

FACTORS ASSOCIATED WITH MATERNAL DEATHS AT INTERMEDIATE
HOSPITAL OSHAKATI (IHO): OSHANA REGION, NAMIBIA

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ABSTRACT

Maternal death is a major health problem in Namibia, and in particular, at Intermediate Hospital Oshakati (IHO), Oshana region. Despite the introduction of several interventions by the Ministry of Health and Social Services to prevent the maternal deaths, IHO had reported the highest percentage (32%) of maternal deaths between January 2008 and May 2010 (MoHSS, 2011). It was against this background that this study was conducted to determine the factors associated with maternal deaths at IHO, Oshana region.

A quantitative, cross-sectional retrospective research method was used to assess each maternal death at IHO, by reviewing patient records. Data was collected from 1 January 2011 to 31 December 2014. Patients' socio-demographic characteristics were described. Different factors associated with maternal deaths were identified and analysed using Microsoft excel and Epi Info 7. Data was collected from deceased maternity patient records, maternal death register and DHIS2 hospital computer.

A total of 74 maternal deaths out of 22840 live births were recorded at IHO for the four years study period (1 January 2011 to 31 December 2014). The leading factors associated with maternal deaths were identified as: antepartum haemorrhage 12 (16.22%), hypertension 9 (12.16%) and 'other' causes 33 (44.59%). Most of the deaths 61 (782.4%) occurred in the age group of 25-44 years. Amongst that number, twenty-six (35.1%) were HIV positive women. About 87.8% of maternal deaths were of rural residents and 54.1% of those who died were single women. The provision of targeted, improved basic obstetric care is crucial to make pregnancy safer and reduce maternal deaths at IHO, Oshana region.

TABLE OF CONTENT	PAGE NUMBERS
ABSTRACT.....	i
ACKNOWLEDGEMENT	vi
DEDICATION.....	vii
DECLARATION	viii
LIST OF ABBREVIATIONS	ix
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF ANNEXURES.....	xiii
CHAPTER ONE.....	1
INTRODUCTION AND BACKGROUND OF THE STUDY	1
1.1.2 Maternal Deaths at International Level.....	2
1.1.3 Maternal Deaths in Sub-Saharan Africa (SSA)	5
1.1.4 Maternal deaths in Namibia	6
1.2 Problem Statement.....	8
1.3 Purpose of the Study	9
1.3.1 Objective of the study	9
1.4 Significance of the Study	10
1.5 Definition of Key Terms.....	11
1.6 Organisation of chapters	12
1.7 Summary	14
CHAPTER TWO	15
LITERATURE REVIEW	15
2.1 Introduction.....	15
2.2 The Three Delays conceptual framework	16
2.4 Global Burden of Maternal Deaths	20

2.5 Maternal mortality situation in developing countries	21
2.6 Maternal Deaths in Africa.....	24
2.7 Maternal Deaths in Southern African Development Community (SADC).....	26
2.8 Maternal Deaths in Namibia	28
2.9 Preventive Measures for Maternal Deaths	31
2.10 Health Services provided at Intermediate Hospital Oshakati (IHO) Oshana region.....	35
2.11 Summary	36
CHAPTER THREE	37
RESEARCH DESIGN AND METHODOLOGY	37
3.1 Introduction.....	37
3.2 Research Design and Methodology	37
3.3 Study Population.....	38
3.3.1 Inclusion Criteria	39
3.3.2 Exclusion Criteria	40
3.3.3 Sample Size.....	40
3.4 Data collection Instruments	40
3.5 Pilot Study.....	41
3.5.1 Validity	42
3.5.2 Reliability.....	44
3.6 Data Collection	44
3.7 Data Entry and Analysis	46
3.8 Ethical Considerations	47
3.8.1 Beneficence.....	47
3.8.2 Justice.....	48
3.8.3 Respect for persons	48
3.8.4 Consent	49
3.8.5 Confidentiality	50

3.9 Study setting.....	50
3.10 Summary	51
CHAPTER FOUR.....	52
RESULTS AND DISCUSSION OF THE STUDY	52
4.1 INTRODUCTION	52
4.2 DEMOGRAPHIC CHARACTERISTICS AND OBSTETRIC RISK FACTORS OF THE DECEASED.....	54
4.2.1 DEMOGRAPHIC CHARACTERISTICS OF THE DECEASED	54
4.2.2 OBSTETRIC CHARACTERISTICS OF THE DECEASED.....	60
4.2.3 Cases referred from District Hospitals.....	62
4.2.4 Antenatal Care Visits	64
4.2.5 Gestational Period for Maternal Death	65
4.2.6 Method of Delivery for Maternal Deaths.....	66
4.2.7 Phases of Labour.....	68
4.2.8 Frequencies for Causes of Maternal Deaths.....	69
4.3 DEMOGRAPHIC CHARACTERISTICS BY ASSOCIATED RISK FACTORS.....	71
4.3.1 Cross tabulation of age with obstetric factors (HIV status, ANC visits, gestational period, method of delivery and phase of labour upon death).....	72
4.3.2 Cross-tabulation of marital status with obstetric factors (HIV status, antenatal care visits, gestational period, and method of delivery and phase of labour upon death)	74
4.3.3 Cross-tabulation of place of residence with obstetric factors (HIV status, Antenatal care visits, gestational period, and method of delivery and phase of labour upon death) of maternal death cases.	77
4.4 Summary	79
CHAPTER FIVE	81
CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS.....	81
5.1 INTRODUCTION	81
5.2 CONCLUSIONS.....	82
5.5 RECOMMENDATIONS	85

5.5.1 Information dissemination	85
5.5.2 Community mobilisation through local electronic and print media platforms	85
5.5.3 The need for improved relationship between the Ministry of Health and other stakeholders.....	86
5.5.4 Improved support and supervision of Health Extension Workers (HEWs)	86
5.5.5 Improved availability of antenatal care services in hospitals and clinics	87
5.5.6 Improving the Infrastructure for Antenatal Care (ANC) Services	87
5.6 Conclusions.....	88
References.....	89
Annexure A: Letter of permission from the University of Namibia to start with the study ..	94
Annexure B: Letter of permission to conduct the study in the public health facilities from the office of the Permanent Secretary of the Ministry of Health and Social Services	95
Annexure C: Checklist for assessing factors associated with Maternal Deaths at Intermediate Hospital Oshakati(IHO), Oshana	97

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DEDICATION

I dedicate this work to all the mothers who lost their lives due to maternal related causes as well as to their loved ones.

DECLARATION

I, Lidwina Kornelius, hereby declare that this study: Factors associated with maternal deaths at Intermediate Hospital Oshakati (IHO): Oshana region, Namibia is my own work and that all sources that I have used have been indicated and acknowledged by means of complete reference and that this work has not been submitted before by any one or for any other degree at this institution.

.....

Signature

.....

Lidwina Kornelius

Date

LIST OF ABBREVIATIONS

ANC	Antenatal Care
APH	Antepartum Haemorrhage
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral
AU	African Union
CARMMA	Campaign for the Acceleration of Maternal Mortality in Africa
CD4	Cell Differentiated (CD4) count
CNN	Cable News Network
C/S	Caesarean Section
DHIS	District Health Information System
HIV	Human Immunodeficiency Virus
IHO	Intermediate Hospital Oshakati
LSS	Life Saving Skills
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
MNCH	Maternal New-born Child Health
NDHS	Namibia Demographic Health Survey

RMT	Regional Management Team
PHC	Primary Health Care
PPH	Post-Partum Haemorrhage
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa
STIs	Sexually Transmitted Infections
TB	Tuberculosis
UK	United Kingdom
UNFPA	United Nations Population Fund
UN	United Nations
WHO	World Health Organisation

LIST OF TABLES

Table 4.1: Age Classification of Maternal Deaths patients at IHO 2011-2014.....	48
Table 4.2: Frequencies of Participants by Marital Status, IHO- Oshana region	49
Table 4.3: Frequencies of Participants by Residential address, IHO-Oshana region.....	50
Table 4.4: HIV status of Maternal Death at IHO from 2011-201.....	52
Table 4.5: Distribution of Maternal Death by Referring Health Facility, IHO Oshana.....	54
Table 4.6: Causes of Maternal Death cases.....	60
Table 4.7: Cross Tabulation of Age with Obstetric factors.....	62
Table 4.8: Cross tabulation of Marital Status by Obstetric factors of Maternal Death.....	63
Table 4.9: Cross Tabulation of Residence with Obstetric factors.....	68

LIST OF FIGURES

Figure 2.1: Three Delays Model.....	16
Figure 4.1 Maternal Death and Maternal Mortality Rate for IHO from 2011-2014.....	46
Figure 4.2 Antenatal Care Visits for maternal death cases at IHO from 2011-2014.....	55
Figure 4.3 Gestational Periods of Maternal Death Cases at IHO from 2011-2014.....	56
Figure 4.4 Method of Delivery for Maternal Death Cases at IHO, 2011- 2014.....	58
Figure 4.5 Phases of Labour for Maternal Death at IHO, 2011-2014.....	59

LIST OF ANNEXURES

Annex I	UNAM Research Permission Letter.....	93
Annex II	MoHSS Permission to conduct research.....	94
Annex III	Checklist.....	95

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

The World Health Organisation (WHO) defines maternal death as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (Chandramohan, Shibuya and Soleman, 2006).

Maternal death in the context of this study was defined as the death of a woman aged between 15-49 years due to maternal related causes at Intermediate Hospital Oshakati, Oshana region during the period 2011-2014. Oshana is the only region in the north-western part of Namibia with a referral hospital, Intermediate Hospital Oshakati (IHO) the only referral hospital for the four Northern Namibian regions of Oshikoto, Ohangwena, Omusati as well as Kunene region in northern Namibia.

An estimated half a million maternal deaths occurred globally every year, specifically in the low income countries. Maternal deaths due to pregnancy and child birth related complications were reported to be the major cause of death for women in the reproductive age group of 15-49 years.

It was reported further that half of that number lives in sub-Saharan Africa (SSA). However, among all regions of the world, only one (1%) of maternal deaths occur in the developed world, while only one third of these deaths are prevented in African countries, with Sierra Leone and Niger over this figure. Sub-Saharan Africa (SSA) where the problem is most acute bears the lowest annual reduction rate of 0.1% maternal deaths. In fact, the overall number of maternal deaths had increased between 2004 and 2010. Almost all of these deaths could have been prevented (Berhan, 2014).

1.1.2 Maternal Deaths at International Level

It was reported in 2013 by Cable News Network (CNN) that the United States of America's trends in maternal deaths went up unlike the rest of the world. Their rate of pregnancy-related deaths has especially gone up in Texas. While maternal deaths are highest in the developing world, their rate of pregnancy-related deaths has especially more than doubled over the course of two years, 2010-2012. Additionally, the United Nations Millennium Development Goals (MDGs) sought a 75% reduction in pregnancy-related deaths from 1990 to 2015. The United States (US) performed worse than any other developed nation when it comes to maternal death over three years, 2010-2012. It was reported that a woman in the US was 10 times more likely to die due to pregnancy than a woman living in Poland, Austria or Belarus (Ravitz, 2016).

According to a study conducted by Ravitz (2016) in the US, the following factors led to women dying during pregnancy and childbirth: lack of funding for the provision of family planning, many restrictions on abortions, other services that were not provided to underserved communities including breast and cervical cancer screenings, Sexually Transmitted Infections (STIs) testing and treatment, and multiple forms of preventive women's care.

Sarah Wheat, Chief External Affairs Officer for Planned Parenthood of Greater Texas said in a written statement that “family planning clinics and other services are the gateway to the health system for many of their clients, hence women have been left out in the cold, without obtaining regular healthcare screenings, or birth control to space their pregnancies, and delays in their initial pregnancy test and prenatal care, all of which are harmful to women’s health (Ravitz, 2016).

A record-linkage study was conducted in Italy to detect maternal deaths and analyse associated causes among five Italian regions in response to a recent ranking of Italy by the Lancet as having the lowest maternal mortality ratio among 181 countries. All women aged 15-49 years resided in the participating regions, with one or more hospitalisations for pregnancy or any pregnancy outcome between 2000 and 2007 were sampled and studied. Cases have been selected and causes of death have been classified according to the 10th International Classification of Diseases. A total of 118 maternal deaths have been identified resulting in a maternal mortality ratio of 11.8, compared with the official figure of 4.4, per 100,000 live births.

The following factors were identified as direct causes of maternal deaths: haemorrhage, thromboembolism, and hypertensive disorders of pregnancy (Phiri, 2014).

A five (5) thematic maternal review process was conducted in 2015 in London by members of the Maternal Morbidity and Mortality group who completed an overarching review of all maternal death reports submitted to the London Maternity Clinical Network. It should be noted that the Maternal Morbidity and Mortality group took evidence of notable practices and areas of learning directly from the root cause analysis carried out by the trust investigation teams and the reports which had been submitted.

Underlying medical conditions that contributed to the maternal deaths reviewed include: diabetes and hypertension, cardiomyopathy, scleroderma, sickle cell disease and a newly diagnosed systemic lupus, cancer, pulmonary embolism with underlying malignancy, acute and chronic tuberculosis, ruptured aneurysm and ketoacidosis. However, it was noted previously that many women had other co-existent conditions or diseases.

As indicated in the analysis, the causes of death were usually multifactorial: poor communication and co-ordination of care across settings. The Kirkup report into Morecambe Bay 5 identified poor information sharing and communication errors featured in cases that resulted in women's death or severe harm.

The review found that there were women who did not attend appointments and or declined recommended treatment. The majority of these women were vulnerable due to social or mental health problems, co-existing medical disease, addiction, housing, overweight, underweight and poverty (Phiri, 2014).

