorrhage. Similarly, Millard et al (2015) also stated that interdependency between civil society organisations, clinical organisations, researchers and

funding bodies helped distribute essential drugs and medicines. However, Yarney (2019) recommended continuous community engagement over a long period to demystify solid beliefs and culture for sustained behavioural change in rural areas.

6.3.2.4 Traditional Birth Attendant (TBA) Training & Collaboration

The involvement of TBA in obstetric care is the subject of debate. Some school of thoughts anchor their recommendation for TBA services in the absence of primary healthcare or logistics to access care in Nigerian communities (Ntoimo et al., 2019; Tukur et al., 2010). According to Aborigo et al (2015), the traditional maternity home is the first point of call for most women in low-income countries. A research participant indicated that women in Rivers State chose unskilled birthplaces over healthcare centres:

> *"We still have a lot of traditional birth attendants in the community, and people still believe in them. Some of these women, when they register for antenatal care in the primary health centre, still go and deliver in churches, quacks or traditional birth attendants that may not be very well schooled or well skilled in the act of taking deliveries, and of course, they come down with all sort of deliveries and issues" (Dr Ian 5/05/18, 10.10 AM)*

Since TBA is unavoidable in communities, a task-shifting strategy will enable TBA to monitor and manage low-risk obstetrics cases (WHO, 2012; Schack et al., 2014). However, with complicated cases, TBA cannot provide the needed support because they are inexperienced or unqualified to conduct caesarean sections. Therefore, when complications set in under their care, the TBA cannot manage complex cases resulting in an emergency trip to medical centres (Tukur et al., 2010). In most cases, women arrive late from rural areas after unsuccessful support from the TBAs. Consequently, haemorrhage or shock had already taken place, leading to an outright death before they reached the hospital (Adeoye et al., 2015). This situation has informed a push back from medical practitioners on the role of the TBAs.

Also, the TBA is an independent provider, and its activities are often not regulated by any external organisational bodies in Nigeria. Therefore, collaborations that will inform behavioural change can be quite challenging because their independence or autonomy as sole traders could deter their willingness to collaborate or learn from clinicians. Also, since this is a source of income for most TBAs, actions that undermine their practice threaten their livelihood. Also, when the TBA considers their traditional medicine more superior, taking advice from medical practitioners is non-futile. For instance, spirituality and diabolical practices are used in complex or witchcraft-related cases inconclusive in orthodox medicine (Aborigo et al., 2015; Yarney 2019). Morris et al (2014) recommended understanding traditional and cultural beliefs and practices related to pregnancy, delivery and postpartum care in communities.

Because of the complexity of involving TBAs in obstetrics care, arguably, in objection to the recommended task-shifting strategy, medical practitioners have recommended that rather than investing in training and optimising TBA's skill and knowledge, more focus should be put into recruiting, training midwives and community health workers to provide support in the grassroots. This strategy informed the Midwives Service Schemes, which, unfortunately, suffered many setbacks with deployment and retention of midwives in rural areas (Abimbola et al., 2012). Providing essential and quality services will attract women to utilise healthcare (Okonofua et al., 2018), but this might not be the case because some deep-rooted beliefs and cultures influence health-seeking behaviour (Yarney, 2019).

Presently, a vast number of women still utilising TBA for various reasons; some use spiritual or traditional homes because of far proximity to healthcare, others because of affordability, lack of awareness (Tamuno, 2011, Fakeye et al., 2009, Aborigo et al., 2015) and for their

cultural beliefs (Yarney 2019). Whichever the case, many researchers have begun to welcome the idea of collaborations. Olusanya et al (2011) suggested that TBAs practise more safely as children born in traditional homes were at lower risk of hyperbilirubinemia than children delivered in hospitals.

Prata et al (2012) stated that involving TBA in maternal care is beneficial for women's enlightenment and uptake of healthcare services to prevent postpartum haemorrhage. As shown in a study conducted by Chukwuma et al (2019), monetary rewards for referrals for TBA increased skilled care. Therefore, the TBA should be trained and equipped with skills to identify high-risk pregnancies and make a prompt referral (Aborigo et al., 2015). Also, training on infection prevention and control and how to carry out deliveries or other low-risk procedures safely (Schack et al., 2014; WHO, 2012). However, the concept of training traditional healers and medical professions to provide an integrated healthcare service needs careful consideration, understanding between parties and an effective execution plan (Nelms & Gorski, 2006; Aborigo et al., 2015; Morris et al., 2014).

This research advocates for the proper regulation of the spiritual and traditional homes in Rivers State to ensure adherence to a certain standard of practice, task-shifting strategy and collaboration with clinicians. However, the policy formulation and implementation process for transformative change and integrated care must include all stakeholders; the traditional practice representatives, medical directors and the local government (Shearer et al., 2016; Smith & Hunsmann, 2019). A dialogue between parties and a consensus on their respective obligations towards safe obstetrics care is crucial for changes to occur. However, the success of this collaboration is still very much under-research in Nigeria.

6.3.2.5 Private-Public Partnership (PPP)

Timely management of patient condition could reduce severe maternal morbidity and complications from medical factors such as postpartum haemorrhage, sepsis, preeclampsia (Mackintosh & Sandall, 2016). Therefore, an effective risk-management process should include; early identification of the problem in the patient trajectory and prompt referral to an appropriate health facility (Makintosh et al., 2013; Callister & Edward, 2017). Presently, there is a weak referral system in Nigeria and a lack of collaboration or integrated care among healthcare providers (Dixon et al., 2010; Omo-Aghoja et al., 2010). Also, the poor state of clinical infrastructure in hospitals in Rivers State negatively impacts the delivery of timely and quality MH. For example, the cardiotocography machine, which is a critical electronic device for identifying fetal complications, is not readily available as indicated by a research participant:

"In my unit, we have about two CTGs in the delivery unit, and you have like 10-15 or 20 deliveries in a day. So technically, it is inadequate. For example, it can take up to 10 hours in the active labour ward. So if you have 2 CTGs and we have more than 15 women in a day. Sometimes, technically you are seeing all of them at the same time. So, it is not whether it is available; it is not adequate". (Dr Nat 20/07/18, 22.03 PM).

The PPP is efficient for improving healthcare delivery, and maximising resources across the state (Specchia et al., 2015), mainly as most public practices in Nigeria have limited equipment. Health experts and research participants recommended the PPP as a viable solution to dealing with the lack of basic and advanced clinical tools in hospitals:

> *"We are starting PPP, private, public partnership. The public man supplying the machines gets 60%, while the hospital 40% for bringing the patient" (Dr Joe 15/05/18, 22.29 PM).*

Based on the feedback, privatisation of certain aspects of the hospitals will be necessary to provide and maintain clinical infrastructure and facilities like cardiotocography and X-ray machines. This concept is similar to the capitalist ideology in healthcare utilised in Canada (Whiteside, 2011). The adoption of PPP will enable the government to achieve health objectives more efficiently through a broader engagement or collaboration with the private sector to improve the efficacy of public investment (Specchia et al., 2015; Torchia et al., 2015). Oluoha et al (2014) showed how PPP provided broad immunisation coverage for children in Abia State, Nigeria. PPP was also effective for detecting and treating tuberculosis in China, India, the Philippines, and Nigeria (Lal et al., 2011) and recommended by WHO for the global control of tuberculosis (Lei et al., 2015). Similarly, a research participant recommended an integrated system through PPP for the effective management of patient condition during pregnancy:

> *"I want to see a person that has a fellowship in the field of obstetrics and gynaecology establishing a private institution run by themselves um and having their site close to where they have health centres. This will enable collaboration between private practitioners specialising in maternal and child health to assist the health centres. Thereby remitting the time lost on referral from the health centres to the tertiary or secondary health care". (Dr Sam 20/07/18, 22.03 PM)*

However, drawing from the study by Whitehall (2011), the capitalist healthcare system is often driven by political neoliberalism, which reduces the state influence on the economy through privatisation. They claim that PPP will leave the healthcare system in the hands of private investors driven by profit-making, which does not necessarily guarantee the quality of delivery. Whitehall pointed out that the setbacks with privatisation include increased cost of healthcare services, lack of accountability, transparency and poor-quality control. Although privatisation is associated with high cost, there is a very high need for infrastructural development in the Nigerian healthcare system as Type 3 factors are the major contributors to maternal deaths (Ntoimo et al., 2019) (see Section 6.4.2.2).

Also, with the continued decline in maternal mortality (Alkema et al., 2016), the lack of political will to improve MH outcomes (Shiftman, 2007) and the lack of primary healthcare facilities as obtainable in many hospitals in Nigeria (Okonofua et al., 2017, Izugbara & Wekesah, 2018), PPP is an appropriate intervention in Nigeria. The pros of privatisation outweigh its cons because PPP targeted at providing relevant clinical infrastructure and services will enable timely identification and management of complications. Overall, it is more economically beneficial to save lives and minimise the cost of care required for a more complex or rigorous intervention due to treatment delays (Mackintosh & Sandall, 2016). Understandably, PPP is very complex, and engagements between two entities with different organisational goals could be challenging. Oluwole & Kraemer (2013) noted some crucial lessons from PPP in managing cervical cancer in Sub-Saharan Africa and Latin America. These include an adaptable and flexible partnership with an effective coordination mechanism and communication system that is responsive to partners needs and strives to address problems on time.

For this study, the PPP sought is not just for profit-making but a collaboration that will enhance the referral system among private, public healthcare systems (Erim et al., 2012; Callister & Edward, 2017). According to Torchia et al (2015), PPP brings together the best private and public sectors: technical skills and knowledge, creative innovations, and problem-solving initiatives. PPP can improve clinical infrastructure, such as providing specialised and technological advanced medical facilities in a targeted or strategic location (based on community needs) to support medical diagnosis (Sharma and Seth, 2011).