According to a study done in the United Kingdom (UK), a total of 135 women died from eclampsia, pulmonary embolism, severe sepsis, amniotic fluid embolism, and peri-partum haemorrhage between 2009 and 2012. Six factors were independently associated with maternal death: inadequate use of antenatal care; substance misuse; medical comorbidities; previous pregnancy problems, hypertensive disorders of pregnancy, and Indian ethnicity. Of the increased risk associated with maternal death, 70% could be attributed to these factors. The report further indicated that there was suboptimal clinical care during delivery and postpartum (Brocklehurst, Knight, Kurinczuk, Lewis, Nair, & Sellers, 2015).

1.1.3 Maternal Deaths in Sub-Saharan Africa (SSA)

Maternal health was reported by WHO in its report on factors associated with maternal mortality in SSA to be one of the major worldwide health challenges. Currently, the unacceptably high levels of maternal deaths are reported to be a common subject in global health and development discussions.

Although some countries have made remarkable progress, half of the maternal deaths in the world still take place in Sub-Saharan Africa, where little or no progress has been made. The World Health Organisation indicated that there was no single simple, straightforward intervention that will significantly decrease maternal mortality alone, but there is a consensus on the importance of a strong health system, skilled delivery attendants, and women's rights for maternal health which can improve or reduce maternal deaths if properly and strongly implemented. Among the 20 countries with the highest maternal mortality ratios, 19 are in SSA.

Additionally, a number of countries in SSA were said to have halved their levels of maternal deaths between 1990 and 2015 of which Namibia is not one. Maternal death was said to result from a wide range of indirect causes which are concurrent diseases that are complicating pregnancy and childbirth like Human Immunodeficiency Virus (HIV), Tuberculosis (TB), Malaria and direct causes such as Bleeding after delivery, Infection, Hypertensive disorders and Obstructed labour (WHO, 2015).

1.1.4 Maternal deaths in Namibia

The Namibian Demographic and Health Survey (NDHS) of 2013 indicated that maternal deaths accounted for nine (9) percent of all deaths among women aged 15-49 years. This in itself depicts a picture of poor progress towards achieving the ratio of less than 200 maternal deaths per 100 000 live births as indicated in the 2007 Road Map for the Acceleration in the Reduction of Maternal Death in Namibia.

The maternal mortality ratio as per the NDHS 2013 was reported to be 249 in 1992, 271 in 2000, 449 in 2006-2007 and 385 in 2013 respectively. That indicated the slight decreasing trend in maternal deaths between 2007 and 2012 in Namibia as a country. The number of women and girls who died each year from complications of pregnancy and childbirth was reported to have declined from 523,000 in 1990 to 289,000 in 2013. These numbers were considered to be statistically insignificant considering MDG 5 (MOHSS, 2014).

According to the United Nations Population Fund (UNFPA), Namibia has an overall reduction of maternal deaths 265/100 000 live births, despite having fallen short of meeting the 2015 targets under the MDG goals. This according to the report, still falls short of the ambitious global target of only 70 deaths per 100 000 live births as set in the United Nations' Sustainable Development Goals (SDGs). Despite the fair reduction, significant factors associated to maternal deaths were reported to be inequality of access to services and poor quality of care. This indicates a severe shortage of health workers in the sub-Saharan region. Countries in the eastern and southern region, Namibia included, still have relatively poor maternal outcomes, the report stated (Brink, 2017).

As part of the commitment by the government of the Republic of Namibia to the MDG number 5 which targeted to improve maternal health and reduce maternal mortality by 75% between 1990 and 2015, the target was not reached. Namibia had introduced different programmes to address the health needs of women and children.

Some of the main programmes were the Safe Motherhood Initiative which was introduced in 1991 and the Roadmap for the Acceleration of the Reduction in Maternal and Child Death introduced in 2006. The maternal and perinatal/neonatal death review committees were established from national to district levels, even down to facility level in order to improve maternal health services and reduce deaths.

Additionally, three delays were found to be associated with maternal deaths in Namibia together with haemorrhage, eclampsia, puerperal sepsis, HIV, pneumonia and Tuberculosis. Nonetheless, the report of the survey on the Factors Contributing to Maternal Mortality and the Prevalence of Missed Maternal Deaths (2011) which was also conducted at IHO indicated that maternal deaths still occurred in health facilities in Namibia and Intermediate Hospital Oshakati was no exception, because it reported the highest number of 37/113 (32%) deaths among all surveyed health facilities. Therefore, a study was necessary to find out the factors associated with maternal deaths at Intermediate Hospital Oshakati (MOHSS, 2011).

1.2 Problem Statement

Loss of life during pregnancy and during giving birth is preventable, and thus a single maternal death was regarded as a cause for concern. The death of a woman in childbirth was a tragic and wasteful event that carries with it a burden of grief and pain among family members. Despite several interventions implemented at IHO such as Life Saving Skills training for midwives and doctors, in-service trainings on

different obstetric topics, abnormal deliveries and management of eclampsia, more women were still dying at this hospital. Oshana is the only region in the north-western part of Namibia with a referral hospital, Intermediate Hospital Oshakati (IHO) the only referral hospital for the four northern Namibian regions of Oshikoto, Ohangwena, Omusati as well as Kunene. IHO had reported the highest percentage (32%) of maternal deaths between January 2008 and May 2010 (MoHSS, 2011).

The recorded maternal deaths at IHO for the years 2011-2014 showed fluctuations as follow: 2011 (18), 2012 (16), 2013 (23) and 2014 (15) respectively. Such deaths of women during pregnancy, delivery and postpartum are negatively impacting the population growth of the region and the country as well. This indicated that there was a great need to conduct a study to look into the factors associated with maternal deaths at the same hospital which is IHO.

1.3 Purpose of the Study

The main purpose of this study was to determine factors associated with maternal deaths at Intermediate Hospital Oshakati, Oshana region.

1.3.1 Objective of the study

To determine factors associated with maternal deaths at Intermediate Hospital Oshakati, Oshana region between the years 2011 to 2014.

1.4 Significance of the Study

There has been a growing interest recently on the reduction of maternal deaths in the world in general. Maternal deaths have been studied in the last three decades however; there are still concerns that generate a considerable body of research on this topic. Different methods of study were used in the world in an attempt to reduce maternal deaths, but many countries failed to reach the MDG 5 target of reducing maternal deaths by 75% by 2015.

Namibia in general and IHO specifically also failed to achieve this target because women are still dying at this hospital. Aside from contributing to the body of recommendations to improve services to reduce maternal deaths in Namibia, the study could also inform and link similar and future studies on the same topic and provide needed inputs into existing maternal health policies and guidelines.

The study findings can help to guide the implementation of new strategies to improve in the reduction of maternal deaths or strengthening the existing ones. Some of the strategies already in place are the availability and provision of maternal health care services, empowering of individuals, families and communities to improve

reproductive health and maternal health as well as the establishment of functional referral systems between communities, clinics, health centres and district hospitals. Therefore, the findings of the study might be used to address the existing gaps in service provision.

Finally, the ultimate aim underlying the study is quality of life for mothers and their babies, meaning mothers enjoying their healthy pregnancies, childbirth as well as postnatal periods without any threat of complications or death (MoHSS, 2007).

1.5 Definition of Key Terms

Maternal Death

Maternal death was defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but, not from accidental or incidental causes (Chandramohan et al, 2006).

Maternal Mortality Ratio (MMR)

Maternal Mortality Ratio was defined as the number of maternal deaths per 100,000 live births (Berhan & Berhan, 2014).

Direct causes

Death resulting from obstetric complications of the pregnancy state (pregnancy, labour or puerperium) from interventions, omissions, incorrect treatments or from chains of events resulting from any of the above (Berhan & Berhan, 2014).

Indirect causes

Death resulting from previous existing disease, or disease which developed during pregnancy and which was not due to direct causes, but was aggravated by the physiological effects of pregnancy (Berhan & Berhan, 2014).

1.6 Organisation of chapters

Chapter One: Introduction and Background of the Study

This chapter looks at the background of the subject. It provides the problem statement and the objectives of the study. This comprises of the historical background of maternal deaths and its effects on the Namibian population. In this case it looks at the following subheadings: background of the study, statement of the problem, the aim and objectives of the study, significance of the study, justification of the study, definition of terms and organization of the study.

Chapter Two: Literature Review

This chapter dwells on the literature review of the study. It looks at the literature in accordance to the objectives of the study. It captures the theoretical framework that underpins the study. It also looks at the phenomena from a global, regional and local context drawing similarities and differences of the effects of maternal deaths.

Chapter Three: Research Design and Methodology

Chapter three provides the research methodology and design of the study. In particular, it looks at procedures undertaken in order to answer the research problem. This involves a discussion on research design, the population of the study, sampling techniques, data collection instruments, data collection procedures, data analysis, and ethical considerations of the study.

Chapter Four: Results and Discussion of the Findings

This chapter deals with data presentation in the form of pie charts, frequency tables and graphs for quantitative data and thematic tables for qualitative data. The chapter will also provide the analysis and an exposition of the research findings.

Chapter Five: Summary, conclusions and Recommendations

Chapter five contains critical evaluation of the findings and a general summary of the study. It provides the general conclusions of the study, the study's contribution to existing knowledge, specific policy recommendations and it gives the possible research directions of the study.

1.7 Summary

The first chapter dealt with the background of the study, problem statement, purpose, study objectives, and significance of the study as well as the definition of key terms and the layout of the study. The next chapter will be the discussion on literature review.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose behind this chapter was to present the relevant literature pertinent to the study. It reviewed the literature from secondary sources such as published journal article, books, newspaper and magazine articles and research dissertations that have been done by others. It captures the studies that have already been conducted on the factors associated with maternal deaths at global level, maternal deaths in Africa, sub-Saharan Africa, Namibia and services provided at Intermediate Hospital Oshakati (IHO).

Literature review is important before one carries out a research study because it gives the researcher the areas that have been researched. This helps the researcher to draw comparisons between the existing knowledge and the research under consideration. In particular, it is necessary for integrating existing knowledge on a particular topic to what is being studied, to ensure that a proposed topic has not been exhausted enough to solve the identified problem and lastly to define the area of study. The aim

of literature review is to build on an existing body of knowledge on the subject and to guide the research to be conducted.

In this case the literature review captured the following subject areas, namely, the theoretical framework underpinning the study, defining the concept maternal death and its prevalence rate among both developed and developing countries. The researcher further narrowed down the focus from national level to local level in Namibia looking at IHO specifically within Oshana region. This helped the researcher to understand what was studied before on maternal deaths and associated factors as well as to look at the impact brought in after previous studies.

2.2 The Three Delays conceptual framework

This is a comprehensive approach propounded by Thaddeus and Maine that proposes that pregnancy-related mortality overwhelmingly contributes to delays in three phases:

1) Deciding to seek appropriate medical help for an obstetric emergency which is influenced by the actors involved in decision-making and some socio-cultural factors;

2) Reaching an appropriate obstetric facility, which depends on how far away the nearest facility is from her home in terms of distance and travel time; availability and cost of transportation and road conditions;

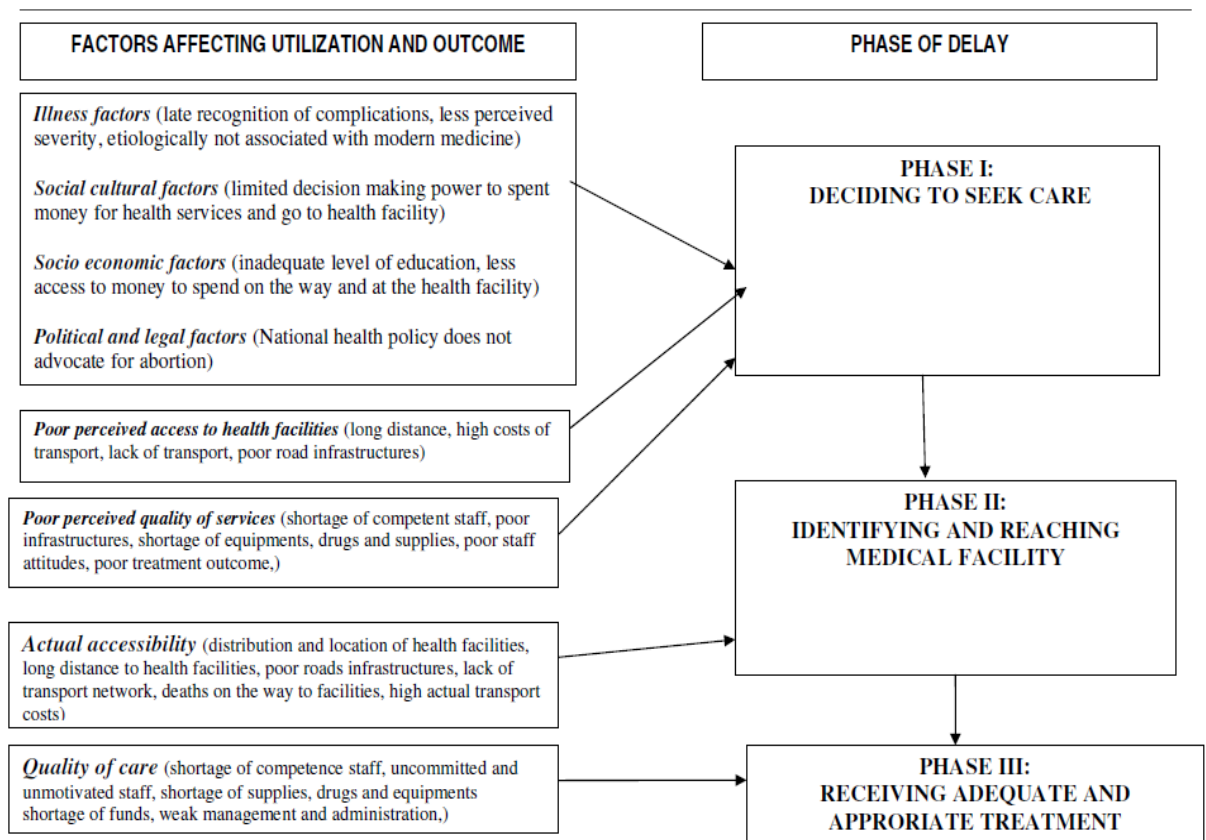
3) Receiving adequate care when a facility is reached; factors affecting the receipt and provision of care (includes the adequacy of the referral system); shortages of supplies such as medicines and other logistics, equipment and trained personnel; competencies of available personnel, ineffective communication and poor patient management.

In order to understand the factors leading to the deaths of pregnant women these delays have a good interplay that exists among them. They are not necessarily interdependent on each other, but a delay in one phase may or may not aggravate or prolong a delay in another. However, there is usually a combination of factors across the three phases that culminate in the woman's death. In this case, putting the pieces together one gains a better understanding of what actually happened. This is mostly proper for cases in which women have either died on the way to or upon arrival at the hospital or when things have gone completely twisted within the hospital itself. By gathering clues from the different phases health management can be assisted so as to adapt or develop interventions that improve the healthcare delivery system and the quality of care rendered (Thorsen, Sundby and Malata, 2012).

However, for healthcare workers to examine their current practices and for communities to modify some of their cultures, norms, beliefs and their behaviours, this can be done through the potential of empowering them. On the other hand, factors associated to maternal deaths can be assisted by the findings from this study to researchers and programme managers in determining complicity. These factors

will help policy makers prioritize funding from donors and maternal health care personnel to modify their practices.

Figure 2. 1: Three delays model of maternal mortality (Thaddeus, and Maine, 1994).



2.3 Defining the concept “maternal death”

Maternal health is a major worldwide health challenge that affects women of childbearing age, 15-49 years. It is specifically defined as the death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (World Health Organisation, 2015).

Maternal death is also called maternal mortality. Maternal mortality represents one of the devastating medical complications in many societies. It has been realised that complications of childbirth and pregnancy are indeed the prime cause of death among women of reproductive age. This is the reason why the international system had agreed to target 2015 as the year in which to reduce the prevalence of the scourge to a reasonable level (by three quarters).

It was in the year 1990 that the target was set as the fifth Millennium Development Goal (MDG) (WHO, 2015). Ending preventable maternal deaths continues to be one of the most important goals internationally; this explains the existence of a new MDG target which was set, and which aims for less than 70 maternal deaths per 100 000 live births by the year 2030 (WHO, 2015). The maternal mortality ratio (MMR) was the most common measure of maternal mortality and was expressed as the

number of maternal deaths/100 000 live-births (Berhane, Enquelassie & Hailu, 2012).

2.4 Global Burden of Maternal Deaths

Globally, approximately half a million maternal deaths occurred every year. About 830 women die from pregnancy or childbirth-related complications around the world every day. Maternal mortality ratios (MMR) in developed countries such as Sweden, Norway, and United Kingdom range from 5.4 to 12 persons per 100 000 live births. Middle income countries such as Mexico and Honduras report 106 or 280 maternal deaths per 100 000 live births. This is supported by a study done in the United States of America which revealed a maternal mortality ratio of only 5.5 per 100 000 live births.

Maternal mortality stands as one of the health indicators that distinguish between developed and developing countries. The maternal deaths occurring in developed countries show that with proper medical health facilities and services in developing countries maternal deaths can be lowered considerably (WHO, 2015).

In this case Japan is an example of a country in the developed world doing well in as far as maternal mortality is concerned. In 1950 it was reported that Japan had a maternal mortality ratio of around 180 deaths per 100, 000 live births and this was

significantly reduced to 50 deaths per 100 000 live births in 1970. By 2004 to 2005 Japan was among the countries with the lowest maternal mortality in the world with its maternal mortality ratio of 6 deaths per 100 000 live births. This success story of Japan was as a result of access to family planning, universal access to skilled care at delivery and timely access to emergency obstetric care for all pregnant women.

Thus, while developed countries have made huge strides towards bringing down the huge death rates among pregnant women, in developing countries pregnant women continue to face very high risks of death and disability. This indicates that maternal mortality is a universal problem, but the variation between developing and developed countries is an indication that maternal mortality can be prevented when its causal factors and effects are known and addressed. This explains why the researcher came up with this study aimed at identifying the factors associated with maternal deaths among pregnant women.

2.5 Maternal mortality situation in developing countries

In a study carried out by Hill, Thomas, Walker, Say, and Inoue (2000) it was stated that between the years 1990-2005 there were 535 900 maternal deaths in the world with sub-Saharan Africa and Asia accounting for 50% of the cases. This study further articulated that maternal mortality globally was on the decrease by 2.5% but the decrease was not felt in Sub-Saharan Africa. The reason behind these statistics

vary within the region, hence there is need for specific studies for further amplification. This explains why the researcher was interested in undertaking a study of this nature at IHO in Oshana Region.

Bangladesh has made remarkable progress towards Millennium Development Goal 5 (MDG5) with a 40% reduction in the maternal mortality ratio (MMR) from 320 to 194 maternal deaths per 100 000 live births (Bangladesh Demographic and Health Survey (BDHS), 2013). It is reported that Bangladesh has been doing well in reducing its mortality rate among pregnant women; however, there is an inadequate health system response and poor healthcare-seeking behaviour of women and their families. A study conducted in India indicated that the dominant figure of maternal deaths occur in hospitals and 17% of mothers died on the way to or from a facility. In addition, 18% of mothers died in transit, 11.5% died while being referred between health facilities (NIPORT, 2014).

In Africa studies have rated maternal mortality ratio as ranging from 424 to 2151 per 100 000 live births. Specifically, in the low-income countries, maternal deaths due to pregnancy and childbirth-related complications are the major causes of death of women in the reproductive age group of 15-49 years (United Nations, 2012).

Maternal deaths can be divided into direct and indirect obstetric deaths. Direct obstetric deaths were defined as “those resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from interventions, omissions,

incorrect treatment or from a chain of events resulting from any of the above for example, bleeding and obstructed labour”. Indirect obstetric deaths were defined as “those resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiological effects of pregnancy, for example HIV and Tuberculosis” (Berhane et al, 2012).

The global report by WHO indicated that there was an average annual percentage decline in the MMR between 1990 and 2008 of 2.3%. None of the broad MDG regions were on track to achieve MDG 5, except Eastern Asia with a 5.5% annual decline. It is assumed that maternal death is not a problem for rich countries in the world because 99% of the deaths were occurring in developing countries (WHO, 2010). Oceania and Sub-Saharan Africa have made the least progress at 1.4% and 1.7%, respectively contrary to the fourteen countries (Bhutan, Bolivia, China, Egypt, Equatorial Guinea, Eritrea, Estonia, Iran, Latvia, Maldives, Poland, Romania, Turkey, and Viet Nam) that achieved an average annual decline of 5.5% or more between 1990 and 2008 (WHO, 2010).

Between 1990 and 2015, the global maternal mortality ratio declined by only 2.3% per year. While developed countries made a stride in lowering high death rates associated with pregnancy, women in developing countries continue to suffer high risks of death and disability as a result of pregnancy. This indicates that maternal death is a global problem and no single country is exempted from it. Nevertheless,

maternal death can be prevented if associated factors are known and dealt with (WHO, 2010).

Some factors that were mentioned to cause maternal death at this level were, among others, haemorrhage, obstructed labour, sepsis, hypertensive disorders of pregnancy, inadequate use of antenatal care, diabetes and other medical co-morbidities. However, maternal deaths that occurred at global level were mostly preventable if quality health services were provided and adequate resources were allocated to health care facilities including human, equipment and financial resources. Maternal health was said to be improved by strong political commitment and policies, appropriate and adequate training of health care providers (WHO, 2010).

2.6 Maternal Deaths in Africa

According to the World Health Organisation (2015) the percentage decrease in maternal mortality ratio between 1990 and 2015 was 5.4% worldwide, however in sub-Saharan Africa the figure was only 1.8%. This means that in sub-Saharan Africa the case is worrying; hence, the need for studies of this nature, where the researcher is interested in finding the best possible solutions towards alleviating maternal death scourge at Oshakati Intermediate Hospital. Maternal death is still a cause for concern for most African countries. The leading biological causes of maternal death in Africa were found to be haemorrhage, infections and hypertensive disorders, and

those deaths were facilitated by a complex set of underlying social, economic and behavioural factors, typically grouped into the ‘Three Delays’.

The delay by the patient in the decision to seek care, the delay in reaching the appropriate care once the decision has been made to seek care and the delay in receiving adequate care after arriving at the health facility, all contributed to maternal death. Dynamics in the drivers of these delays and in interventions to ameliorate them and treat the biological causes of maternal death, all contribute to changing trends in maternal mortality in Africa (WHO, 2010).

A study undertaken by Berhane et al in Ethiopia on causes of maternal mortality reported that globally, approximately half a million maternal deaths occur every year.

Traditionally, the causes of maternal mortality have been classified as direct and indirect, each contributing to about 70%–80% and 20%–30% of the total maternal deaths, respectively.

It was also reported that the major causes of maternal deaths were similar across low income countries, often obstetric in origin, and generally followed obstructed labour with or without uterine rupture, hypertensive disorders mainly severe pre-eclampsia and eclampsia, infection and haemorrhage mainly placenta praevia/abruption, uterine rupture and postpartum haemorrhage. The majority of these fatal obstetric complications were said to occur during labour and immediately after birth. As a result, in the low-income countries like Ethiopia, more than three-quarters of maternal deaths due to the direct obstetric causes occurred during and after birth.

What was not exactly known in Ethiopia was the contribution of each of these common causes to the overall maternal mortality. Furthermore, little was known about the trend of maternal mortality due to the direct obstetric causes (Berhane et al, 2012).

A community-based survey report on maternal mortality and related factors, conducted in the Esiju health district of Ghana, revealed that postpartum haemorrhage (45.5%), jaundice in pregnancy (22.7%), obstructed labour (6.8%), eclampsia (6.8%) and fever (4.6%) were the main presumptive causes of maternal death and related factors (Browne, Djan, Martey, Opoku & Twum, 2008).

2.7 Maternal Deaths in Southern African Development Community (SADC)

Deaths occurring during pregnancy, childbirth and puerperium, hereafter referred to as ‘pregnancy-related’ deaths were defined as “death occurring during pregnancy, childbirth and puerperium. Due to a lack of adequate information on causes of death in SSA, surveys reported that maternal mortality often relied only on the timing of the death in relation to pregnancy and therefore reported pregnancy-related mortality as maternal mortality ratio (MMR).

Maternal mortality in Malawi was said to be high. The most recent national survey estimate was 675 maternal deaths/100 000 live-births during the period 2004–2010. In settings such as Malawi, where it was difficult to distinguish between HIV-disease-related indirect obstetric deaths and incidental deaths due to HIV coincident with pregnancy, timing deaths in relation to pregnancy was also more likely (Adegoke, Mgawadere, & Van den Broek. 2007).

According to a study conducted in Zimbabwe, an estimated 3000 women died during child birth and at least 1.23 percent of gross domestic product is lost annually due to maternal complications according to the United Nations. Zimbabwe was said to be among 40 countries where the maternal death rate exceeds 960 per 100,000 live births and the situation was reported not to be improving. The figure lagged far behind the MDGs of reducing maternal mortality by 75% in the year 2015. Maternal mortality must be declared a national disaster deserving urgent national attention, said the study report.

The following were identified as being factors associated with high maternal deaths in Zimbabwe: rural poor women who continue to experience difficulties in accessing quality obstetric care, the dollarization of the economy in 2009, which saw the impoverished country, abandon its hyper-inflated currency and adopt several foreign currencies, mainly the US dollar, women delivering outside health institutions and being attended to by unskilled birth attendants, growing social inequalities, AIDS and lack of access to emergency obstetric care.

Around one-third of Zimbabwean women still deliver at home and do not report at health facilities for post-natal check-ups including those who delivered at hospitals. Hospital staff charge fees for maternal health services and that prevents women who cannot afford from accessing health services. About 400 posts for both nurses and doctors have been frozen due to inadequate funding and this led to pregnant and post-partum women not receiving the care they needed (Phiri, 2014).

A study conducted by David et al in Mozambique revealed the following as contributing factors to severe maternal deaths in that country: haemorrhage as the most common, followed by eclampsia, HIV sero-prevalence, and inappropriate attendance of antenatal care services, late or wrong diagnosis, and inadequate management immediately after delivery, lack of monitoring of blood pressure and other vital signs. In addition, a third delay was identified, lack of blood derivate and unavailable operating room respectively.

2.8 Maternal Deaths in Namibia

According to WHO estimates, Namibia's MMR increased in 2005 at 310 maternal deaths/100 000 live births (MoHSS, 2014). The WHO estimates of the MMR for Namibia in 2010 was estimated to be at 200 maternal deaths per 100, 000 live births, ranking Namibia in a medium category country with MMR between 100-200, 000

live births. Recent estimates from UN reports adjusted MMR of 339 in 2013 and MMR of 265 in 2015 for Namibia (NDHS, 2013). The lifetime risk of maternal death in Namibia is 1.4%, and this translates to 1: 71 which is significantly higher than the average rate of 1:160 for developing countries. The post 2015 target is that no country should have an MMR greater than 140/100 000 live births by 2030. Therefore, Namibia as a country needs to put more efforts into achieving this from the current ratio (MoHSS, 2016).

Vital registration, population and housing census and Namibia Demographic and Health Survey (NDHS) serve as primary data source for maternal mortality in the country. Many cases of maternal deaths that take place in the community are not registered; hence they are not usually included when studies are conducted because only those that occurred at health facilities are studied. Pregnancy related deaths are among the top five reported causes of deaths in Namibia (MoHSS/NSA, 2013).

Similarly, the findings for the joint review of maternal, new-born, child and adolescent health and nutrition programmes in Namibia (2016), indicate that despite Namibia's efforts to implement the Roadmap for Accelerating the Reduction of Maternal and Neonatal Morbidity and Mortality together with other several programmes, the annual rate of reduction in maternal mortality ratio was too low 0.4% in 1990-2000 and 3.9% in 2005-2015 to show any progress towards achieving the MDG 5. This however calls for the country to refocus efforts to implement the renewed global strategy for women's, children's and adolescents' health in order to

achieve the Sustainable Development Goals (SDGs) and improve the health of every woman, every child, and every adolescent in Namibia (MoHSS, 2016).