PPP in healthcare is required to strengthen collaborations and integrate practices between hospitals and other support services such as the laboratory, ambulance, blood bank service for active patient and disease management. However, PPP is not a takeover by private investors. Instead, the government is expected to lead negotiations in partnerships, monitor the quality and safety of products and services, and ensure that people living in the community have access to facilities when needed (Torchia et al., 2015). For example, Paul Webster's Report (2015) on Lesotho's PPP hospital project highlighted an unsuccessful partnership. The government could not negotiate a mutually beneficial agreement resulting in the high cost and low quality of care and decline in net universal healthcare coverage. Hence, the government should be at the forefront of negotiations; a stipulated contracted price must be agreed between parties, measures to control inflation of prices and quality of services (Torchia et al., 2015). In some cases, the Local and State governments should provide a subsidised payment plan to support health access for indigent patients (Sharma & Seth, 2011).

PPP seems promising in the Nigerian context, but caution must be taken before partnerships. Nikolic & Maikisch (2006) emphasised the need for a critical policy evaluation to examine the impact of partnerships on patient outcomes. Shelby et al (2017) recommended that a pilot study on the PPP novel approach be conducted on a small scale to identify partnership pitfalls in treating diseases like multidrug-resistant tuberculosis and report any concerns to appropriate stakeholders. Multiple stakeholders must be involved in the PPP decision-making process to maximise the full benefits of partnerships characterised by informal communication mechanisms and trust (Singh & Prakash, 2010). These will guide and inform the selection of appropriate private investors to achieve specific healthcare goals focused on benefits in the public interest (Torchia et al., 2015).

6.3.2.6 Non-governmental organisation- NGO/Religious Groups Intervention

The finding from this research shows patient-related factors influencing the health-seeking behaviour of women in Rivers State, such as poverty, illiteracy, cultural and religious practices discussed in Section 5.5.2 of this report. The role of the government and PPP towards improving MH outcomes has also been discussed extensively in previous sections. However, NGOs can engage with more disadvantaged groups in environments where the government cannot thrive (Popple & Remond, 2000; Brieger et al., 2015). NGO and social groups have a heightened understanding of the local context relating to specific health needs and social issues. (Olivier & Wodon, 2014).

It is evident from the previous researcher that a collective effort from multiple stakeholders will instigate policy reforms and appropriate action to improve MH (Smith & Rodriguez, 2016; Smith & Shiftman, 2018; Shearer et al., 2016). These researchers assert that a convergence of ideas among politicians, healthcare institutions, individuals with technical skill and knowledge (clinicians), interested parties (advocates for women issues) will bring MH issues to the forefront of the national agenda. For example, a critical evaluation of Ghana and Tanzania MH reform by Smith & Huntsman (2019) showed multiple stakeholders' involvement and activism brought women issues to the parliament by Tanzanians, resulting in a broader commitment towards reducing MM. In contrast to Ghana reform, where lack of political and civil engagement led to weaker commitment. Hence, tackling maternal mortality should not be left to the government and healthcare providers alone or a network of clinicians and development partners. A change in network structure will facilitate change in ideas, shift in power dynamics and influence the policy change process (Shearer et al., 2016). If a network structure consists of actors with ideologies focused on enhancing women's reproductive rights, health policies will be more inclined to improve women's issues (Smith & Shiftman, 2018). Since the typical

Nigerian community is highly religious, out of 203.5 million, 49.3% are Christian and 48.8% Muslim, while 2% practised no or other religion shown in the Nigeria 2018 International Religious Freedom Report (United States Department of State, 2019). Moreover, religion has contributed to several maternal deaths as women prefer to take the advice of spiritual leaders over medical instructions:

> *"Some culture does not believe you should access medical care, or traditional or religious groups are vetting them. Some women die before getting to the hospital because of the delays. leading to high maternal and perinatal mortality". (Dr Rey 30/05/18, 9.41 AM).*

Therefore, churches, mosques and other religious organisations should play an active role in health policy development (Widmer et al., 2011). Religious groups can be beneficial for disseminating health information and promoting health utilisation by health promotion programs to encourage participation in blood donations, general health assessment, smear test, and medical research to improve health outcomes. (Anasi, 2012, Campbell et al., 2007). Hembling et al (2017), using a structure questioning technique involving five-hundred and ten mothers with children under the age of twenty-three (23) months, demonstrated that training and mobilising religious leaders in Ghana improved timely antenatal care uptake. However, religious ideologies Islamic, or Christian, could shape the activities of the NGO, preventing holistic policy development, as evident in a study conducted by Dotsey & Kumi (2019). For instance, Denis (2013) discussed disputes among Christian leaders, as recommending contraceptives promotes promiscuity or sin among members.

Nevertheless, two central norms can shape the trajectory of MH policy; women's rights and poverty eradication (Smith & Rodriguez, 2016). This research calls for International and local NGOs, religious organisations, and other social groups to reduce MM by advocating for

women's rights and bringing women issues to the forefront of political debates and policy developments (Smith & Huntsman, 2019). Social groups and NGOs can bridge the wealth-related inequalities in healthcare through financial support for poor communities (Chirewa, 2012); create incentives for women during pregnancy and develop women empowerment programs such as loans and funding for new business start-up, skill acquisition and training programs (Ahmed and Khan, 2011; Parmar and Banerjee, 2019). Also, to demystify religious and cultural practices in our communities through community education of women and the society on the dangers of poor practices and the need for health utilisation (Public enlightenment) (Hembling et al., 2017). In low-income countries, NGOs can be helpful for clinical training, development and provision of essential resources for clinical surgery, especially in rural areas (Ricca et al., 2011). However, there were management issues, and a lack of accountability between the NGO and recipients of training in hospitals in Rivers State as described by a research participant, senior colleagues take training opportunities meant for inexperienced staff for financial benefits instead of using training to enhance team capability:

> *"You find out that any time an NGO, in particular, organises any training and pay us to train nurses in family planning. For example, training organised both in Port Harcourt and in Abuja, the people I see always are people I have trained previously, so why are they coming in? it is a huge issue that older staff who has the knowledge reserve, which should nominate younger ones for training will always come and still be training because of maybe the monetary involvement and all the rest". (Dr Joe 31/05/18, 21.54 PM).*

Also, the best plan of action can be hindered by inadequate funding of the NGO, weak leadership and lack of collaboration with relevant stakeholders (Chirewa, 2012). The government and healthcare providers play a crucial role in managing the network of relationships between NGOs, churches or religious organisations and people in the community (Brieger et al., 2015). To reduce Africa's disease burden, the partnership between NGOs and government is essential for devising an effective strategy for disseminating health information,

managing tropical diseases, and financial support (Anasi, 2012). Chirewa (2012) acknowledged complexities with managing these relations and recommended a tool kit for the NGO, which includes; understanding the problem, dialogue with multiple stakeholders and a plan of action as a strategy for a successful intervention. Like the UNICEF/UNDP/World Bank/WHO successful Community-Directed Intervention program for the management of tropical diseases and distribution of ivermectin where the actions of local directors were in sync with the primary healthcare and people in the community (Brieger et al., 2015). Similarly, using the LiST analysis model, Ricca et al (2011) revealed that the community-based NGO project with clear intervention strategies and multiple stakeholders' involvement reduced child mortality rates.

6.3.2.7 Healthcare Regulatory Bodies

This study's recommendations for improving clinical practices such as laboratory and pharmaceutical services in Nigeria are critical. Likewise, addressing healthcare activities leads to type 3 delays in hospitals (Section 6.3.2.2). Internal measures for tackling maternal mortality issues discussed in detail (Section 6.3.1); healthcare providers to develop and set standards for the management of obstetrics emergencies, conduct a regular internal audit and manage human resources to achieve organisational goals. Nevertheless, an external regulatory body ensures minimum standards across hospital settings and support services, accrediting practices and regulating professional practice (Mora et al., 2018). However, their role and impact in the Nigerian healthcare system should be substantiated as it is evident from various studies that clinical settings and support services do not comply with external regulatory standards (Welcome, 2011; Onwujekwe et al., 2009). Liu et al (2016) revealed that drug vendors were less likely to register with regulatory bodies Pharmacist Council of Nigeria as such, there was no control of activities. Likewise, laboratory services in Rivers State are still very much

unregulated, and these fundamental quality issues and problems during obstetrics intervention as highlighted by a research participant:

> *"There is a major problem with our private laboratories in this country, and they are not well regulated. Anyone can start providing services, write whatever name on their laboratory practice and the next day people bring samples in". (Dr Cal 7/06/16, 22.40 PM).*

The poor regulation of clinical practices has contributed to many quality control issues and several deaths in Nigeria (Iyioha et al., 2015). Research shows that hospital in Nigeria lacks Basic Essential Obstetrics Care and Comprehensive Essential Obstetrics Care (Ugal et al., 2012). Therefore, the regulatory bodies must enforce standard practices against specific criteria through regular planned and unannounced checks of primary, secondary and tertiary hospitals (public and private setting), pharmaceutical and laboratory services, including activities of the traditional birth attendants and spiritual maternity homes. Beaussier et al (2016) suggested that regulators establish the level of acceptable risk, the probability of occurrence and the consequences of risks and develop appropriate enforcement based on risk analysis.

Although, a risk-based approach to regulating healthcare can be problematic because defining the acceptable risk level in a dynamic environment is challenging. The Care Quality Commission (2012) utilised the risk-based approach and encountered difficulties as it failed to detect risk (Griffiths et al., 2016), leading to devastating outcomes in Mid-Staffordshire Trust in the UK National Healthcare Service reported in the Francis enquiry (2013). Since then, Care Quality Commission UK has focused its approach on the quality control process rather than measurement risk standard (CQC, 2013). According to Iyioha et al (2015), the fundamental goal of regulatory bodies is to protect the patient receiving medical treatment.

The UK standard (CQC, 2013) shows the quality control process, which utilises intelligent monitoring for inspecting clinical data and gathering information from staff and patients to ascertain the quality of care. The quality of care is assessed against four criteria; how safe, effective, responsive and well-led the care is. The regulators must publish inspection reports that are ranked; outstanding, good, require improvement or inadequate. It will help to guide public view of the quality of healthcare outcomes, management and leadership issues, the staff profile within an organisation, incident profile, and the hospital facility's quality. By so doing, it promotes quality-based competition in healthcare (Porter & Teisberg, 2006), where patients can make an informed decision on their preferred medical facility (Bisceglia et al., 2019).