Currently, the high levels of maternal death are topping the global, sub-Saharan Africa (SSA) and countries specific agenda for health and development. Although some countries in the world made progress on the reduction of maternal deaths, many deaths do occur in SSA where Namibia as a country is a member state and maternal death is as well a challenge (Alvarez, Gil, & Hernandez, 2009).

Namibia is one of a number of sub-Saharan African countries in which the HIV epidemic has had an enormous impact on maternal health and maternal deaths. In 2010, the World Health Organisation (WHO) estimated that 59.4% of maternal deaths in Namibia were attributable to HIV/AIDS. In addition, the 2016 National HIV Sentinel Survey concluded that 17.2% of adults in Namibia were HIV-positive.

This represents a significant contribution to the increased maternal death in the country. Antiretroviral (ARVs) drugs availability was cited as one of the significant strategies to reduce maternal deaths due to HIV/AIDS. Over the 1990–2010 period, however, the progress towards reduction of the national MMR was only 2% overall (average annual reduction of 0.1%), making Namibia one of 14 sub-Saharan countries designated as having made insufficient progress towards MDG 5 (MoHSS, 2010).

After implementing several interventions in Namibia such as training nurses and doctors in Emergency Obstetric Care, Anaesthesia, Focused Antenatal Care, and the establishment of several maternal death review committees at all levels of care and development of the Road Map to Accelerate the Reduction of Maternal deaths, the number of deaths remains a serious public health problem. The country figure for maternal deaths stands at 385 deaths per 100 000 live births (MoHSS, 2013).

2.9 Preventive Measures for Maternal Deaths

The Sustainable Development Goals (SDGs) and the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030) was launched after seeing that it is possible to accelerate the decline, countries have now united behind a new target to reduce maternal mortality even further. One target under SDG 3 is to reduce the global maternal mortality ratio to less than 70 per 100 000 births against Namibia's target of less than 265 deaths per 100 000, with no country having a maternal mortality rate of more than twice the global average (WHO, 2015).

According to the Campaign on Accelerated Reduction of Maternal, New-born and Child Mortality in Africa (CARMMA) 2012, the continent was still confronted with formidable challenges as it strived towards attaining the Millennium Development Goals (MDGs), especially MDGs 5, by 2015. The substantial progress made in most African Union (AU) Member States in improving Maternal, New-born and Child

Health (MNCH) is a clear testimony that the factors underpinning the challenges are as well-known as the interventions that should be undertaken as counter measures. However, political will to strengthen the efforts for a sustained and accelerated push to achieve success was still lacking. CARMMA serves as a critical advocacy platform for improvement of maternal health, therefore reducing factors associated with maternal deaths on the continent (WHO, 2015).

This first report by CARMMA, therefore, sought to facilitate the presentation of progress thus far while highlighting persistent challenges and recommending remedial action. Through CARMMA, the African Union also advocated for the recognition that preventable maternal mortality and morbidity were pressing human-rights issues that violated a woman's rights to health, life, education, dignity, and information. It was also noted that a response to maternal morbidity and mortality should include implementation of specific legal and ethical obligations by Member States, such as the establishment of effective mechanisms of accountability (i.e., maternal death audits or reviews).

The report further argued that monitoring progress should not just focus on data, but it should also take into consideration human beings behind all those numbers, meaning case analysis for women who died should be thoroughly done to obtain a deeper understanding of factors that led to the death of a specific woman. It recommended implementers to monitor and reinforce equity by disaggregating data

on maternal mortality and morbidity to assess whether vulnerable groups were equally benefiting from maternal health programmes (WHO, 2015).

The World Health Organisation (WHO) in the same report recommended that women receive four antenatal visits in order to ensure the provision of the full spectrum of monitoring and follow-up services, such as for pre-eclampsia and prevention of malaria through prophylaxis. Four leading causes of maternal deaths (Post-Partum Haemorrhage (PPH), Sepsis, eclampsia and obstructed labour) were reported to be related to obstetric complications around the time of childbirth, and three-quarters of those deaths and significant morbidity can be prevented by access to a full continuum of quality reproductive health services (WHO, 2015).

Women leaders in the government including Ministers and Deputy Ministers, development partners, academics and representatives of various non-governmental organizations gathered in numbers at a high-level advocacy forum and engaged in a discussion on maternal health and HIV prevention in Lesotho. The United Nations Population Fund (UNFPA), in collaboration with The Office of the First Lady and Ministry of Health organized the event on 16/09/2015 in order to increase political will and create an enabling socio-economic, political and legal environment for women and girls to claim and exercise their sexual and reproductive health and rights. The Speaker of the National Assembly emphasized the urgent need for reducing the high maternal mortality in Lesotho, which constitutes to 1,155 per 100 000 live births and the HIV prevalence which has put Lesotho at number two in the

world and called upon leaders to put more efforts to reduce these numbers (Brink, 2017).

Health authorities have been running campaigns highlighting the benefits of delivering in the health facility. The minister of health announced that it is the government's top priority to reduce maternal deaths by looking at its causes especially HIV positive women who need to be started on treatment regardless of their Cell Differentiated (CD4) count. Filling vacant posts by recruiting qualified nurses to reduce the workload in maternity sections would also go a long way in the reduction of maternal deaths.

In Mozambique, the government is mobilising young people in communities to totally abstain from sex before marriage, so as to avoid unsafe abortions and unwanted pregnancies. Government has pledged to urgently prioritise social services delivery to fulfil its human rights obligations as stipulated in the new constitution. Another preventive method identified was to declare maternal death a national disaster for it to receive urgent attention in the form of adequate human and financial resources.

Since independence in 1990, Namibia has introduced and implemented several programmes to improve the health and well-being of women and children. The Safe Motherhood Initiative was introduced in 1991, just immediately after independence

and the Roadmap for the Acceleration in the Reduction of Maternal and Child Deaths was introduced in 2006 (MoHSS, 2007).

These brought about establishment of the National Maternal/Perinatal/Neonatal Death Review Committee as well as scaling it down to regional, district and health facility level committees, to have an in depth look at maternal death cases and to recommend better solutions to address their causes and associated factors.

2.10 Health Services provided at Intermediate Hospital Oshakati (IHO) Oshana region

The services that are provided at IHO are mainly curative, rehabilitative and specialized services such as internal medicine, obstetrics and gynecology, surgery, orthopedic, urology, psychiatric, dental, dermatology, radiography, sonography, neurology, and ophthalmology. Both low and high-risk maternal health services are offered at IHO simply because there is no district hospital in the district, neither in the region to provide basic emergency obstetric care to women in need of such services.

There is a state-of-the-art maternity ward at this facility which was recently inaugurated by Former Namibian President Hifikepunye Pohamba in 2013; however, there were few midwives, medical officers, registered nurses/midwives and

specialists responsible for service delivery at this unit. Due to high staff turnover and critical staff shortage in all categories of health providers, some cadres do not have needed skills to manage pregnancy-related complications; hence the maternal deaths are not reducing but rather fluctuating and decreasing as expected.

2.11 Summary

The chapter reviewed the literature in the context of maternal deaths at Global, African, SADC, Country level which is Namibia, preventive measures for maternal deaths and finally the health services provided at Intermediate Hospital Oshakati. The next chapter, chapter 3 will be discussing the research design and methodology.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The previous chapter provided information on what is already known about the current study topic. This chapter takes an in-depth look at the research design and the detailed process of how the study was carried out and refers to how the researcher achieved the set objective of determining factors associated with maternal deaths.

3.2 Research Design and Methodology

The cross-sectional, retrospective descriptive design was chosen. Cross-sectional retrospective designs are also known as one-shot and are most commonly used in social sciences. This design suits studies aimed at finding the prevalence of a phenomenon, situation, problem, attitude or issue by taking a cross-section of the population. In this study, a cross-section of deceased women was taken out of the total that died at IHO for the 2011-2014 periods. Cross-sectional designs are considered to be useful in obtaining the overall picture as it was at the time of the

study. These types of study designs are extremely simple, cheap to undertake and easy to analyse (Kumar & Singh, 2012).

Descriptive statistics were used to describe numerical data because they are the recommended methods used in quantitative research. The aim of descriptive statistics was to produce a scope of characteristics of distributions through frequencies, measures of central tendency and measures of dispersion. Inferential statistic was used to determine the relationships between independent and dependent variables such as age, marital status, HIV status, residence, antenatal as well as delivery history and their association with maternal death (Delpont et al, 2011).

Retrospective studies investigate a situation, problem or issue that has happened in the past. They are usually conducted either on the basis of the data available for that period or on the basis of the respondents' recall of the situation (Kumar & Singh, 2012). This study looked at the factors associated with maternal deaths at IHO retrospectively from January 2011 to December 2014 by reviewing maternity records for 74 deceased women due to maternal related factors.

3.3 Study Population

Population is referred to as individuals with specific characteristics or the persons, events, organisation units, case records or other sampling units with which the

research problem is concerned (Delpont et al, 2011). It is also referred to as the larger pool from which a sample element was drawn and to which the findings were to be generalised (Blanche, Durrheim & Painter, 2014). The population for this study was all maternity records for women of child bearing age 15-49, who were admitted at IHO and died during January 2011 to December 2014 study period.

3.3.1 Inclusion Criteria

According to Leedy & Omrod (2010) inclusive criteria refers to attributes and predefined characteristics of participants who are essential for their selection to participate in a research study. Furthermore, the inclusion criterion removes the influence of specific confounding variables and should respond to the scientific objective of the study and is critical to achieve it. In addition, proper selection of inclusion criteria will optimize the external and internal validity of the study, improve its feasibility and minimize ethical concerns; specifically, good selection criteria will ensure the homogeneity of the sample population, reduce confounding.

Subjects that were included in the study were a total of 74 cases of women aged 15-49 years who were reported to have died during child birth; from pregnancy related complications or died within 42 days after childbirth for the period from 1 January 2011 to December 2014 at IHO, in Oshana region.

3.3.2 Exclusion Criteria

This refers to attributes of participants that require their removal from the study. The study excluded all women who died at Oshakati hospital due to any other cause not related to pregnancy or child birth for the same study period from 1 January 2011 to December 2014.

3.3.3 Sample Size

The study was based on Intermediate Hospital Oshakati death records of women of child bearing age who died due to maternal related causes during the study period. The total sample was all women 15-49 years who died due to maternal related causes from 2011-2014. A total of 74 women were sampled for this study. There being no other cases of maternal deaths recorded for the study period, all 74 were studied to understand various factors associated with maternal death.

3.4 Data collection Instruments

The researcher adapted a checklist identified from literature to collect data on the following variables: age, marital status, gravidity, gestational age, and antenatal care

history, place of death, residential address, referring facility and HIV status. The data was collected from patients' hospital records, such as maternity files and maternal death registers.

The checklist was compiled in English and no translation was needed since it was only used by the researcher and the Health Assistants and they all understood English. The tool consisted mainly of three sections that covered different variables: Section A: Details of the deceased woman such as inpatient number, age, marital status, residential address, gestational age and HIV status, Section B: Maternal obstetric history, for example, stage of pregnancy at death, diagnosis at death, type of referral health facility, and Section C: Antenatal care and post-natal history such as ANC attendance and number of visits, post obstetric risk factors, method of delivery, phase of labour during death and if there was any event recorded during puerperium.

3.5 Pilot Study

Piloting is a way of assessing the feasibility of a research project, the practical possibilities to carry it out, the correctness of some concepts, the adequacy of the method and instrument of measurement. It is usually the initial stage before the actual research begins and it is carried in the form of an exploratory research (Blanche et al, 2014). The pilot study for this research was conducted on eight (8)

maternal death records at Intermediate Hospital Oshakati from the women who died between August and December 2015. The aim of the pilot study was to determine the validity and reliability of the checklist before the actual study began and help refine the tool before actual data collection. The pilot phase ran for five days including data analysis.

The variable on educational level under Section A was not recorded because there was no provision for it in the patients' files, neither in the health passports, together with date and time of admission and death because they will not carry any significance in the outcome of the study, therefore they were deleted from the checklist to avoid inconsistencies during the main data collection process.

There was a need to capture the gestational age of the deceased which was not initially included in the checklist, to determine how far the pregnancy was when the women died. It was added to the checklist so that it could be captured during the main data collection. Condition on admission was also removed from Section B and comments on ANC, delivery and puerperium were removed from Section C, because they were not useful in determining the factors associated with maternal deaths.

3.5.1 Validity

Leedy and Ormrod (2010:31) suggest that the internal and external validity of the researcher's measurement instruments influence the extent to which one can learn something about the phenomenon being studied, the probability that statistical significance will be obtained in the data analysis and the extent to which the researcher can draw meaningful conclusions from the data.

Validity refers to the study and instruments ability to measure what was intended to be measured and the best available approximation to the truth and inference. It tested the relevance of the research instrument in this study, which was the checklist. Validity establishes whether the results obtained meet the requirements of the research method. There are different types of validity such as internal, content, construct and external validity (Leedy & Omrod, 2010).

This study made use of internal, content, construct and external validity where the implemented measurement instrument, being the checklist, required feedback from supervisors and the researcher based on their perceptions after the pilot study.

Additionally, content validity was applied by including all necessary variables and questions to determine factors associated with maternal death. Construct validity refers to measuring what was intended to be measured. This type of validity was done by editing and modifying the checklist by the researcher and the supervisor after the pilot study. Some of the variables such as educational levels and the

duration between the onset of the problem and the death of a woman and the name were removed.

External validity refers to generalizability; findings have implications for other individuals in other settings and at other times. This was ensured by hypothesising that the findings from the pilot study could be inferred to the general population on factors associated with maternal deaths at IHO (Leedy & Omrod, 2010).