Where the organisation has performed poorly, the regulator is required to recommend corrective measures, provide training and support to hospitals. This approach is referred to as the bottom-up approach whereas, the top-bottom approach includes penalty or fines and punishment for poor practice or lack of compliance by the health organisation such as the dissolution of hospital practices, withdrawing of working rights for gross misconduct by clinicians (McDermott et al., 2015). According to McDermott and colleagues, arguably, the hybridisation of both approaches has immense potential as each strategy has its significance to improving quality outcomes, but implementing both strategies within a single practice could be problematic. Therefore, the Nigerian regulatory bodies must adopt an appropriate strategy that meets Nigeria's local and national agenda for healthcare.

However, the healthcare regulatory bodies in Nigeria are challenged by the lack of transparency and accountability, poor governance and financial constraints, which affect the way regulators operate (Mora et al., 2018). These issues need to be tackled to strengthen the role of the healthcare regulator and improve the quality of MH services in Nigeria. Also, the regulatory

authorities need to operate independently (bipartisan) to prevent any conflict of interest (Osemeke & Osemeke, 2017; Smith & Hunsmann, 2019).

6.4 Summary

There are preventable and unavoidable causes of MM discussed in this Chapter. Based on research findings, preventable causes are the highest contributors to poor MH outcomes in hospitals in Rivers State. Considering the complexity of these factors in the health care system in Nigeria, the PRISMA categorisation of factors enables a broader and more generalised analysis of these factors. As such, improvement measures in MH was mapped to the PRISMA flow-chart model, which consists of internal and external measures. The recommended internal measures are designed to address organisational, technical and human-behaviour issues such as setting SOP in hospitals, improved management oversight, SHRM, regular internal audit, and implementation of ICT infrastructure to support medical diagnosis for storing and sharing medical information. Understandably, the hospital cannot operate in isolation from its external environment. Therefore, the external measure will address issues from the environment. Government intervention is necessary to tackle Type 1, Type 2 and Type 3 delays to MH. Also, targeted community intervention or educational programs to improve health utilisation, strategic PPP, and active participation from NGOs and religious and social support groups. An effective healthcare regulatory process similar to the CQC, UK is strongly recommended to improve the clinical quality and MH outcomes. In the next Chapter, theoretical and practical contribution to research is discussed, the implication for policy development, the recommendation for further studies, the strength and limitation of the study.

Chapter Seven: Conclusions, Implications and Future Research

7.1 Research Overview

The research aims to improve MH in Rivers State, Nigeria, using the PRISMA model. The PRISMA provided the platform for developing holistic improvement measures to address the complexity and multifaceted problems contributing to high MM. Based on an extensive literature review, clinical and non-clinical factors influence MH outcomes. The clinical factors contributing to the poor quality of obstetrics care stem from the lack of adequate healthcare management, inaccessible clinical tools & equipment, poor infrastructure and the inadequate human resources capability (Izugbara & Wekesah, 2018; Oknonofua et al., 2017; Ugal et al., 2012; Ogu et al., 2017). Whereas, non-clinical factors include issues from the external environment that influences health utilisation or health-seeking behaviour such as poverty, illiteracy, culture, religion and region-specific disparities (Ntoimo et al., 2019; Pratley, 2016; Kaiser et al., 2019; Yarney, 2019), as well as the medical state of the patient (Mbachu et al., 2017; Adeniran et al., 2019). Also, political affiliations and ideologies influence the development of health policies, funding allocations and the decision-making process on women's reproductive health and rights (Shifman, 2007; Walt & Gilson, 2014; Smith & Shiftman, 2018).

Due to these complex factors, it was essential to ascertain which factors were most significant in Rivers State. Presently, the risk management process adopted in Nigerian hospitals are ineffective and, in some settings, not used at all (Bandali et al., 2016; Mathai et al., 2015; Dohbit et al., 2019). Tools like Maternal Death Reviews, WHO Safe Child Checklist and ICT platforms like the Mobile Community Based Surveillance and the OpenMRS system have been used to identify risk and support the medical diagnosis but have failed to address the problem holistically and neither incorporate multiple stakeholders in the process (Obasola et al., 2015;

Perry et al., 2017; Hoffman & Mohammed, 2014). There were issues of poor incidence reporting, blame culture, lack of commitment and accountability hindering the risk management process (Hoffman & Mohammed, 2014). The holistic evaluation of the problem and the use of an integrated strategy to improve healthcare practices are consistent with previous researchers' recommendations (Kuruvilla et al., 2014; Erim et al., 2012; Say & Raine 2007; Izugbara & Wekesah, 2018).

In this study, the PRISMA provided a more generalised and holistic approach to analysing the problem in categories; Technical, Organisational, Human-Behaviour and Patient-related failures in the MH delivery system (Woloshynowych et al., 2005; van der Schaaf & Habraken, 2005). The PRISMA model also supports practical improvement suggestions following a risk investigation (van der Schaaf & Habraken, 2005). The risk analysis process begins with a detailed investigation of the root causes of problems (Ashmore & Ruthven, 2016). In order to have an in-depth understanding of the problems in each category, a pragmatic researcher adopts the most suitable methods to investigate the risk factors—both quantitative and qualitative approaches in an explanatory mixed-method design. Pragmatism is recommended for dealing with complexities associated with the healthcare system, especially where each method is insufficient (Finkelstein et al., 2015; Petticrew et al., 2015).

The PRISMA model utilised empirical data from the PRMQ administered to clinical and managerial staff at three participating hospitals, UPTH, BMSH and the Military Hospital. The robust data from the survey addressed The first research question: what are the main clinical and non-clinical risk factors contributing to MM in Rivers State? Thereby achieving Objective 1: investigate and analyse clinical and non-clinical risk factors contributing to MM using the PRISMA Model. Further analysis of the data using EFA answered the second research

question: what are the relationships the exits between risk factors? Thereby achieving Objective 2: To investigate the relationship between risk factors and their order of riskiness using Exploratory Factor Analysis (EFA).

Quantitative Research Findings:

The quantitative research finding revealed preventable and unpreventable failures in the participating hospitals. Based on the EFA result, the most significant contributors to MM are preventable, and these were underlying issues such as poor patient safety culture, inaccessible equipment's, weak healthcare coordination and intervention during medical procedures. Existing studies suggest that latent and active failures in a system can be resolved through effective health management, risk management, and an integrated healthcare system that incorporates the primary, secondary, and tertiary healthcare functions and various stakeholders (Callister & Edward, 2017; Erim et al., 2012). Including political agendas geared towards implementing evidence-based practices and focused on infrastructural development (Madore et al., 2017; Smith & Rodriguez, 2016).

Understandably, patient-related issues were often unpredictable and unpreventable in healthcare settings. In this category, the research findings show that patients' medical conditions and illnesses developed during pregnancies had the highest impact on MH outcomes. The finding indicates that the preparedness of the hospitals could put them in a more strategic advantage to combat ongoing and unpreventable issues (Kirkup, 2015). For example, addressing organisational issues like the poor state of the healthcare facility, providing essential drugs and resources in Nigeria can lead to significant improvements (Ntoimo et al., 2019; Okonofua et al., 2017). Also, building quality infrastructures can create a positive perception and increase healthcare utilisation (Okeke & Chari, 2018; Lange et al., 2016). Nonetheless,

more insight into improvements in Rivers State, Nigeria, is needed. So, the health experts illuminated the MH delivery failures and proffered context-specific improvement recommendations.

Qualitative Research Findings:

The explanatory mixed-method was complementary. So the qualitative approach is a follow on from the quantitative inquiry. The semi-structured interview provided recommendations based on health expert opinion for improving the MH delivery system. Thereby, achieved Objective 3; to coordinate health experts' perceptions of clinical and non-clinical risks identified and how the MH delivery system can be improved and Objective 4; to recommend improvement measures in MH delivery in Rivers State, Nigeria that will inform health policies and clinical practices. These addressed the third and fourth research questions, respectively: iii) what are the health professionals' perceptions of risk factors? (iv) how can the quality of MH outcomes be improved in Rivers State?

Section 5.2 of the Qualitative Data Analysis shows a thematic analysis of health experts' interviews coded into PRISMA failures categories. There were preventable failure failures identified in the MH. The technical failures identified were notably the lack of clinical tools, which were also inaccessible—numerous organisational issues such as poor patient safety culture, weak infrastructure, staffing issues. Active human failures resulted from an inefficient referral system, lack of proper coordination, health care integration, and ineffective external regulatory bodies. The health experts identified other unpreventable patient factors to include the impact of culture, religion, affordability of health care and the inevitable presence of the TBA in low-income settings. The insight gained validates the findings from the analysis of the PRMQ survey that indicated the failures are preventable and unpreventable.

Further investigation and analysis into risk factors from the health experts' perspectives informed the improvement recommendations for the MH delivery system. Preventable failures in the system can be addressed through proper management of clinicians using SHRM, regular internal audit and monitoring system, setting SOP, management oversight, ICT in maternal care. While, unpreventable failures due to patient condition and characteristics, culture, religion, and traditional birth attendance can be addressed from an advantageous position. The suggestion from health experts includes collaborations with the TBA, community interventions, and government intervention to provide public enlightenment, financial and social empowerment. Table 6.1 presents an overview of recommendations and excerpts from the interview.

The following section highlights some limitations and challenges encountered while conducting the research.

7.2 Challenges and Limitations

Confidentiality issue

Researching in hospital settings is challenging due to the sensitivity of the information. In most cases, research participants were concerned about their confidentiality, but they were assured of the anonymity of their responses through a written and verbal statement before engaging. Likewise, the ethics clearances established engagement terms with the respective organisations.

Financial constraints

There were financial constraints as this is a self-funded study. Multiple journies to the participating hospitals was not feasible. So, an independent administrator was employed with

a senior manager to administer the questionnaire while the researcher conducted the interviews via telephone. The remote interview minimised the cost of transportation for multiple visits and missed appointments. Due to financial and security setbacks, the research did not employ direct observation, patient interviews and document reviews. The researcher took a more pragmatic approach to achieve the research objectives while preserving the validity and credibility of the study.