3.5.2 Reliability

Reliability has to do with the quality of measurement. In its everyday sense, reliability is the consistency or repeatability of your measures. Other researchers must be able to perform exactly the same exercise under the same conditions, assuming that what was being measured did not change and it could generate the same results. Reliability is the measurement of accuracy and precision of the study findings. The tool was then piloted to rule out any inadequacy. This was done to reinforce the findings and ensure that the wider scientific community will accept the requirement of testing the instrument before the study (Leedy & Omrod, 2010).

3.6 Data Collection

The researcher used a checklist to collect primary data on the following variables: age, marital status, gravidity, gestational age, and antenatal care history, date of death, place of death, residential address, referring facility and HIV status. The data was extracted from patients' hospital records, such as maternity files and maternal death register.

The researcher was assisted by the nurse manager and the administrative officer at the maternity section to access some maternal death records for the years 2013-2014. These were only available at the maternity section. Privacy and safety of the deceased patients' records were maintained at all times by making sure all the files were in a lockable cabinet and the key was always kept by the nurse manager during the week and the second in charge over weekends.

The key was handed to the researcher during the data collection period and she always left it with the nurse manager after every session of data collection.

The health assistant recruited for the study sorted the files according to the years and gave to the researcher to collect data using the checklist designed for the study. Each completed checklist was then handed to the health assistant to enter information in the computer and thereafter locked the records back in the cabinet at the maternity section. The rest of the files for the years 2011-2012 were kept at the Management Information System (MIS) office of the administration block at the hospital (IHO), where the two officers were busy rearranging them in the computer, entering some information that were not entered before. One checklist was used for every file to record the required variables such as demographic information and obstetric history

for the deceased women. Data collection started October 2016 and ended 30 December 2016.

3.7 Data Entry and Analysis

Data was entered into Microsoft excel spreadsheet. The data was then cleaned after entering and coding, meaning data sets were checked for errors and then detected errors were corrected by selecting a random sample and re-entering it to double check for errors (Blanche et al, 2014). Frequency analyses were then done using Epi Info 7.2 to quantify the prevalence and causes of maternal deaths. Cross tabulations of events and graphs were used to describe the data. Fischer's exact test at 95% confidence was used to determine statistical significance of the association between each demographic factor and the obstetric factors. Statistical significance was set at P value of less than or equal to 0.05, means a P value less than 0.05 indicates that there is an association between two factors and p-value greater than 0.05 means there is no association.

In addition, descriptive statistics were used to describe numerical and categorical data in order to help organise, summarise, describe the sample and interpret the data. These are recommended methods to be used in quantitative research. The aim of descriptive statistics was to produce a scope of characteristics of distributions through frequencies, measures of central tendency and measures of dispersion.

It was also used to determine the network of relationships between different variables (Delpont et al, 2011).

3.8 Ethical Considerations

Ethical research safeguards integrity, quality, respect, confidentiality, anonymity, impartiality, voluntary consent and participant safety. Ethics is the study of what is good or right.

3.8.1 Beneficence

Beneficence means to treat study subjects in an ethical manner. There are two general rules that have been formulated under beneficence namely: (1) do not harm and (2) maximize possible benefits and minimize possible harms.

Beneficence is commonly exercised to minimise the risk of causing harm to research subjects throughout a research project and beyond. Researchers exercise beneficence in several ways such as assessing and taking account of the risks of harm and the potential benefits of research to participants and to the wider community and in being sensitive to the welfare and interests of people involved in their research. It is characterised by doing good to research participants. Doing good in research would

commonly mean conducting research that is beneficial at least for participants as well as other community members. The researcher oriented those who were assisting with data collection and handling on ethical issues and safeguarding of patient records safety. It was ensured throughout the whole process of data handling by not making available information concerning the deaths of women to anyone, except the study assistant who entered information into the computer for analysis purposes. Research documents, hospital files for deceased women, completed checklists as well as the maternal death register were always kept under lock and key after usage.

3.8.2 Justice

Justice is expressed in terms of fairness in distribution of what is deserved; to give a person what is entitled to him/her or treating research subjects equally. This was assured by convenient sampling of all women 15-49 years who were reported to have died at Intermediate hospital Oshakati from 1 January 2011 to 31 December 2014 due to maternal related causes. All registered maternal death cases were sampled and included in the study so none was left out.

3.8.3 Respect for persons

Respect for study subjects included giving enough and needed information, in this case to the Hospital Superintendent, Control Administrative Officer as well as to the Nurse Manager at IHO in order for them to allow the researcher access to medical records to be assessed for research purposes. Research subjects should also be treated anonymously meaning that no one, including the researcher should be able to identify any record and link it to anybody after the study (Delpont et al, 2011). The checklist was edited and modified after the pilot study to remove names and use registration number and age in order to safeguard and protect the deceased patient's identity. This was done to protect the privacy of all research subjects.

3.8.4 Consent

Consent is regarded as one of the core principles of researchers and therefore study subjects should provide informed consent to participate in the study (Du Plessis, 2003). The importance of this aspect of research could not be overemphasised. Approval and permission to conduct research was done in the following manner: the researcher first sought approval from the University of Namibia's Postgraduate Research Committee; permission to conduct research in a government health facility was then obtained from the Research and Ethics Committee of the Ministry of Health and Social Services. Further permission was sought from the Senior Medical Superintendent for Intermediate Hospital Oshakati who delegated the authority to the Control Administrative Officer to give the researcher access to patients' files.

3.8.5 Confidentiality

Confidentiality is another principle that should be observed by researchers to respect the information collected for study purposes. It was referred to as the handling of information in such a manner that it is not accessible to a second party unless it is for study purposes (Delpont et al, 2011). It arises from respect for the right to privacy, and functions as a precautionary principle. Confidentiality of information in this study was guarded by not allowing any other person rather than the researcher, the health assistant, maternity nurse manager and administrative officer to have access to patients' records. Disclosure and dissemination of information was therefore carefully considered by the researcher to avoid possible harm to research participants by means of publication. This means, no personal details will be used on any publicly available material, bearing in mind that masters' theses are also public documents that can be made available in universities' libraries only.

3.9 Study setting

This study was conducted at Intermediate Hospital Oshakati (IHO) which is located within Oshakati Health District in Oshana region, one of the few districts in Namibia without a district hospital. Oshana covers the area of 8,647 square kilometers with the population growth rate of 0.9%. The hospital serves as a district, regional and referral hospital in the north-western part of Namibia. It caters for the population of

Oshana region which was 176, 674 by 2011 additional to other regions namely, Oshikoto, Ohangwena, Omusati and Kunene. The population served by IHO is both rural 55% and urban 45% respectively (MoHSS, 2011).

3.10 Summary

This chapter discussed the research design and methods with more emphasis on descriptive designs. It also looked at the study population as well as the sample size. This section talked about data collection procedures and analysis of the collected data. Issues concerning ethics such as beneficence, justice and respect for persons, informed consent and confidentiality were discussed. The findings from the study, as well as the conclusion and recommendations will be discussed in the next chapter.

CHAPTER FOUR

RESULTS AND DISCUSSION OF THE STUDY

4.1 INTRODUCTION

The previous chapter looked at research design and methodology. Thus, having completed the data collection exercise the intention behind this chapter is to analyze the data. The research findings are discussed and interpreted from the data gathered from women who attended health institutions in northern Namibia especially Intermediate Hospital Oshakati (IHO). The researcher had therefore decided to utilise the cross-tabulation method to draw comparisons between the risk factors versus the demographic characteristics.

This chapter focuses on the presentation, interpretation and discussion of the results obtained from the study. The study was carried out by reviewing 74 maternity records for women who died due to maternal causes at Intermediate Hospital Oshakati (IHO) for the period 1 January 2011 to 31 December 2014. Seventy-four (74) maternal death records for women of childbearing age from January 2011 to December 2014 were analysed respectively.

In order to determine the possible factors associated with maternal deaths at Intermediate Hospital Oshakati, Oshana region between the years 2011 to 2014, the results were analysed descriptively in terms of sums, average, mean, standard deviation as well as frequencies and rates. Additionally, results were presented in forms of tables, figures and graphs. Each visual presentation was interpreted and discussed accordingly.

Socio-demographic characteristics associated with possible risk factors were quantified and these were age, marital status and residential address. The last part of the results focuses on different possible risk factors and were calculated in terms of frequencies. Objective for the study was to determine factors associated with maternal deaths at Intermediate Hospital Oshakati, Oshana region between the years 2011 to 2014.

Different health facilities that referred these deceased women to IHO will also be included in this chapter. In addition to the demographic factors, the following suspected risk factors were identified to be associated with maternal deaths such as HIV status, ANC care, gestational period, glucosuria, hypertension, abnormal fetal lie, multiple pregnancy, anaemia, Ante-Partum Haemorrhage (APH), Post-Partum Haemorrhage (PPH), previous Caesarean Section (C/S), and phases of labour.

4.2 DEMOGRAPHIC CHARACTERISTICS AND OBSTETRIC RISK FACTORS OF THE DECEASED

4. 2.1 DEMOGRAPHIC CHARACTERISTICS OF THE DECEASED

Demographic characteristics refer to the statistics that describe a sample and can be used to divide that sample into different groups. Demographic characteristics are features of the sample that the respondents and researcher cannot control (Gray, 2009). The demographic characteristics described in this study were females under different ages, marital status and residential address.

The Intermediate Hospital Oshakati (IHO) recorded 74 maternal deaths and 22, 840 live births from January 2011 to December 2014. Figure 4.1 displays the maternal deaths and the Maternal Mortality Rate (MMR) for IHO from 2011 to 2014. The primary axis shows maternal mortality rate per 100 000 and secondary axis shows the number of maternal deaths.

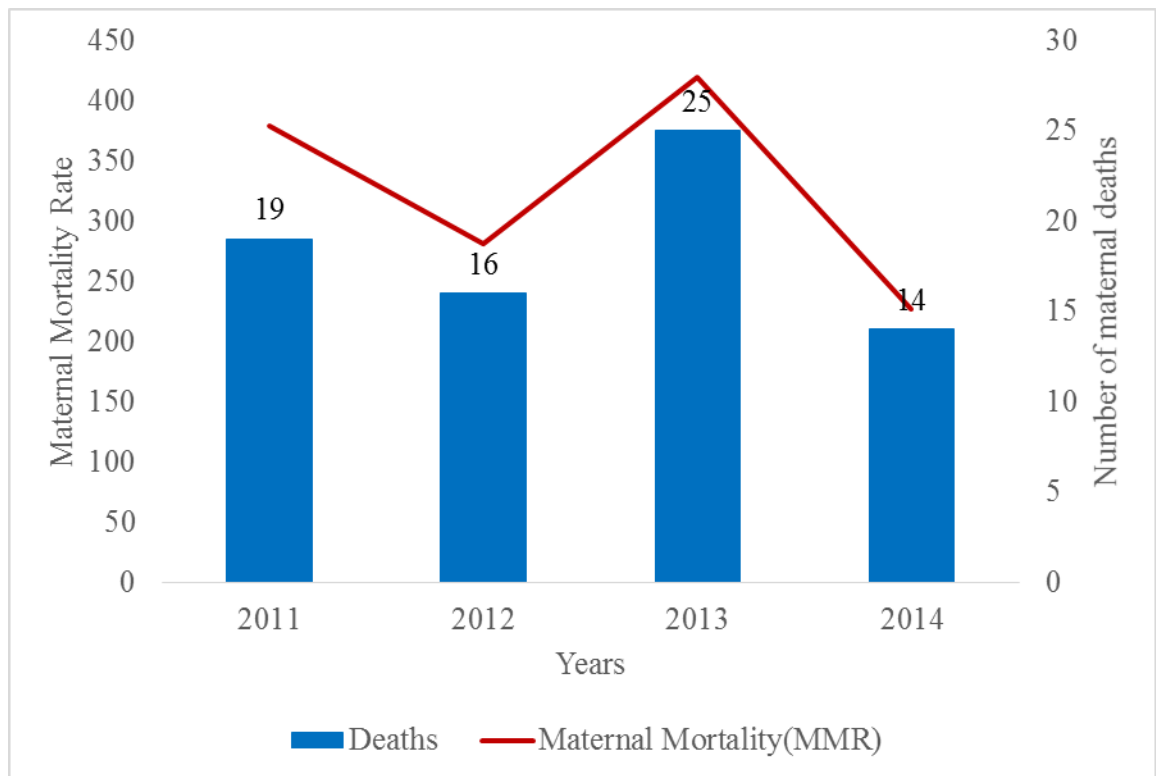


Figure 4.1 Maternal deaths and Maternal Mortality Rate for Intermediate Hospital Oshakati from 2011 to 2014.

Nineteen (19) women died in 2011 due to maternal causes which equals to the Maternal Mortality Rate (MMR) of 379/100 000 live births, 16 women who died in 2012 is equivalent to the MMR of 281/100 000 live births, 25 deaths in 2013 equals to the MMR of 419/100 000 live births and 14 deaths in 2014 is equivalent to the MMR of 227/100 000 live births respectively.

The maternal mortality rate increased between 2012 and 2013 from 281 to 419 and decreased to 227 between 2013 and 2014 respectively. The maternal deaths and the MMR for the four-year period under study followed the same trend of being higher than the MGDs 2015 target of reducing Maternal Mortality Rate to less than 200/100 00 live births.

4.2.1.1 Age classification of maternal death patients at IHO, 2011 to 2014

Age was the first demographic characteristic to be determined for participants under this study. The age of women who died due to maternal death-related factors in this study ranged from 15-50 years. Eighty-two (4%) hospital records reviewed were in the age range of 25-44, followed by teenagers and young women in the range of 11-24 years which made up 14, 9%. The distribution of maternal deaths by age group at IHO (2011-2014) is shown in Table 4.1 below.