Lack of proper documentation

Incident reports are essential in risk investigation and management processes (Jansma et al., 2011). There is a lack of credible documents in health settings in Nigeria (Bandali et al., 2016; Hoffman & Mohammed, 2014). Carson-Stevens et al (2016) attribute the poor record-keeping to blame culture and lack of effective leadership. Also, the health systems in Nigeria predominantly use paper records which are not reliable. As the credibility of records cannot be guaranteed, the researcher employs other reliable methods (PRMQ and Interview) to investigate risks.

Limitation 1: Data Collection Methods

Alternative data collection methods like the PRMQ and semi-structured interviews were utilised to identify failures in the system. The PRMQ is a risk investigation tool that allows for the proper evaluation of failures in the system. To further enhance the validity of the process, the interview provided cross-validation (triangulation) for the study.

Limitation 2: Lack of Direct Female Patients' Perspective

The research approach considers the clinicians and health experts' perspectives, not the patients' view. However, the opinion of several female participants is evident in this study.

Analysis of the PRMQ shows one hundred, and twenty-two (122) female participants and three female health experts represented in this research. These women provided valuable insights into maternal issues—the research targeted female midwives, nurses and OBYGN consultants that have also utilised MH services in Nigeria. Also, the PRMQ included patient-related contributors to MM, where the research participants were required to comment truthfully on observable patient characteristics and conditions that interfere with medical interventions. Because these women have also utilised healthcare in the participating hospital settings and are healthcare professionals who provided services to women, it mitigates any omission of direct responses by patients.

7.3 Research Contribution and Significance

Previous interventions in Nigeria focused on improving health utilisation or skilled birth attendance through midwives' deployment programs (Abimbola et al., 2012), public education and financial schemes (Okonofua et al., 2011), community mobilisation (Prata et al., 2012), the use of ICT infrastructure in healthcare (e-health & m-health) (Obasola et al., 2015). Despite these interventions, research shows that the rate of maternal mortality has not improved over the years (Alkema et al., 2016). The ICT platforms were mainly used to collect patient information and, in some cases, useful for illness diagnosis, but failed to evolve into effective, responsive action through multiple stakeholder collaboration (Obasola et al., 2015). Although, in several communities, health utilisation increased significantly, particularly with the implementation of the Abiye project (Erim et al., 2012; Isola, 2015). However, other problems could hinder the success of the interventions. For instance, the Abiye project dealt with transport and logistics issues but did not resolve human resources challenges in settings or external government issues on the rising cost of care or out of pocket payment (Love, 2013). Hence, previous improvement initiatives were unsuccessful because adopted strategies do not

cover a broad spectrum of issues contributing to failures in the healthcare system. Also, failures due to the inability to adopt a holistic risk management process involving multiple stakeholders instigated partial mitigation of risks (Obasola et al., 2015; Erim et al., 2012). The lack of a holistic approach or an integrated strategy in the MH delivery system in Nigeria constitutes a significant research problem.

The PRISMA model was applied in the MH system and addressed the research problem discussed extensively in subsequent Section 7.5 (implication for Health Policy and Practice). Based on the researcher's knowledge, this is the first use of the PRISMA to support the risk management process in healthcare and MH in Nigeria. The PRISMA model provided a good structure for developing PRMQ and, based on the EFA, has adequate construct validity and reliability. The PRMQ provided insights on internal and external failures contributing to MM in Rivers State. These were avoidable risk factors associated with organisational, human behaviour, and technical failures in the MH deliver system, as well as unavoidable patient-related factors.

Further investigation and analysis into risk factors from the health experts' perspectives informed the improvement recommendations for the MH delivery system. These include proper management of clinicians using SHRM, regular internal audit and monitoring system, setting SOP, management oversight, ICT in maternal care, collaborations with TBA community and government intervention. Hence, inference from the interview data revealed that a network of responsible stakeholders is needed to implement desired changes. The improvement recommendations provided in this study contributes to the clinical governance and evidence-based risk management literature. Other insights from the research revealed that PRISMA could be effectively used in developing countries but with some modification to the

model to reflect the socio-economic characteristics and prevalent medical conditions of people living in specific regions. The modification of the PRISMA approach contributes to the model's theoretical underpinning, and most importantly, the research contributes to risk management in MH in Rivers State and other developing countries with similar characteristics.

7.4 Theoretical Contribution: Modified–PRISMA for the Nigeria MH delivery system.

The PRISMA model was used to develop the conceptual framework for managing the MH delivery system in Rivers State, as shown in Section 3.3, and this was validated with the robust empirical data. By doing this, some dimensions of the original PRISMA framework was improved, and this elaborated the model's application in a different context. The conceptual framework (Chapter 3) for this study highlights the Organisational, Technical, Human Behaviour and Patient-Related factors contributing to failures in the system. It was asserted that the elimination of these failures would improve patient safety and MH outcomes. Extensive literature review and evidence from this study shows that there were specific contextual patient factors responsible for MM in Nigeria. So an adaptation of the PRISMA framework to include context-specific patient factors was crucial, other than the broad definition as factors due to patient conditions and characteristics obtainable in the Eindhoven Classification Model (van Vuuren et al., 1997). As shown in Table 7.1, the modification of the PRISMA in this context includes socio-economic factors that interfere with the quality of MH, direct and indirect medical factors. Also, this study identifies serious issues of gross-misconduct among clinicians which can not be classified under any of the PRISMA categories of failures (X-factors). In the next sub-sections, these modifications will be discussed.

Table 7.1 Modified- PRISMA Categorisation of Risk Factors		
Technical factors	T-EX	Failures due to external technical factors
	TC	Failures due to equipment set-up or construction
	TM	Failures due to material defects
Organisational factors	O-EX	External organisational failures
	OK	Knowledge transfer failures
	OP	Operating protocol failures
	OC	Failures due to the organisational culture
Human-behaviour factors	H-EX	External human failures
a. Knowledge-based behaviour	HKK	Knowledge-based failure
b. Rule-based behaviour	HRQ	Qualification-related failures
	HRC	Human coordination failures
	HRV	Verification-related failures
	HRI	Intervention-related failures
	HRM	Failures due to inability to monitor a process or patient
skilled-based behaviour	HSS	Health care slips
	HST	Failures due to tripping incidence
Others (modified)	**PF1**	Direct medical failure due to patient characteristic & condition.
Patient condition & characteristics	**PF2**	Indirect medical failure due to patient characteristic & condition
	PF3	Failures relating to socio-economic factors
Unclassified	**X**	Failure due to gross misconduct/ negligence

PRISMA Modifications:

a. Direct Medical Failure due to Patient Characteristic & Condition (PF1).

Direct medical factors are unpredictable in obstetrics care and contribute to 73% of maternal deaths in Nigeria (Say et al., 2014). It includes; haemorrhage, sepsis, preeclampsia, unsafe abortion and ruptured uterus (WHO et al., 2019; Mbachu et al., 2017; Omo-Aghoja et al., 2010). It is well established that the lack of preparedness of healthcare providers delay medical intervention and lead to deaths (Type 3 delays). The latent and active failures in the system have been covered extensively in the PRISMA model. However, other precipitating factors relating to patient characteristics influencing patient outcomes need to be defined in the Nigerian context. Research findings include traditional healers and spiritual homes that cannot manage complications, family interference with women's healthcare choices (location) and distance to the health facility. Therefore, the risk analysis process should identify patient

characteristics that interfere with direct medical incidences. This process will inform appropriate actions, organisational protocols and technicalities involved in managing the unpredictability of patient conditions, including an external measure that can be taken to improve outcomes. For example, community outreach programs promoted the use of misoprostol to prevent postpartum haemorrhage (Prata et al., 2012) and task-shifting strategy to enable TBA to identify risks and make a prompt referral (Schack et al., 2014).

b. Indirect Medical Failure due to Patient Characteristic & Condition (PF2)

The research finding indicates that indirect medical factors or existing medical conditions contribute to MH mishaps (Section 5.3.4.4). These include chronic conditions such as HIV/AIDS, heart disease, cancer, diabetes, cerebral diseases and liver disorders and contribute to 27% of maternal mortality (WHO et al., 2019; Say et al., 2014). First, the risk manager or the healthcare provider must identify prevalent chronic diseases within communities (public health issues) to develop a strategic approach to combat these problems, like developing specialist units and purchasing equipment based on patients' needs. A study conducted by Hughes et al (2015) showed that building clinical infrastructure within proximity to high need regions improved patient outcomes.

Prevalent conditions can also influence the government's health agenda and budget to provide necessary financial support to eradicate chronic conditions of public concern like the COVID-19 pandemic (Yang et al., 2020). For example, the UK government is to invest three hundred and thirty thousand billion pounds in addressing the impact of the coronavirus pandemic (HM Treasury, 2020). Similarly, in the past, measures have been taken to prevent mother to child transmission of HIV/AIDS through the broad-scale distribution of anti-retroviral drugs, provision of all necessary clinical infrastructure and skill development (Patricio et al., 2015).

Also, use antenatal steroids in late preterm periods to prevent infections and respiratory deaths (Souter et al., 2017).

Understandably, there are organisational, technical and human behaviour failures in managing chronic conditions. Research has identified failures due to late and inaccurate medical diagnosis, lack of essential drugs and medicines, human resource capabilities (specialist doctors & surgeons) and clinical investigative equipment (Sections 5.3.2 & 5.3.3 & 5.3.4). There is an unmet need for pre-conception care and reproductive healthcare services, contributing to Nigeria's devastating outcomes (Ahmed et al., 2012). Lassi et al (2014) recommended pre-conception is essential for managing chronic conditions during pregnancy because early identification will ensure timely intervention and medical advice before conception. However, patient-related factors contribute to unsuccessful medical intervention as well.