Table 4.1 Age classification of maternal death patients at IHO, 2011 to 2014

Age	Frequency	Percent (%)
15-24	11	14.9%
25-34	37	50.0%
35-44	24	32.4%
45-50	1	1.4%
Unknown	1	1.4%
Total	74	100.0%

The mean (\pm SD) age of maternal death patients at IHO from 2011 to 2014 was 33 (\pm 6.4) years and ranged from 19 to 49 years. The modal age group was 25-34 years which accounted for 37 (50%) of maternal deaths.

The highest number of maternal deaths was found among women of 25-34 years (50%), followed by the age group of 35-44 years which made up 32.4% of the total deaths. The teenage and young mothers 15-24 years were eleven (11) and contributed 14.9% of the maternal deaths. The least were age groups of women 35-44 and 45-50 years, who made up 1.4% each respectively.

In a study conducted by MoHSS in the year 2014, results indicated almost similar findings with this study that the 25-29 age group was the highest affected by maternal deaths, followed by 30-34 and 35-39 age groups respectively. On the contrary, a previous study conducted by MoHSS in 2011 found that more deaths occurred in the 31-40 years age group which accounted for 53.8%. However, the current study's findings contrast with those of a study conducted in Ethiopia 2010 which found that maternal death was highest among 19-34 age categories. Another contrast was also observed in the study conducted in Nigeria in 2013 that the deaths were highest amongst the older age categories of 44-49 years.

4.2.1.2 Marital Status

This is the second demographic characteristic for the study participants and it is divided into four categories as follow: married, single, unknown and not recorded. This was done so as to determine which women were more at high risk of dying due to maternal associated factors. Table 4.2 shows the distribution of the participants in frequencies and percentages according to their marital status.

Table 4.2. Frequencies of participants by marital status, IHO, Oshana region, 2011-2014 (n=74)

Marital Status	Frequency	Percent (%)
Married	16	21.6
Not recorded	13	17.6
Single	40	54.1
Unknown	5	6.8
Total	74	100.0

The highest portion (54.1%) of the women who died was single. This could indicate that being single is likely to put women at high risk of dying as a result of pregnancy-related, delivery and postpartum factors. Married women accounted for 21.6%, second to single women who died due to maternal-related factors. The findings were in line with the study conducted in 2015 by Tessema et al in Ethiopia (2015) on Pre-eclampsia and associated factors among pregnant women attending antenatal care in Dessie referral hospital.

Furthermore, the marital status of thirteen women (17.6%), was not recorded and five women who made up 6.8% were of unknown marital status. This implies that single women are at high risk of maternal deaths compared to their married counterparts, reason being stress from delivering children without fathers as a result of fathers denying these pregnancies which brought less social acceptability and lack or minimum economical support from partners and family members as well as the community at large.

4.2.1.3 Residential Address

The third and last demographic characteristic in this study was residential address. In trying to find out which women die most between those who lived in rural and urban areas, the findings indicate that most of the women (87.8%) who died were of rural residence versus 12.2% from urban settings as indicated in Table 4 below.

Table 4.3. Frequencies of participants by residential address, IHO, Oshana region, 2011-2014 (n=74)

Residential Address	Frequency	Percent (%)
Rural	65	87.8
Urban	9	12.2
Total	74	100.0

This table indicates that women who lived in rural areas are at high risk of maternal deaths compared to those who lived in urban settings. These according to my own view is due to certain reasons categorized under the first and second delay such as having no access to information on safe motherhood or early health-seeking behavior, no access to health facilities due to long distances, lack of road infrastructure and cost of transport.

Many women do not realize the need to go to the hospital or clinic early for antenatal care services and deliver under the care of a skilled birth attendant. Women who live in urban settlements seem to have the privilege of better access to health services,

being it distances to clinics or hospitals, the road and cost of travelling to the nearest hospital. Their access to health information is also better compared to others who live far from health facilities, hence their percentage of dying during pregnancy and delivery is lower. According to the study conducted by Tieba et al, married women were found to have a protective effect of 62% over unmarried ones.

4.2.2 OBSTETRIC CHARACTERISTS OF THE DECEASED

The following obstetric risk factors of deceased women captured in the maternity records will be described and discussed: HIV status, ANC care, gestational period, glucosuria, hypertension, abnormal fetal lie, multiple pregnancy, anaemia, Ante-Partum Haemorrhage (APH), Post-Partum Haemorrhage (PPH), previous Caesarean Section (C/S), and phases of labour. Table 4.4 shows the proportions of HIV positive maternal deaths at IHO from 2011 to 2014. Even though the HIV status of 35 (47.3%) of the patients was not known, 26 (35.1) of the maternal deaths were HIV positive.

The HIV Status of maternal deaths in IHO from 2011 to 2014 is presented in Table 4.4.

Table 4.4: HIV Status of maternal deaths in IHO from 2011 to 2014 (n=74)

HIV status	Frequency	Percent
Negative	13	17.6%
Positive	26	35.1%
Unknown	35	47.3%
TOTAL	74	100.0%

Out of the total 74 deaths, 35 (47.3%) had unknown HIV status, 26 (35.1 %) were HIV positive while 13 (17.6 %) were HIV negative. More women's HIV statuses were not known at the time of their death, followed by HIV positive and the least were found to be HIV negative when they died.

A Malawian study conducted in 2011 on maternal deaths, indicated that 13 (41%) of the 32 women who died were HIV positive, nine (28%) were HIV negative and 10 (31%) women's HIV status was unknown. The Malawian study is contrary to the current because the total number of women studied was less than half of the current study (32 women) however, more than half of the women, 13 out of 32 (41%) were HIV positive compared to 26 out of 74 (35.1%). Women with unknown HIV status in Malawi accounted for 31% compared to 47.3% in the Namibian current study while 9 out of 32 (28%) of the women in Malawi were HIV negative when they died compared to 13 (17.6%) in the current study.

Namibia is one of a number of sub-Saharan African countries in which the HIV epidemic has had an enormous impact on maternal health and maternal deaths. In 2010, WHO estimated that 59.4% of maternal deaths in Namibia were attributable to HIV/AIDS. Antiretroviral (ARVs) drugs availability was cited as one of the significant strategies to reduce maternal deaths due to HIV/AIDS. Another study conducted in Namibia, Oshana region 2011-2014 on the trends of maternal mortality reported that out of the total 58 maternal deaths, 24 (44.8%) were found to be HIV positive, 9 (15.5%) negative and 23 (39.7) were of unknown status (MoHSS, 2016).

4.2.3 Cases referred from District Hospitals

Many maternal death cases under this study were referrals from district hospitals. Almost all district hospitals in the north-western regions of Namibia referred a woman or more during the period of the study except Okongo district hospital in Ohangwena region which did not refer a case to IHO, Oshana region between 01 January 2011 to 31 December 2014. Distribution of maternal deaths by referring health facility, IHO Oshana Region, 2011- 2014 is presented in Table 4.5.

Table 4.5: Distribution of maternal deaths by referring health facility, IHO Oshana Region, 2011- 2014 (n=73)

Referral Hospital	Frequency (%)	Percent
Eenhana Hospital	1	1.4
Ongwediva Health Centre	1	1.4
Onhuno Clinic	1	1.4
Tsandi Hospital	1	1.4
Okahao Hospital	2	3.0
Okatana Health Centre	2	3.0
Onandjokwe Hospital	2	3.0
Tsumeb Hospital	2	3.0
Oshikuku Hospital	4	5.4
Opuwo Hospital	7	9.5
Outapi Hospital	8	10.8
Engela Hospital	11	14.9
Not referred	31	41.9
Total	73	100%

Overall, about 31 women (41.91%) of the maternal death cases were not referred but, these were women who went straight to IHO to seek for care themselves. The highest number, 11 (14.86%) of referred cases were from Engela district hospital, Ohangwena region, followed by Outapi district hospital in Omusati region with 8 (10.81%) and 7 (9.46%) from Opuwo district hospital in Kunene region respectively.

Oshikuku district hospital in Omusati only referred four (4) women (5.41%). The rest of the health facilities referred either one or two cases respectively. It was evident that there were delays within the health system as a result of the distance to reach health facilities locally as well as the distance from referring facilities to IHO since it was the only intermediate hospital north-west of the country. Shortage of human resources (midwives and doctors) to serve as scrubbing nurses, enough doctors to conduct emergency C/S as well as shortage of skills to manage obstetric complications and necessary material resources, such as sonar machines at some district hospitals could also be attributed to high maternal deaths.

4.2.4 Antenatal Care Visits

The Antenatal care status was observed and 45/74 (61%) women were found to have no information recorded about antenatal care visit. The rest of the women 29/74 (39.2%) had visited a health facility for antenatal care services.

The ANC visits for Maternal death cases at IHO from 2011 to 2014 are presented in Figure 4.2.

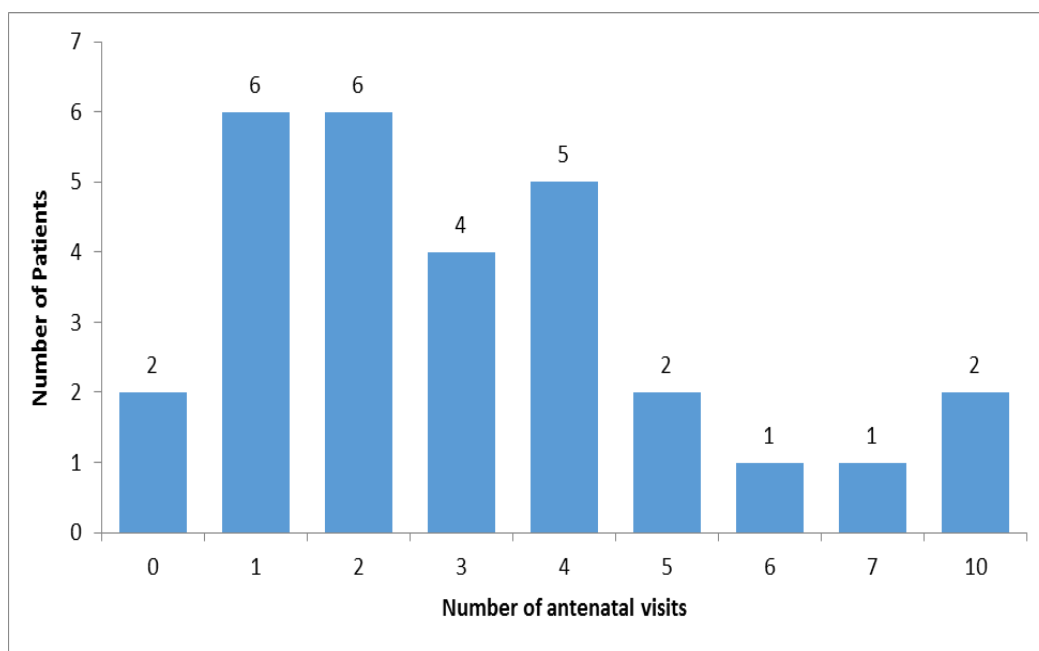


Figure 4.2 Antenatal care visits for maternal death cases at IHO from 2011 to 2014.

Furthermore, data on attendance of antenatal care was only recorded for 29 (39.2%) of the patients. Of the women who died a maternal death 29 were indicated to have ANC attendance records available. Twelve (41.4%) of the women had one to two antenatal care visits while 6.9% had no ANC visits. A total of 11 (37.9%) of the cases attended the minimum required of four or more ANC visits.

4.2.5 Gestational Period for Maternal Death

An analysis of the gestational period was done in relation with maternal death cases and it was found that 47 (63.51%) had records of their gestational age as indicated in Figure 4.3 below.

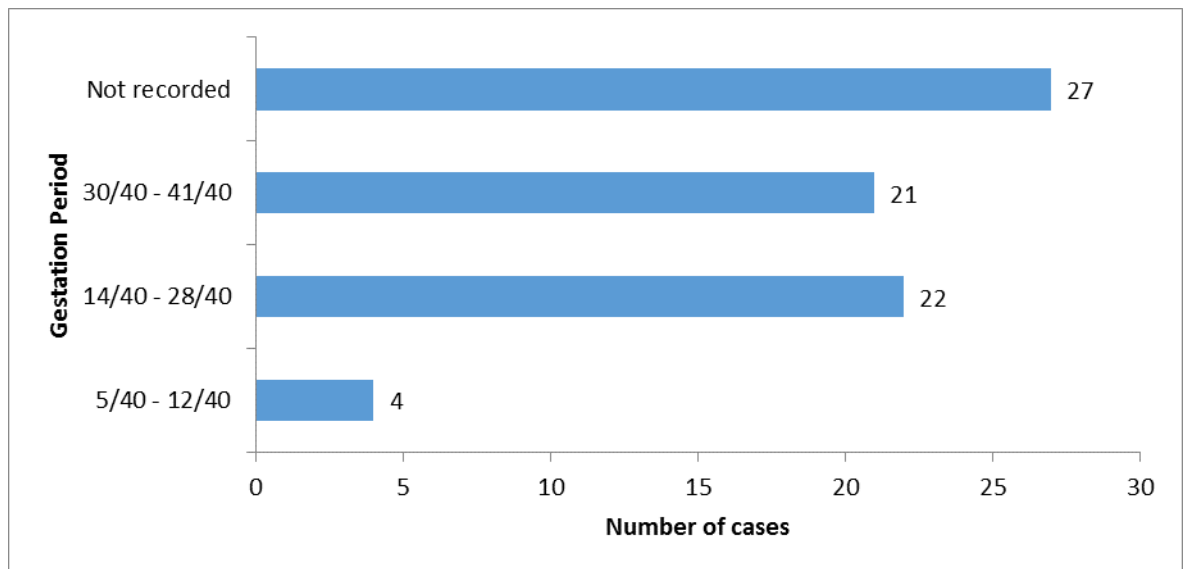


Figure 4.3 Gestational period of maternal death cases recorded at IHO, 2011 – 2014 (n=74)

Although 27 (36.5%) cases had no records for their gestational age, 22 (29.7%) and 21 (28.4%) were found to be in the 14/40 – 28/40 and 30/40 - 41/40 gestational periods respectively. This generally shows that half of the women died before they reached 30/40 of pregnancy, meaning those who delivered before they died had premature labour and delivery.