Research findings indicated that some women only find out during pregnancy existing medical conditions (Section 5.3.4). As a result, there were no pre-conception care and consultation before pregnancy. Including PF2 in this category will enable risk managers to understand major prevalent issues with women's health and socio-political factors influencing health-seeking behaviour. This inclusion will inform policymakers, healthcare providers, clinicians, and other stakeholders on tackling chronic illness during pregnancies to achieve the best possible outcomes.

c. Failures due to Socio-Economic Factors (PF3)

In Nigeria, socio-economic factors have a significant impact on MH outcomes. Previous research has identified region disparities associated with MH, including wealth-related

inequalities, level of education, cultural and religious norms specific to a region (Adeyanju et al., 2017; Ononokpono et al., 2014; Adedini et al., 2014). Likewise, in this research, health experts revealed religious beliefs among the people of Rivers State as women take advice from religious leaders over medical instructions and prayers offered in place medical interventions during complication or management of chronic illnesses (Section 5.3.4). Also, there are affordability issues with the soaring cost of care and out of pocket payments, including the lack of women's autonomy in their homes, deterring them from deciding on their own, and inadequate knowledge on MH issues (educational level). Patient-related factors are presented in Section 5.3.4 of this report. It is vital to identify significant socio-economic failures that contribute to late interventions and poor MH outcomes in this context. By so doing, societal issues can be addressed appropriately by several stakeholders in collaboration with the Ministry of Health in Nigeria. The research findings revealed that failures were due to socio-economic. The subsequent section identified the practical recommendation on managing patient-related failures in participating hospitals.

d. Gross Misconduct/ Negligence

Research findings revealed gross misconduct and negligence by clinicians in participating hospitals. There was evidence of document forgery or falsification of patient's information (Section 5.3.5), non-exist of workers due for retirement (ghost workers), embezzlement of clinical funds (Section 5.3.2.1), unmerited or 'God Father' recruitment system (Section 5.3.2.4) in the MH system. This category will enable risk managers to identify and tackle gross misconduct by clinicians, instigate fines and appropriate actions to instil discipline and healthcare accountability among clinicians (McDermott et al., 2015). However, in some cases, the institution is liable for gross misconduct, like failing to implement safety protocols and measures inpatient management (Maloney et al., 2018; Perry et al., 2017). In which case, a risk

manager must identify such institutional failure and report to responsible authority within the organisation or escalate to an external regulatory body.

Hence, the conceptual framework for improving MH in this context is adapted to include essential modifications suited for low-income countries similar to Nigeria. Figure 7.1 presents a diagrammatical representation of the modified conceptual framework.

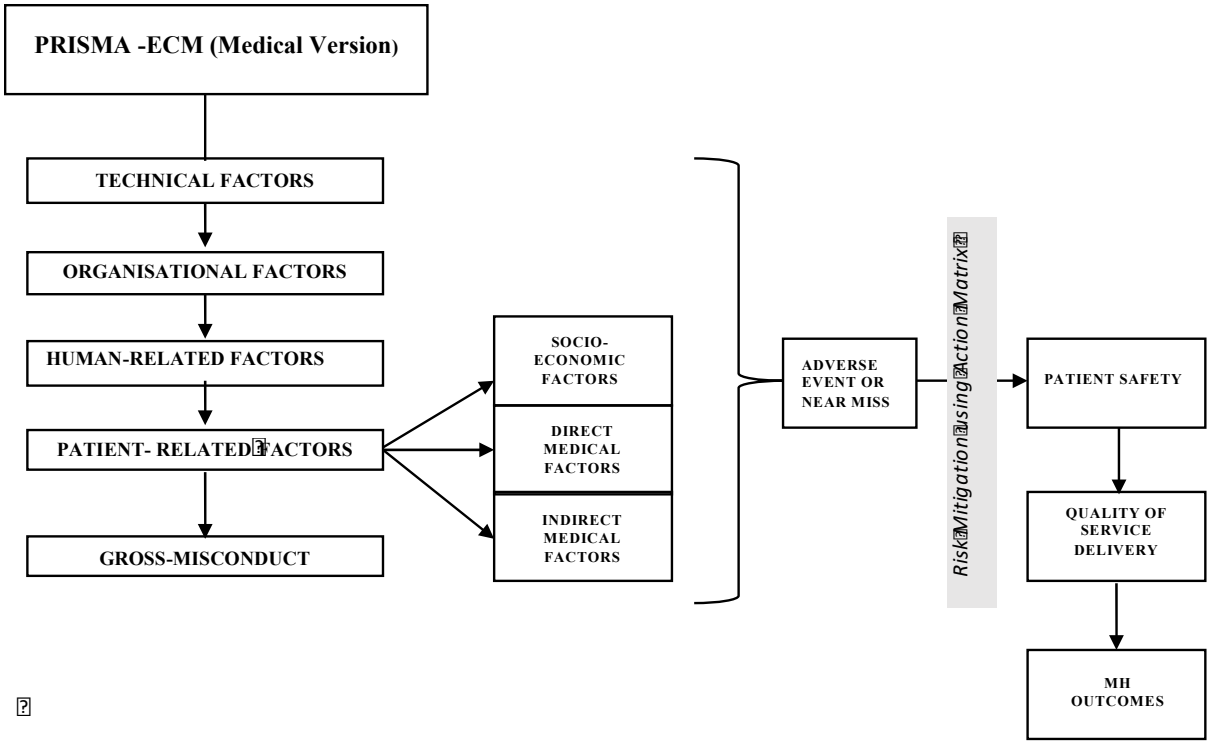


Figure 7.1: Thesis Diagrammatical representation of modified framework for improving MH outcomes

7.5 Implication for Health Policy and Practice

An extensive literature review of MH in Nigeria revealed three main research problems. First, the lack of proven risk management processes and evidence-based practices in low resource

healthcare settings (Enuku & Igbinosun, 2012; Callister & Edward, 2017). The PRMQ is an evidenced-based approach for risk investigation that clinicians can use to reduce MM in Rivers State (Chinwah et al., 2020). PRMQ can enable practitioners and policymakers to analyse statistical failure analysis and identify the most significant and preventable failures in the system leading to high MM that will inform appropriate policies.

The second research problem is the lack of an integrated and holistic approach to improve MH delivery in Nigeria (Erim et al., 2012). The PRISMA is a systematic approach that will enable practitioners and policymakers to address the problem holistically. The research identified technical, organisational, human behaviour and patient-related factors. Internal and external improvements recommendations were made, which is comprehensive—an overview of Interview excerpts and key supported previous studies shown in Table 6.1. Policies makers and clinicians can take actions to prevent MM. Figure 7.2 presents a summary of internal recommendations.

Internal Recommendations

Recommendation 1: Management Oversight

Inferences from the health expert's interview emphasise the need for management oversight. Healthcare providers must provide effective leadership by establishing shared goals and vision for the MH system (Bryce et al., 2018). It is also the responsibility of the oversight to promote and enforce stewardship and accountability among healthcare practitioners to ensure that the organisation is achieving set targets (Maloney et al., 2018; Bryce et al., 2018).

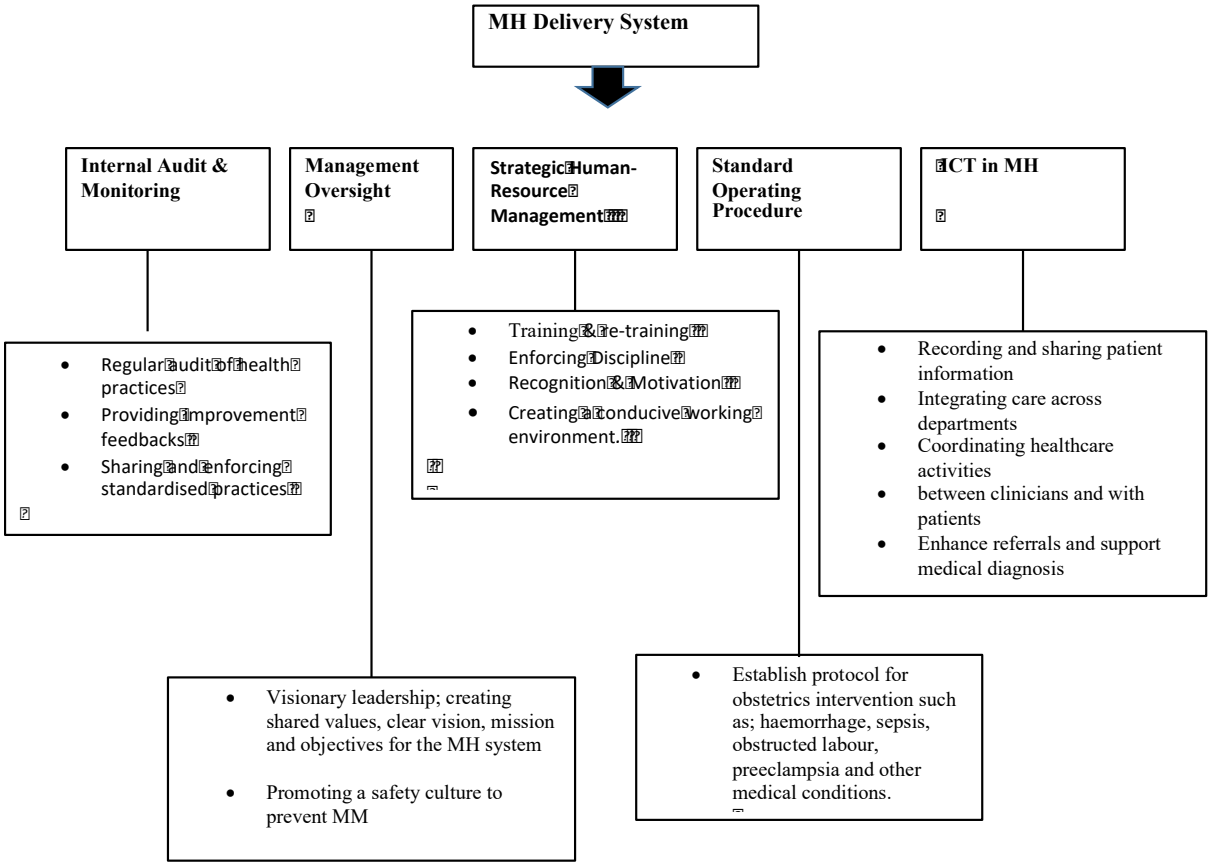


Figure 7.2: Thesis summary of internal improvements recommendation based on Health Experts' perspective

Recommendation 2: SHRM

The Healthcare providers in Rivers State must adopt SHRM focused on developing the workforce capability by providing necessary training and development for clinicians, recruiting the right staff based on merit, provide staff motivation through incentives to increase organisational productivity (Wright & MMahan, 2011; Jiang & Messersmith, 2018). As well as, promote and enforce a safety-first approach by setting KPI and ensuring clinicians are working under set guidelines (SOPs) while managing obstetrics complications (Maloney et al., 2018; Perry et al., 2017).

Recommendations 3: Setting SOP

Hospitals in Rivers State should establish SOP for clinical procedures is necessary for managing obsterrics complications. Setting and enforcing SOP for the management of direct medical cases such as haemorrhage, preeclampsia, sepsis, and obstructed labour will lead to better outcomes. However, a continuous evaluation of the SOP is essential to check its impact on patient outcomes over time, verify its effectiveness and where necessary corrective measures are recommended to the healthcare providers (Alhatmi, 2010).

Recommendation 4: Internal Audit and Monitoring system

Research findings revealed that the internal audit system is either irregular or non-functional, and when conducted, corrective measures are not put in place or enforced among clinicians (Section 6.3.1.5). Hospital must adopt an effective internal audit system such as provided by the ISO (2018) 31000 standard for risk management which gives the blueprint for effective auditing (Russell, 2003). The process involves conducting planning audit at regular intervals, reporting audit information clearly to all stakeholders, taking appropriate actions on

nonconformities and a verification process to ensure actions have been implemented to improve quality.

Recommendation 5: ICT in Maternal Care

A proper ICT infrasture is needed for MH delivery services. The ICT platform will create a value-based system which integrates healthcare across the different levels of care, lead to better healthcare coordination among healthcare providers and practitioners (Porter & Lee, 2013). E-health provides support for medical diagnosis, which facilitates an efficient referral system (Anstey Watkins et al., 2018; Damayanti et al., 2019) Also, useful for recording, storing and sharing information, and this is essential for medical research and continuity in care (Bervella & Al-Samarraieb, 2019).

External Recommendations

The hospitals in Rivers State cannot operate in isolation from its external environment and socio-economic factors contributing to MM. The recommended external improvement measure includes government intervention, community support, private-public partnerships, collaborations with TBAs, NGOs, and the external healthcare regulatory bodies, as shown in Figure 7.3.

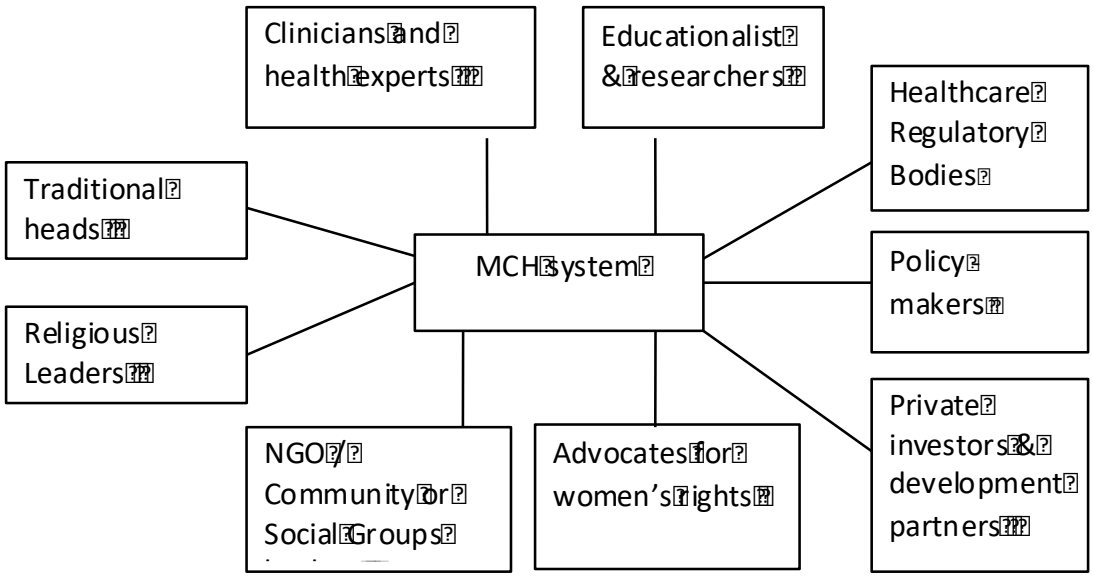


Figure 7.3: Network of Relationships for sustainable change in MH Delivery System.

The research recommends that the educational institutions in Rivers State play a pivotal role in medical research, training doctors and providing insight on MH issues. However, implementing evidence-based practices require government funding and support. The government is to develop and implement health policy favourable to women, expand the current health insurance to accommodate indigent patients and build social and financial support programs to empower women.

Government intervention is needed to tackle the three types of delay; Type 1 delay relating to the decision to seek care; Type 2 delays due to inability to reach hospital facility; and Type 3 delays associated with accessibility issues. Improvement action includes developing safe transport for women, providing comprehensive obstetrics care (family planning, intrapartum and postpartum care services) and facilitating public enlightenment programs to educate women on the consequence of poor healthcare-seeking behaviour and healthcare choices. Experts believe this is achievable through community intervention programs, support from

NGOs, religious leaders, and other social groups. Also, liaising with traditional heads and community leaders can facilitate clinicians and TBA collaborations, the implementation of task-shifting strategy, as well as promote risk management in the grassroots with limited skilled birth attendants. To promote safe practices, the role of the external regulatory bodies is crucial. It is the sole responsibility of the regulatory bodies in Rivers State to monitor and regulate healthcare practices both for the orthodox and non-orthodox care, the pharmaceutical industry and the laboratory practices. An independent regulatory body (bi-partisan organisation) is needed to develop, enforce standardised practices, and implement punishment to offenders.

Conclusively, the research addresses the third research problem: current intervention employed in Nigeria to improve MH outcomes fails to progress into responsive actions involving multiple stakeholders (Hofman & Mohammed, 2014; Obasola et al., 2015). The research recommends a network of relationships to improve MH outcomes (Figure 7.3). The healthcare providers' key role is to provide effective leadership to facilitate these relationships and engage with multiple stakeholders. The leadership is needed to give clear direction on the area of needs and specify each stakeholder's role in achieving a high quality of MH delivery, to bridge wealth-related inequalities associated with MH, improve accessibility to healthcare and tackle socio-political issues (Gil-Gonzalez et al., 2006; Callister & Edward, 2017; Erim et al., 2012). Practically, it is impossible to achieve a sustainable change through active stakeholder's collaborations where there are failures within the system (Shiftman et al., 2016; Walt & Gilson, 2014). The organisation must first strengthen its internal issues, as summarised in Figure 7.1. The EFA findings from the PRMQ survey discussed in Section 6.2 further affirms the role and impact of effective leadership and management on the healthcare system, which highlights the need to tackle the most significant avoidable latent and active failures in the system as it

provides a strategic advantage required to address the patient-related failures (unavoidable factors).

7.6 Future Research

The research findings and practical recommendations for improvements were clinicians and health experts' views. Future use of the PRISMA model in Nigeria can explore the patient perception of risk factors through direct interviews and patient interactions. Also, other methods of investigating risk can be used, such as a review of the incident report and other clinical documents such as the maternal death notes.

Secondly, the quantitative data analysis utilised the EFA to understand the relationship between MH risk factors, and the result revealed two-factor loadings, avoidable and non-avoidable failures in the system. Though this provides some insights into relationships between the MH outcomes using EFA, the complex relationships between the causes of MH outcomes and maternal deaths, for example, were not explored. Future research can adopt a structural equation method to explore the complex relationships between the factors and examine their effects on maternal deaths. The PRISMA framework can be used to manage risk and improve the quality of MH systems in other developing countries that exhibit features of Nigeria.

As a reflexive researcher, it is essential to acknowledge the complexity of the healthcare environment and that all the problems associated with the delivery system might be unidentifiable during the field study period. Therefore, the PRMQ survey can be adapted to meet other hospital settings requirements, and further inference draws from new insights. It is also important to declare that the researcher is an outsider and has no prior knowledge or experience as a gynaecologist and obstetrician in medicine. Nonetheless, the focus is on

implementing researchers' management and patient safety expertise to manage risk in hospitals and working collaboratively with experts to provide practical recommendations on enhancing the MH system. Therefore, the author declares no conflict of interest in undertaking this study. The primary motivation is to promote safe practices and join in the efforts to reduce the high rate of MM in under-developed countries using evidence-based practices.

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Appendices

Appendix 1: Conference Presentations and Publications.

Appendix 1.1: International Conference on Corporate Social Responsibility (CSR) and 9th Organisational Governance Conference. 10th -13th September 2019. Polytechnic Institute of Cávado and Ave (IPCA), Portugal Barcelos.

Title: Ascertaining the risk factors of maternal child health outcomes in Rivers State, Nigeria: Towards the PRISMA model [1]Viviane Chinwah; [2]Frank Nyame-Asiamah; [3]Ignatius Ekanem

Appendix 1.2: Gender, Work & Organization, 11th Biennial International Interdisciplinary Conference 24th to 26th June 2020. University of Kent, Canterbury, UK. (Now moved to June 2021 due to the COVID 19 –Pandemic).

Title: Maternal Mortality and Morbidity, a Violation of Human Rights and an Injustice to Women in Nigeria: A Critical Exploratory Evaluation of Contributing Risk Factors. [1]Viviane Chinwah; [2]Frank Nyame-Asiamah; [3]Ignatius Ekanem

Appendix 1.3: 11th International Conference On Governance Fraud Ethics and Corporate Social Responsibility (CSR) & 11th International Women and Business Conference. 27th -28th August, 2020.

Title: Strengthening the Socio-Structural Dimension of Women's Sexual and ReproductiveRights in Developing Countries: Towards the Sustainable Development Agenda. [1]Viviane Chinwah.

Appendix 1.4: Publication

Chinwah, V., Nyame-Asiamah, F., Ekanem, I. (2020) Risk factors affecting maternal health outcomes in Rivers State of Nigeria: Towards the PRISMA model. Social Science & Medicine, 113520.