4.2.6 Method of Delivery for Maternal Deaths

The method of delivery was another variable analysed in relation to maternal deaths for this study. A total number of 25/74 (33.8%) maternal death cases were reported to have vaginal unassisted deliveries while 18 (24.3%) had not delivered. Fifteen women 20.3% delivered by caesarean section and 14 (18.9%) had abortions. The method of delivery for 2 (2.7%) of maternal death cases was not known. Figure 4.4 shows the method of delivery for maternal death cases recorded at Intermediate Hospital Oshakati from 2011 to 2014.

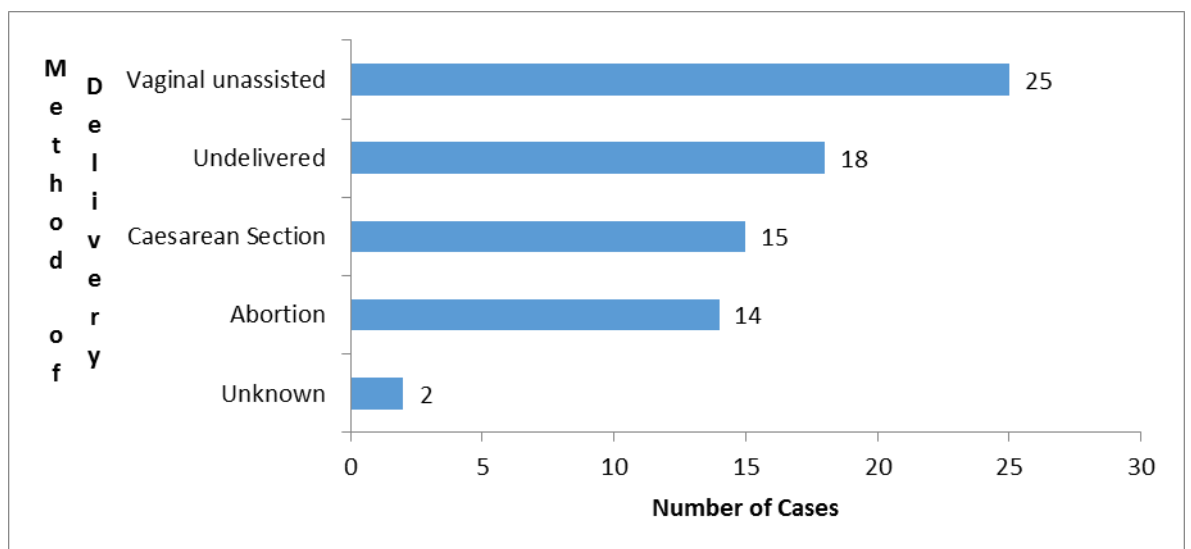


Figure 4.4 Method of delivery for maternal death cases recorded at Intermediate Hospital Oshakati, 2011 – 2014 (n=74)

The figure above shows that 25 women had a normal delivery unassisted, which accounts for 33.8% of the total deliveries. There were 18 women who died before they could deliver, and who made up 24.3% of the total deaths. Fifteen women (20.3%) had undergone a caesarean section as a method of delivery, while 14 (19%) of the women who died had aborted. Two of the maternal death cases' delivery

methods were unknown, meaning the reviewed records did not indicate the mode of delivery. The overall picture shows that more women died after normal delivery, followed by those who died before delivery.

4.2.7 Phases of Labour

The phases of labour upon death such as antepartum, active phase, abortion, postpartum and the unrecorded phases were analysed and the findings are presented under Figure 4.5 below.

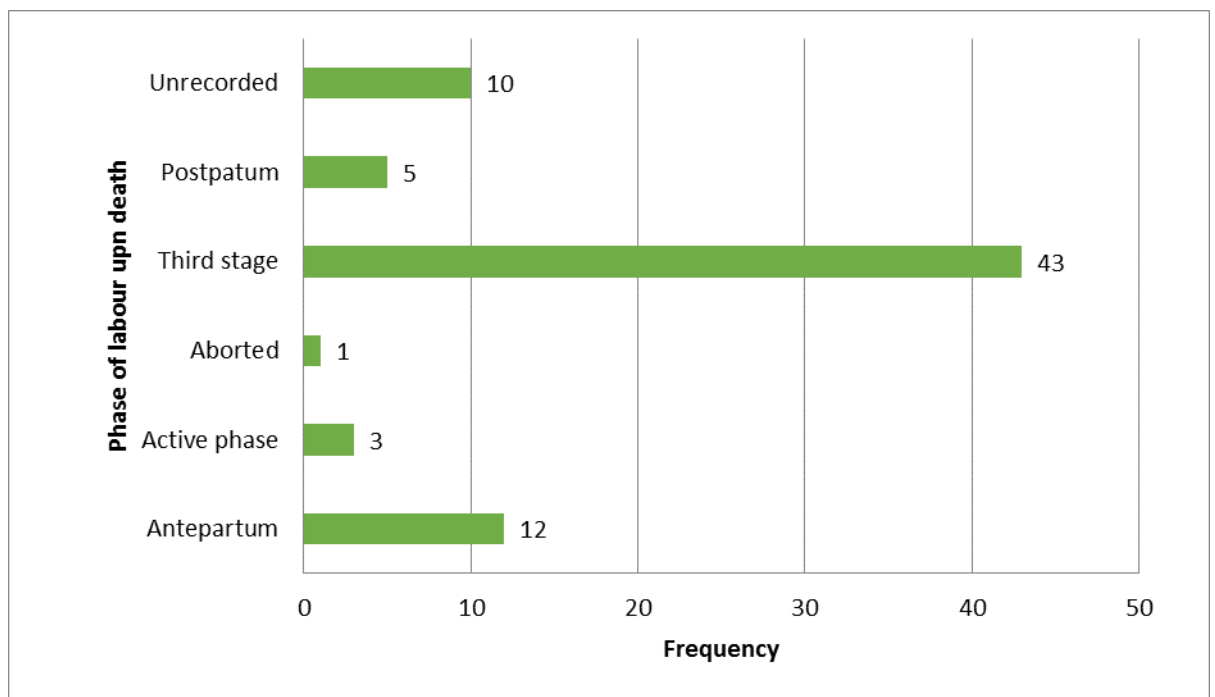


Figure 4.5 Phase of labour upon death for maternal death cases recorded at IHO from 2011 to 2014 (n=74).

A majority (43) of the women died in the third stage of labour, followed by those who died during the antepartum period (12). Ten (10) women had no indication of the phase in which they died and the least (1) died due to abortion. Additionally, the analysis of the phases of labour upon death of the cases indicates that 43 (58.1%) died in the third stage while 12 (16.2%) and 5 (6.8%) died in the antepartum and postpartum phases respectively.

4.2.8 Frequencies for Causes of Maternal Deaths

An evaluation for causes of maternal deaths revealed that several factors were responsible for the death of the women under this study. The following were found to be causes of maternal deaths as presented in Table 4.6 below.

Table 4.6 Causes of death of maternal death cases reported at IHO, 2011 - 2014

Causes of maternal death	Frequency	Percent (%)
Anaemia	8	10.8
Glycosuria	1	1.43
Hypertension	9	12.2
Multiple pregnancies	2	2.7
Ante Partum Hemorrhage	12	16.2
Others	33	44.6
Unknown	9	12.2
Total	74	100

The majority of maternal deaths were identified to be caused by other causes (44.59%). Antepartum haemorrhage (16.22%) was the second leading cause of death among the direct causes. This, according to a study done in 2011-2014 to measure trends of maternal mortality in Oshana region could be explained by late health-seeking behaviours on the side of pregnant women, shortage of personnel, medical equipment and medications as well as frequent shortage of blood and blood products at many of the blood transfusion banks in the country (MoHSS, 2010). Hypertension and unknown causes accounted for 12.16% each, anaemia 10.81%, while the lowest was glycosuria 1.35%. Approximately half (44.59%) of the maternal deaths were caused by other causes such as psychosis, Hepatitis B, elderly primi-gravida, multigravida, and post-maturity.

However, a study conducted in rural Tanzania on causes and risk factors for maternal death showed that the leading causes of maternal death were puerperal sepsis, haemorrhage, eclampsia and abortion complications (Evance, Kahn, Masanja, & Mbaruku, 2013).

In studies carried out in different regions in Namibia to establish the leading causes of maternal death, the following were found to be among the causes: age, parity, and lack of antenatal visit, marital status and low levels of maternal education.

4.3 DEMOGRAPHIC CHARACTERISTICS BY ASSOCIATED RISK FACTORS

Cross tabulation of each demographic characteristic (age, place of residence and marital status) with each obstetric risk factor (HIV status, ANC visits, gestational period, phase of labour and method of delivery) was done to determine statistical significance of differences observed in the descriptive analyses (Section 4.1 and 4.2). Fisher's exact test at 95% confidence level was used with statistical significance at P value ≤ 0.05 . Missing and unknown variables were not included in the cross-tabulation analysis.

4.3.1 Cross tabulation of age with obstetric factors (HIV status, ANC visits, gestational period, method of delivery and phase of labour upon death)

Cross tabulation of age group with obstetric factors (Table 4.5) showed that there were not significant differences in the distribution of HIV status ($P = 0.32$), ANC visits ($P = 0.71$), gestation period ($P=0.3$), method of delivery ($P=0.99$) and phase of labour at death ($P=0.23$) across different age groups of maternal death cases.

Table 4.7 Cross-tabulation of age group of maternal death cases by obstetric risk factors, Intermediate Hospital Oshakati, 2011 – 2014.

Factor	Variable	Age		Total	Fisher's exact 2-tailed <i>P</i> -value
		15 - ≤ 34	35 - ≤ 50		
HIV Status	Positive	18	7	25	0.32
	Negative	8	5	13	
	Total	26	12	38	
ANC visits	0 - ≤ 4	18	5	23	0.71
	5 - ≤ 10	3	3	6	
	Total	21	8	29	
Gestational Period	5/40 - 12/40	3	1	4	0.30
	14/40 - 28/40	14	8	22	
	30/40 - 41/40	14	7	21	
	Total	31	16	47	
Method of Delivery	Abortion	11	3	14	0.99
	Caesarean section	7	8	15	
	Undelivered	13	5	18	
	Vaginal unassisted	16	8	24	
	Total	47	24	71	
Phase of labour upon death	Aborted	0	1	1	0.23
	Active phase	2	1	3	
	Ante-partum	10	2	12	
	Post-partum/Third stage	29	18	47	
	Total	41	22	63	

* $P \leq 0.05$ statistically significant

4.3.2 Cross-tabulation of marital status with obstetric factors (HIV status, antenatal care visits, gestational period, and method of delivery and phase of labour upon death)

The table 4.8 below presents several obstetric factors versus marital status as a demographic factor, looking at any association between the two. HIV status, ANC visits, gestational period and phase of labour were found to be not significant statistically.

Table 4.8 Cross-tabulation of Marital Status by obstetric factors of maternal death cases recorded at IHO, 2011 – 2014

Factor	Variable	Marital Status		Total	Fisher's exact 2-tailed p-value
		Married	Single		
HIV Status	Positive	6	12	18	0.68
	Negative	2	7	9	
	Total	8	19	27	
ANC visits	0 - ≤ 4	4	15	19	0.30
	5 - ≤ 10	3	3	6	
	Total	7	18	25	
Gestational Period	5/40 - 12/40	0	4	4	0.58
	14/40 - 28/40	4	14	18	
	30/40 - 41/40	6	14	20	
	Total	10	32	42	
Method of Delivery	Abortion	0	12	12	0.02*
	Caesarean section	4	9	13	
	Undelivered	2	10	12	
	Vaginal unassisted	8	9	17	
	Total	14	40	54	
Phase of labour upon death	Aborted	0	1	1	1
	Active phase	0	1	1	
	Ante-partum	3	8	11	
	Post-partum/Third stage	12	23	35	
	Total	15	33	48	

* $P \leq 0.05$ statistically significant

The table 4.8 on the previous page indicates that there is no significant association between marital status and obstetric factors mentioned in this study except the method of delivery p– value which stands at 0.02. The leading method of delivery as an obstetric factor in relation to marital status was abortion 12/40 (30%) of the single women, followed by 10/40 (25%) women who were undelivered. Nine single women had vaginal unassisted delivery and another 9 underwent caesarean section respectively. Only 14 women who died were married of whom eight (8) had unassisted vaginal delivery, four (4) had undergone Caesarean Section and two of them died undelivered. Similarly, a study conducted by Berg et al on risk factors of maternal death in Mexico reported that unmarried women had odds ratios of 16.2 for maternal deaths and this indicates that generally women who are not married are at risk of maternal deaths not only in Namibia but in other countries around the world.

There was no statistically significant difference in the HIV status ($P=0.68$), number of antenatal care visits completed ($P=0.3$), gestation period ($P=0.58$) of phase of labour at death ($P=1.00$) of maternal death cases with different marital statuses. However, a statistically significant difference was observed in the method of delivery across married and single patients ($P=0.02$), with single patients accounting for 12 (100%) of abortion deliveries and 10 (83%) of undelivered cases respectively.

4.3.3 Cross-tabulation of place of residence with obstetric factors (HIV status, Antenatal care visits, gestational period, and method of delivery and phase of labour upon death) of maternal death cases.

Below is the table showing the place of residence in relation to several obstetric factors of women who died due to maternal related factors.

Table 4.9 Cross tabulation of Place of Residence with obstetric factors

Factor	Variable	Place of Residence		Total	Fisher's exact 2-tailed p-value
		Rural	Urban		
HIV Status	Positive	23	10	33	0.38
	Negative	3	3	6	
	Total	26	13	39	
ANC visits	0 - ≤ 4	19	4	23	0.57
	5 - ≤ 10	4	2	6	
	Total	23	6	29	
Gestational Period	5/40 - 12/40	4	0	4	0.29
	14/40 - 28/40	20	2	22	
	30/40 - 41/40	16	5	21	
	Total	40	7	47	
Method of Delivery	Abortion	14	0	14	0.06
	Caesarean section	10	5	15	
	Undelivered	18	0	18	
	Vaginal unassisted	21	4	25	
	Total	63	9	72	
Phase of labour upon death	Aborted	1	0	1	0.27
	Active phase	2	1	3	
	Antepartum	12	0	12	
	Post-partum/Third stage	41	7	48	
	Total	56	8	64	

* $P \leq 0.05$ statistically significant

The study found that women from rural areas were more likely to be at risk of dying due to maternal death causes than women from urban areas across all obstetric risk factors. There was no statistically significant difference in the HIV status ($P=0.38$), number of antenatal care visits completed ($P=0.57$), gestation period ($P=0.29$), method of delivery ($P= 0.06$) and phase of labour at death ($P=0.27$) of maternal death cases by place of residence (rural or urban).

4.4 Summary

The results for this study shows that women aged 25-34 years were more affected by maternal death than any other age group. Furthermore, women from rural areas were more compared to urban women because of poor access to health information and delayed health seeking behaviours. The marital status of women who died most was said to be single compared to married and other categories. This might be due to inadequate care and support both emotional and financial from their partners. Thirty-five percentages of the women who died were HIV positive, 47% had an unknown status while 17% were HIV negative.

Approximately 42% of the women had referred themselves to IHO to seek maternal health services and 58% were referred from all district hospitals in the north-western part of Namibia except Okongo district hospital which did not refer any case for the study period. The cross-tabulations for demographic characteristics versus obstetric

factors indicated that there was no statistical significance among all factors except the mode of delivery in association with the place of residence.

CHAPTER FIVE

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The previous chapter analysed the data and discussed the meaning of the data in the context of the literature review. The chapter aimed to provide conclusions drawn from the study results, limitations of the study and recommendations made in relation to the research objective outlined in Chapter one.

Despite several interventions implemented at IHO such as Life Saving Skills training for midwives and doctors, in-service trainings on different obstetric topics, abnormal deliveries and management of eclampsia, seventy-four maternal deaths were recorded at IHO for the years 2011-2014. Such deaths of women during pregnancy, delivery and postpartum are negatively impacting the population growth of the region and the country as well. The loss of life during pregnancy and during giving birth is preventable. Thus, there was a great need to conduct a study to determine factors associated with maternal deaths at Intermediate Hospital Oshakati, Oshana region between the years 2011 to 2014. The study will help to make necessary recommendations that will enable the appropriate interventions to be carried out in order to prevent loss of lives during pregnancy and labour.

5.2 CONCLUSIONS

This section of the chapter discusses whether or not the stated objective of determining the factors associated with maternal deaths at Intermediate Hospital Oshakati, Oshana region between the years 2011 to 2014 was answered.

Age, marital status and residential address were the only demographic characteristics of deceased women captured in the maternity records. In addition to the demographic factors, such as: HIV status, ANC care, gestational period, glucosuria, hypertension, abnormal fetal lie, multiple pregnancy, anaemia, Ante-partum Haemorrhage (APH), Post-partum Haemorrhage (PPH), previous Caesarean Section (C/S), and phases of labour were suspected risk factors identified to be associated with maternal deaths. For the ages of women who died during the period of study ranged from 19 to 50 years. Most of the maternal deaths (50%) occurred in the age group 25-34 years.

Most of the maternal deaths occurred among the middle-aged women between 25 to 44 years, while 11 women (14.9%) were young and teenage mothers. The most common direct causes that led to maternal deaths were found to be ante-partum haemorrhage which accounted for 16.22%. Hypertension contributed an equal portion of 16.22% while other causes of maternal death topped the list (44.59%). The main indirect cause of maternal deaths was found to be HIV/AIDS (35.1 %). Generally, there was no statistical significance between demographic characteristics of women and the obstetric risk factors except the mode of delivery versus place of residence, which stood at the p value of 0.06%. Many women 95.95% who died were

referred from district hospitals in all four northern regions including Opuwo in Kunene region.

5.3 LIMITATIONS OF THE STUDY

Methodological limitations:

By definition, cross-sectional retrospective designs are also known as one-shot and are most commonly used in social sciences that involve the collection of secondary data from records which may be incomplete (Kumar & Singh, 2012).

- Some of the patients' files and the maternal death register were incomplete and did not contain all needed information such as educational levels, antenatal care attendance and marital status. In addition, the information was not always recorded clearly.
- There was no one to ask for further details since the study design was document review, thus, only information in the medical records could be used.
- The data did also not include the duration between the admission and onset of complications.
- Moreover, hospital death records were not all stored at the same place therefore, the researcher tried to retrieve the deceased files for the period

under study at the warehouse situated in Ongwediva, some 10 kilometres away from Oshakati, where the study was based.

- The study was conducted only in Oshana region, therefore limiting the generalisation of the results to the rest of the country.

5.4 SUGGESTIONS FOR FUTURE RESEARCH STUDIES

This study looked mainly at factors associated with maternal deaths at Intermediate Hospital Oshakati, Oshana region using a cross-sectional data. The study identified the following areas for further studies to improve maternal health service provision and reduce maternal deaths:

- A similar study on factors associated with maternal deaths could give a clear picture of maternal death if primary data such as interviewing next of kin of deceased women as well as birth attendants, for example midwives and doctors across all regions in the country, to get a clear picture on the topic of maternal deaths.
- Other variables such as educational levels, employment status, source of income or employment status could also be used to determine the association between different factors and maternal deaths.
- Using other data sets such as pregnant and postpartum women interviews who are living to compare factors with those who died.

5.5 RECOMMENDATIONS

The report of this study and existing literature on the same topic indicates that significant efforts in maternal health services are still needed to improve the quality of these services.

A set of specific recommendations are done, with the main focus on improving maternal health care at the community and facility levels, stakeholder's involvement, community mobilization, providing and improving infrastructure at all levels of care.

5.5.1 Information dissemination

Primary Health Care (PHC) staff should provide health information to communities at large including pregnant women and their caretakers on maternal health issues and the services available at health facilities across the region. In this case the study highlighted the need for dissemination of maternal health information.

5.5.2 Community mobilisation through local electronic and print media platforms

The local electronic and print media, as well as the radio should assist with community mobilisation at a larger scale on the need to seek antenatal health services early. This will empower the women to know the danger signs during pregnancy and the importance of delivering at a health facility under the care of skilled birth attendants (Doctors and Midwives).

5.5.3 The need for improved relationship between the Ministry of Health and other stakeholders

The Regional Management Team (RMT) needs to improve the relationship between the Ministry of Health and other stakeholders such as local non-governmental organisations, civil society organisations, church leaders, traditional and political leaders to take ownership of health and support community mobilisation activities on the importance of maternal health.

The RMT should aim to train more health staff, midwives and doctors in LSS and anaesthesia especially at district hospital maternity sections as well as all PHC facilities to avoid unnecessary delays and referrals.

5.5.4 Improved support and supervision of Health Extension Workers (HEWs)

Health Extension Workers need to be strongly supported and supervised on the ground to take their community-based health care services seriously in order to raise awareness on maternal health, prevention and recognition of complication of pregnancy and childbirth as well as referring maternal cases to nearest health facilities immediately.

5.5.5 Improved availability of antenatal care services in hospitals and clinics

The Ministry of Health needs to improve on the availability and accessibility of antenatal care, safe delivery and postnatal care including the provision of post-abortion care at all health facilities in Oshana region in particular, and the entire country in general.

5.5.6 Improving the Infrastructure for Antenatal Care (ANC) Services

The Ministry of Health in collaboration with RMTs should aim to fully equip district hospitals with all basic emergency obstetric care equipment. The Ministry of Health needs to look into improving the infrastructure at all levels of care and ensure enough transport for emergency obstetric cases.

5.5.7 Health Service Provision

Health workers at PHC facilities should offer HIV test to all pregnant women and initiate the positive ones on lifelong ART without delay. The Regional Management Team needs to strictly monitor the implementation of recommendations made after maternal death reviews by committee members at all levels.

The regions and hospitals with high maternal deaths should endeavour to strengthen audit committees to ascertain factors associated with maternal deaths and craft ways to reduce maternal morbidity and mortality in Namibia in general and IHO in particular. This will help the women to better understand the risk factors associated with pregnancy and childbirth in order for them to make informed decisions early.

5.6 Conclusions

In Oshana region at IHO, the leading common causes associated with maternal deaths were identified during this study as antepartum haemorrhage, and other causes such as psychosis, Hepatitis B, elderly primi-gravida, multigravida and post-maturity. It was evident that most of these maternal death causes were preventable. The trend of MMR increased sharply between 2012 and 2013, then declined slightly between 2013 and 2014 even though it did not reach the MDG target for 2015/16. There was instability in the MMR, meaning a lot still needs to be done to reduce maternal deaths to lower and stable rates.

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Annexure A: Letter of permission from the University of Namibia to start with the study

University of Namibia, Private Bag 13301, Windhoek, Namibia
101 Main Road, Stormwater Avenue, Paarlsepark
☎ +264 61 206 4111 (10) <http://www.unam.edu.na>



RESEARCH PERMISSION LETTER

Date: 20/06/2016

TO WHOM IT MAY CONCERN

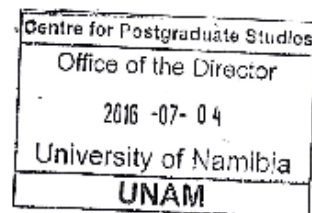
RE: RESEARCH PERMISSION LETTER

1. This letter serves to inform you that student: **LUDWINA KORNELIUS** (Student number: **9205144**) is a registered student in the SCHOOL PUBLIC HEALTH for the **MASTER IN PUBLIC HEALTH** degree at the University of Namibia. His/her research proposal was reviewed and successfully met the University of Namibia requirements.
2. The purpose of this letter is to kindly notify you that the student has been granted permission to carry out postgraduate studies research. The School of Postgraduate Studies has approved the research to be carried out by the student for purposes of fulfilling the requirements of the degree being pursued.
3. The proposal adheres to ethical principles.

Kind regards

Signed: *pp. Alfred H. Hob, PGS, Fac of Health Science*
Name of Main Supervisor: *Dr. K. Hofmeier/Aoebes*

Signed: *Dr. M. Hedlmbi*
Dr. M. Hedlmbi
Director, School of Postgraduate Studies
Tel: 2063523
E-mail: mhedlmbi@unam.na



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Annexure B: Letter of permission to conduct the study in the public health facilities from the office of the Permanent Secretary of the Ministry of Health and Social Services



H. Kalume
MR. Nandjila

Sms 17/10/16
[Signature]

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198
Windhoek
Namibia

Ministerial Building
Harvey Street
Windhoek

Tel: 061 - 203 2562
Fax: 061 - 222550
E-mail: hsarganb@gnaf.com

OFFICE OF THE PERMANENT SECRETARY

Ref: 17/3/3
Enquiries: Ms. H. Nangombe

Date: 10 October 2016

Mrs Lidwina Kornelius
School of Public Health
University of Namibia
PO Box 1664
Oshakati
Namibia

Dear Mrs Kornelius

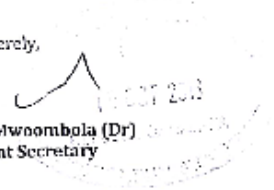
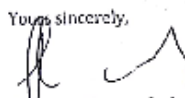
Re: Factors Associated with maternal deaths at Intermediate Hospital Oshakati (IHO) Oshana Region Namibia

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**
 - 3.1 The data to be collected must only be used for academic purpose;
 - 3.2 No other data should be collected other than the data stated in the proposal;
 - 3.3 Stipulated ethical considerations in the protocol related to the protection of Human Subjects should be observed and adhered to, any violation thereof will lead to termination of the study at any stage;

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- 3.4 A quarterly report to be submitted to the Ministry's Research Unit;
- 3.5 Preliminary findings to be submitted upon completion of the study;
- 3.6 Final report to be submitted upon completion of the study;
- 3.7 Separate permission should be sought from the Ministry for the publication of the findings.

Yours sincerely,



Andreas Mwoombola (Dr)
Permanent Secretary

"Health for All"

Annexure C: Checklist for assessing factors associated with Maternal Deaths at Intermediate Hospital Oshakati(IHO), Oshana

Checklist for Assessing Factors Associated with Maternal Deaths at Intermediate Hospital Oshakati (IHO), Oshana.

This Form must be kept Private and Confidential at all times and no photocopies are to be made. When not in use, it must be locked in a secure place.

SECTION A: Details of the Deceased

Registration Number:..... Age in completed years:.....

Residential address: Rural urban Marital status: Married Single Divorce (tick what is applicable)

Gravida Para Still Births Abortions Gestational age.....

Days since delivery/abortion: HIV status: Negative Positive Not recorded

Date of admission: Day Month Year

Date of death: Day Month Year

SECTION B: Maternal Obstetric History.

Stage of pregnancy or delivery when admitted:

Ectopic Pregnancy	Ante partum	In labour	Postpartum	Other/specify
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Diagnosis at death:

Abortion	Hemorrhage	Sepsis	Eclampsia	Others/Specify
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Referred from another Health facility? Yes No

SECTION C: Antenatal and Postnatal History

Did she attend Antenatal Care? Yes No No record

If Yes: Total No. Of visits

Post Obstetric Risk Factors:

Type of Complication	Yes	No	Comments
Previous C/Section			
Abnormal Presentation/Lie			
Anaemia			
Glycosuria			
Hypertension			
Multiple Pregnancies			
Ante Partum Hemorrhage			
Ectopic pregnancy			
Other (Please specify)			

Delivery and Puerperium Information

In which phase of labour did she die?

Latent Phase	Active Phase	Second stage	Third Stage
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Method of Delivery:

Vaginal unassisted	Vaginal assisted vacuum	Vaginal assisted Forceps	Caesarean Section
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Puerperium (Tick ✓): Uneventful Eventful PPH Sepsis Others (specify):