Appendix 2: Ethics Approval for Research

Appendix 2.1: Email Confirmation Ethics Approval CMET

Sheku Fofanah <sheku.fofanah@lsclondon.co.uk>
[redacted]
Mon, Apr 25, 2016 at 12:07 PM

Dear both,

Please be informed that your ethics applications have been approved. Please keep this email as official confirmation and take note of the ethics number against your name.

Viviane Dumle Chinwah -2005630/25/04/16

Kind Regards,

Sheku.

Appendix 2.2: Research proposal sample to hospitals in Rives State, Nigeria

Cardiff Metropolitan University
Chaucer House
London, United Kingdom
SE1 1NX
12/05/16

The Chairman Ethics Committee
C/O the Chief Medical Director

…….
Rivers State, Nigeria

Dear Sir,

APPLICATION FOR RESEARCH ETHICS APPROVAL.

I write to apply for ethics approval and permission to conduct research at the……... I have attached a research proposal stating the aim, objectives, ethical consideration, proposed plan of work and risk assessment for conducting research in your facility. Also, included are the project overview and letter of consent for your authorisation.

These documents should provide you with all the information about the project timeline, data collection methods and insights on the benefits of research to your institution. I have also included a questionnaire which will be administered to clinical and managerial health care staff should my application be successful. This will enable you provide advice on the suitability of questions asked, give you the autonomy over research findings and publication of results.

The research ethics committee at Cardiff Metropolitan University (CMET) have given their authorisation for research with no concerns; Reference number-2005630/25/04/16. It is important to emphasize that this research does not seek to investigate any particular incidence but draw on good health care practices to improve maternal-child health outcomes in hospitals using proven risk assessment methods utilised in the National Health Service in the United Kingdom and in most developed countries known as PRISMA flow chart model.

I will be extremely grateful if my application is considered favourably.

Yours' Faithfully
Viviane Chinwah
Viviane Dumle Chinwah
(PhD Researcher Student)

Appendix 2.3: Participant consent form

PARTICIPANT CONSENT FORM

Cardiff Metropolitan University Ethics Reference Number:

Participant name or Study ID Number:

Title of Project:

Name of Researcher:

Participant to complete this section: **Please initial each box:**

1.	I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily.	
2.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.	
3.	I agree to take part in the above study.	

The following statements could also be included in the consent form if appropriate:

1.	I agree to the interview / focus group / consultation being audio recorded.	
2.	I agree to the interview / focus group / consultation being video recorded.	
3.	I agree to the use of anonymised quotes in publications I agreed to my quotes being attributed to me	

....

Signature of Participant Date

....

Name of person taking consent Date

.....

Signature of person taking consent

**When completed, 1 copy for participant & 1 copy for researcher site file*

Appendix 2.4: Letter of Approval for UPTH**.**

UNIVERSITY OF PORT HARCOURT TEACHING HOSPITAL

P.M.B. 6173. PORT HARCOURT - website: www. upthnigeria.org

HOSPITAL ETHICAL COMMITTEE

UPTH/ADM/90/S.II/VOL.XI/326 — 4th October 2016

Viviane Dumle Chinwa
Cardiff Metropolitan University
London, United Kingdom

ETHICAL APPROVAL

IMPROVING MATERNAL-CHILD HEALTH (MCH) OUTCOMES IN RIVERS STATE, NIGERIA: A STUDY OF THE STRATEGIC AND ORGANISATIONAL IMPERATIVES THAT SAVES LIVES

We refer to your letter dated 16th September 2016 requesting for Ethical Approval of your research project titled "**IMPROVING MATERNAL-CHILD HEALTH (MCH) OUTCOME S IN RIVERS STATE, NIGERIA: A STUDY OF THE STRATEGIC AND ORGANISATIONAL IMPERATIVES THAT SAVES LIVES**".

After a critical appraisal of your proposal by the University of Port Harcourt Teaching Hospital Ethical Committee and the Research Ethics Group of the Centre for Medical Research and Training College of Health Sciences, University of Port Harcourt, approval is hereby given to you to commence your study.

Note the following:

1. The study can only be started after it is approved by the examining body.

. The Hospital reserves the right to withdraw this approval if at any time during the conduct of the study you infringe on the ethical regulations of the Hospital or the ethical rights of your study subject.

B. J. Thom-Manuel (Mrs.)
Secretary
for: Chairman

Appendix 2.5: Letter of approval for BMSH

GOVERNMENT OF RIVERS STATE OF NIGERIA

RIVERS STATE HEALTH ETHICS COMMITTEE

Rivers State Health REC
RSHMB
Port Harcourt
27th March, 2017

VIVIANE CHINWAH (B.SC, MBA)
Cardiff Metropolitan University

ETHICAL APPROVAL

RESEARCH PROPOSAL TITLED "IMPROVING MATERNAL-CHILD HEALTH (MCH) OUTCOMES IN RIVERS STATE, NIGERIA: A STUDY OF THE STRATEGIC AND ORGANIZATIONAL IMPERATIVES THAT SAVES LIVES".

We refer to your letter dated 20th October, 2016 requesting for Ethical Approval of your Research Project titled **"IMPROVING MATERNAL-CHILD HEALTH (MCH) OUTCOMES IN RIVERS STATE, NIGERIA: A STUDY OF THE STRATEGIC AND ORGANIZATIONAL IMPERATIVES THAT SAVE LIVES."**

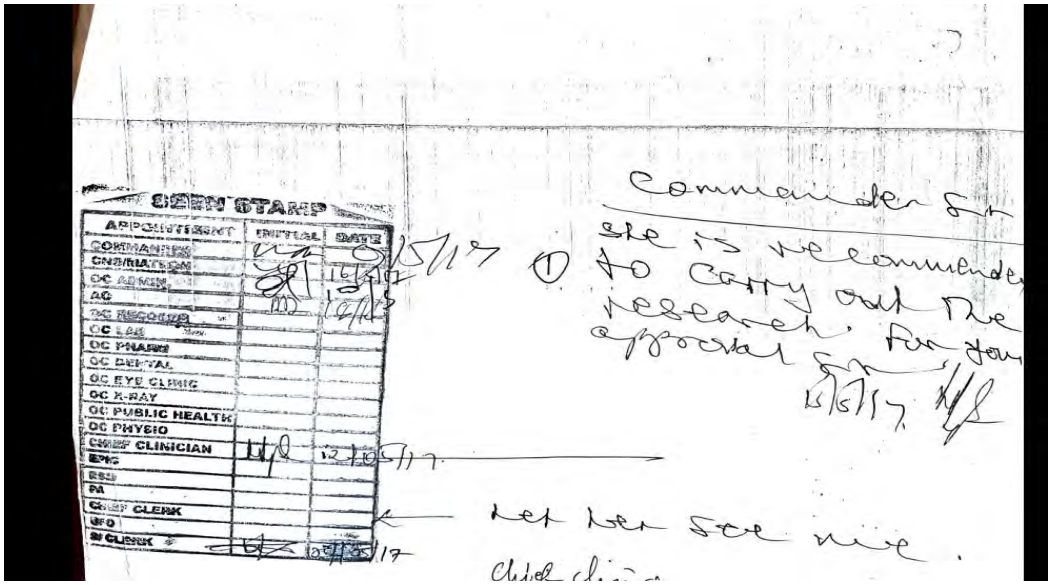
After a critical appraisal of your proposal by the Rivers State Health Research Ethics Committee, approval is hereby given to you to commence your study.

Note the following:

1. The Committee reserves the right to withdraw this approval if at any time during the conduct of the study you infringe on the ethical regulations of the Committee or the ethical rights of your study subject.

Dr. West Boma A.
Chairman
Rivers State Health Research Ethics Committee

Appendix 2.6: Approval note from Military Hospital



Appendix 3: Qualitative and Quantitative Research Guide and Findings

Appendix 3.1: Clinical and managerial staff Questionnaire (PRMQ) Guide and Questions

This survey seeks to obtain responses on how we could improve MH outcomes in Rivers State, Nigeria. We would be very grateful if you could kindly share your experience of providing maternal-child health delivery with us by completing this questionnaire. Information you provide will be treated confidential and your identity will not be revealed in this study.

Part A: Participant Demographics

1. Gender 1. Male 2. Female

2. Age 1. Below 25 2. 25-40 3. Above 40

3.What is your highest educational qualification? 1. BA/ BSc 2. MSc 3. PgDip 4. PhD

4.What is your job title? ……..

5. What professional licence, if any, is required to allow you to do your job? …….

6. How long have you occupied this position? 1. Less than 5yrs 2. 5 -10yrs 3. More than 10yrs

7.Does your role involve 'hands-on' patient contact? 1. Yes 2. No

8. How many years of 'hands-on' patient contact experience do you have?

1. Less than 5yrs 2. 5 -10yrs 3. More than 10yrs

Part B: Patient Safety Factors

1.How often are your daily tasks supervised by your line managers or immediate supervisors? 1. not at all 2. monthly 3. Bi-monthly 4. Quarterly 5. Yearly 6. Bi-yearly

2.Which professional/national governing body regulates your care giving practices?.....

3.In the past 12 months, have you experienced any incident while on duty? 1. Yes 2. No

4. If yes, how would you describe the severity of the incident experienced? If no, go to question 6

1. Very Severe 2. Severe 3. Moderately Severe 4. Slightly Severe 5. Not Severe

5. If you have answered question 4, how often is the incident witnessed likely to occur in your ward?

1. Always 2. Often 3. Occasionally 4. Rarely 5. Never

6. In the past 12 months, have you witnessed any incident while on duty? a. Yes b. No

7. If you have answered question 6, how often is the incident witnessed likely to occur in your ward?

a. Always b. Often c. Occasionally d. Rarely e. Never

8. If you have answered 'yes' to question 6, did you fill out an incident report? 1. Yes 2. No

9. If yes, indicate areas covered in report. a. Date and time of incident b. Nature of incident c. Good practice (what was done well) d. care delivery problems e. What contributed to the incident f. others ……

10. If no, why? ……. …….

11. If possible, what do you think could have been done to eliminate the occurrence of the incidents you witnessed or experience? …….

12. How many hours of training have you received in the past 12 months on patient safety?
a. None b. less than 10 hours c. 10-20 hours d. More than 20 hours

13.Organisational factors	**Scale (1-5)**
1. strongly disagree 2. disagree 3. neither agree nor disagree 4. agree 5. strongly agree.	
1. There is a free flow of communication from junior staff to senior staff	
2. I get quick response to questions and inquiries from my line managers when needed.	
3. I get regular advice and support from more experienced practitioners for my care giving activities.	
4. In my team, we recognise and address more critical situations before attending to the moderate and less healthcare cases.	
5. In my team, we have share values for achieving maternal child health objectives.	
6. In my team, we follow a consistent approach to record and report incidence at work.	
7. In my hospital, there is an effective way of transferring information between other departments and the gynaecology and obstetrics department.	
8. I receive regular and updated training for my job role.	
9. Team members meet regularly to discuss ways to improve safety practices within my department.	
Technical factors	**Scale (1-5)**
10.We have regular power and gas supply to support our health care delivery.	
11. I have adequate materials, resources and equipment required to perform my job.	
12. The equipment and resources I use are regularly checked and monitored to ensure that they function correctly.	
13. I have the technical knowledge and skills needed to use equipment and tools effectively for my job.	
14. All relevant equipment and tools are set up correctly and kept in a room where I can easily access them.	
15. All equipment and tools are well designed by manufacturers to an acceptable standard to allow me to do my job properly.	
Human behaviour factors	**Scale (1-5)**
16. In my team, we are able to address complex or abnormal pregnancy conditions.	
17. In my team, there is a procedure for verifying patient information before attending to them.	
18. In my team, successful intervention measures are taken to handle critical conditions and emergencies.	
19. In my team, care delivery tasks are allocated based on staff's knowledge and expertise.	
20. In my team, we have clear understanding of what to do to achieve quality care.	

21. In my team, proper health assessment is done by clinicians before diagnosis of an illness.
22. In my team, adequate planning and preparation is done before any health care delivery.
23. In my team, we have suitable monitoring systems and procedures to keep up to date with changes in patient's care plan.
24. In my team, adequate measures have been put in place to prevent data entry errors
25. In my team, adequate measures have been put in place to prevent test result errors.
26. In my team, adequate measures have been put in place to prevent prescription errors.
27. In my team, tripping and slip incidents are discussed in meetings.
28. In my team, we have adequate health and safety measures in place to minimise or eliminate trips and slips at work.
Patient –related factors **Scale (1-5)**
29. The women in our care have access to advice and support on maternal care and pregnancy related issues.
30. The women in our care attend heath care appointments sufficiently.
31. The women in our care mix formal healthcare prescriptions with other forms of traditional care practices.
32. The women in our care take medication not prescribed by the doctor.
33. The women in our care are aware of consequences of their healthcare choices.
34. The women in our care are aware of any existing chronic disease(s) before pregnancy.
35. The women in our care are aware of any illness they develop during pregnancy.
36. The women in our care understand how to manage illness on their own, as recommended by the doctors
37. The women in our care have sufficient money to pay for their care expenses.
38. The women in our care make health care choices based on religious beliefs.
39. The women in our care make health care choices based on cultural values other than religious beliefs.
40. The women in our care are able to make their own health care decision without other family members interfering.

Thank you for completing this questionnaire!

Appendix 3.2: Qualitative study

Appendix 3.2.1 Sample Health Experts Letters

Chaucer House
White Hart, London
SE1 1NX
vivianechinwah@yahoo.com
07848871017

The Semi-Structured Interview

The Prevention and Recovery Information System for Monitoring and Analysis (PRISMA) Model for Improving Maternal-Child Healthcare Outcomes in Rivers State, Nigeria

Dear ….....

Thank you for accepting to participate in this study on improving maternal-child healthcare (MH) indicators in Rivers State, Nigeria. My name is Mrs Viviane Dumle Chinwah and I am undertaking a doctoral research in the field of health Care Management; particularly in the area of maternal care. The aim of this research is to examine the theoretical efficacy of the PRISMA flow chart model (Prevention and Recovery Information System for Monitoring and Analysis) as a tool for improving MH outcomes in Rivers State, Nigeria.

You have been nominated by …… as an expert in the field of gynaecology and obstetrics care with knowledge and insight needed to provide original contribution to this study which seeks to coordinate and gain expert opinion on how health care services can be optimised to achieve better outcomes for patients.

In the first part of this project, up to 250 questionnaires were administered to clinical and managerial staff at G&O departments of three hospitals in Rivers State, Port Harcourt; Braithwaite Memorial Hospital, Military Hospital and the University of Port Harcourt Teaching Hospitals with ethics approval from all participating hospital. Data analysis from questionnaire administered provided useful insights into a typical MH delivery system and captured areas within the system that can be enhanced in terms of organisational, technical, human behaviour and patient-related factors based on PRISMA-medical version classification of factors by van der Schaaf & Habraken (2005).

This stage will involve the participation of 10-15 health expert to gather professional views on key strategies for optimising the MH delivery system. Hence, your contribution is highly valuable and will help move this research forward significantly.

It is important to state that the motive of this study is not to expose weaknesses in the system, but to work collaboratively with stakeholders to improve the effectiveness of the system while highlighting good practices within the health care system.

There is no direct risk or discomfort related to this research. However, if you feel uncomfortable with any part of this research at any time, you have the right to withdraw participation without any consequences. By participating in this research, there is the opportunity to use the knowledge of PRISMA flow chart model to enhance safety measures adapted to the Nigerian context and share ideas with other experts. Also, it is important to note that steps will be taken to protect your identity, and this includes keeping all participants anonymous.

Thanks again for your contribution towards this research.

Yours Sincerely'
Viviane Chinwah
Viviane Dumle Chinwah
(PhD Research Student)

Appendix 3.2.2: Semi-Structured Interview Guide and Questions

The interviewed utilised open and structured questioning techniques. Part A consist of demographic information. In the Part B of the study, an opening question technique will be employed to answer questions on the general state of the MH system. this will be followed by a structured questioning organisational, technical, human behaviour and patient-related factors.

Guide:

- We will like you to answer all questions elaborately as much as possible in all sections and limit your answer to the most important ideas.

- Please provide specific and practical answers and give examples to support your answers.

- Actual names of patients, colleagues and managers cannot be used as we intend to keep the identify of clinicians confidential.

- When answering questions on how to improve quality of healthcare, please do not limit your answers to what is currently obtainable in the Nigerian healthcare system but try to envision what you think can be done as an expert in the field.

Part A: Participants Information

Name:
Position:
Highest Qualification Obtained:
Affiliations:
Relevant Publications:
Previous personal or organisational research work completed:
Job Description/ specialisation:
Approximate number of employees within your supervision:
Years of experience in gynaecology and obstetrics care:
Years of experience in the healthcare sector:
Email/ phone contact:

Part B: Open Questions

Guide:
a. External Changes: these are changes that are necessary for improving quality of delivery but outside the control of the healthcare delivery system or management such as government legislations, politics, socio-economic factors etc.

b. Internal Changes: these are changes that should take place in the healthcare delivery system and within the control of the hospital management.

Question 1: Please can you give an overview of the general state of MH delivery system in Rivers State.

Question 2: The rate of maternal-child mortality in Nigeria is significantly high. What major changes will you recommend improving or enhance the quality of delivery (patient safety) that will result in better outcomes for women? This can be described in terms of the external and internal changes.

Part C: Structured Questions

Guide: Description of PRISMA categories of risk.

Organisational factor are system failures contributing to poor healthcare outcomes. For example, the organisation culture and how it impacts on patient outcomes, the flow of communication within the department and how critical care or obstetric emergencies care are prioritised and implemented etc.

Technical factors are failures due to material defects, design and inaccessibility of the equipment.

Human-behaviour factors are failures due of the poor attitude of clinicians, skills, qualifications or actions contributing to maternal deaths.

Patient-related factors are failures due patient characteristics and condition that lead to poor outcomes.

Questions:

Please kindly discuss at least five challenges in each category.

I. Identify organisational challenges contributing to failures in the MH system

II. Identify technical challenges contributing to failures in the MH system

III. Identify human behaviour contributing to failures in the MH system

IV. Identify patient -related challenges contributing to failures in the MH system

Questions

Outline your proposed strategic plan for dealing with organisational, technical, human-behaviour and patient-related challenges. A strategic plan is an organisational activity that is used to set priorities, strengthen operation to ensure clinical staffs work towards achieving goals for improving health outcomes.

I. Propose action plan for dealing with organisational challenges in the system.

II. Propose action plan for dealing with technical challenges in the system.

III. Propose action plan for dealing with human behaviour challenges in the system.

IV. Propose action plan for dealing with patient related challenges in the system

End of Interview: Thank you again for your time and contribution to this study

Appendix 3.2.3: Health Experts Interview Schedule

Health Experts	Interview Sessions	Date	Time (GMT)	Duration
Dr. Mya	Part 1 Part 2	1/05/18 15/05/18	12.21-12.44 16.55-17.10	00.23.91 00.15.01
Dr. Ian	Part 1	5/05/18	10.10-10.54	00.44.00
Dr. Joe	Part 1 Part 2	15/05/18 31/05/18	22.29-22.53 21.54-22.12	00.24.39 00.22.06
Dr. Jon	Part 1	30/05/18	23.08-00.09	1.01.40
Dr. Rey	Part 1 Part 2	30/05/18 1/06/18	9.41-10.17 9.47-10.24	00.36.07 00.37.39
Dr. Cal	Part 1 Part 2	7/06/18 7/06/18	21.33-22.32 22.40-23.16	00.59.18 00.36.16
Dr. Ali	Part 1 Part 2	12/06/18 12/06/18	16.43-17.14 17.15-17.38	00.30.53 00.23.57
Dr. Sam	Part 1	20/07/18	22.03-22.47	00.47.29
Dr. Ben	Part 1	20/07/18	21.03-22.01	00.58.49
Dr. Nat	Part 1	20/07/18	22.03-23.01	00.58.44
Dr. Dex	Part 1	2/08/18	20.54-21.42	00.48.17
Dr. Ada	Part 1	16/08/18	15.08-15.38	00.30.09
TOTAL	**17-sessions**			**656.15mins (11.34.00)**