FACTORS ASSOCIATED WITH STILLBIRTHS DURING INTRAPARTUM CARE AT THE WINDHOEK CENTRAL HOSPITAL AND INTERMEDIATE HOSPITAL KATUTURA, KHOMAS REGION, NAMIBIA

A RESEARCH THESIS SUBMITTED IN FULFILMENT

OF THE REQUIREMENT FOR THE DEGREE OF

MASTER OF NURSING SCIENCE

OF

THE UNIVERSTY OF NAMIBIA

BY

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April 2023

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ABSTRACT

Intrapartum stillbirths account for 1.3 million deaths worldwide, which is half of all stillbirths occurring during labour and delivery. NSA (2020), states that the current stillbirths' rate in Namibia is not calculated due to the limitations of data. The present study investigated factors associated with stillbirths during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura, Khomas region, Namibia.

A quantitative, descriptive and retrospective study was used on a total population of 186 patients' records of babies who died during labour and delivery. The sample and the population were the same (186 patients' records). Data were collected by means of a structured checklist, analysed with SPSS 27, and presented as descriptive statistics in the form of frequency distributions of study variables. Furthermore, bivariate analyses in the form of Pearson Chi-Square test of association were obtained to determine whether there exists a significant association between variables.

The study concluded that there was no association between the sociodemographic and obstetric factors, (mother's place of residence, mode of baby delivery, presentation of a baby, mother's age and gestational age) with stillbirths during intrapartum care. The study also found that there was a significant association between a fetal factor (placenta abruptio) and intrapartum stillbirths. The study also concluded that there was a substantial association between the modifiable factor (delay to provide care once the mother arrived at the health facility) with intrapartum stillbirth. The study also concluded that intrapartum stillbirths accounted for one third (30%) of the overall stillbirths in the study settings.

Recommendations for further research to **s**tudy the quality of intrapartum care given to women would provide a better indicator of the quality of maternal and new-born health services. With one-third of stillbirths occurring intrapartum, perinatal death evaluations (audits) should be encouraged and strengthened at the facility level. Standards for ANC and intrapartum care services should be strengthened to improve labour monitoring and quality care.

Keywords: Factors, Intrapartum care, Stillbirth.

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LIST OF ABBREVIATIONS AND/OR ACRONYMS

ANC	Antenatal care
APH	Antepartum haemorrhage
BBA	Born before arrival
BOLD	Better Outcomes in Labour Difficulty
CMF	Congenital Malformations
CPD	Cephalopelvic disproportion
CTG	Cardiotocography
C/S	Caesarean Section
ENAP	Every New Born Action Plan
FHRM	Foetal Heart Rate Monitoring
HBB	Helping Babies Breath
HCP	Health Care Professional
HMIS	Health Management Information Systems
MCH	Maternal and Child Health
MoHSS	Ministry of Health and Social Services
LMICs	Low- and Middle-Income Countries
PIH	Pregnancy induced hypertension
PET	Pre-Eclampsia
SBA	Skilled Birth Attendant
SBR	Stillbirth Rate
SDGs	Sustainable Development Goals
SELMA	Simplified, Effective, Labour Monitoring to Action

SGA	Small-for-gestational age
UN IGME	United Nation Inter-Agency Group of Child Mortality Estimation
WHO	World Health Organisation

ACKNOWLEDGEMENTS

Firstly, I would like to thank my heavenly Father, the Almighty God for His grace, and for granting me the wisdom, knowledge and understanding to make this study possible. All the glory and victory belong to you Father God.

I am grateful to the Ministry of Health and Social Services for allowing me this opportunity to conduct the study at the maternity units of the study hospitals.

I also would like to express my sincere gratitude and appreciation to the following individuals who contributed to the success of this study:

- Dr E. Mulenga, my supervisor, for the guidance, support and encouragement throughout the course of this work. It has been an absolute privilege to have worked with you. Thank you for devoting your time towards assisting me.
- Dr P. Iiyambo, the statistician who assisted with my research thesis - your guidance is highly valued.
- Ms. Taimi Amakali- Nauiseb, thank you for your guidance and assistance and for never getting tired whenever I knocked on your door.
- To my husband, Mr Andreas Tuta Runone and our three sons Andre, Louie and Johnny, for the motivation, love, support and patience. Thank you for believing in me and for your understanding during the times I could not be there for you.
- The staff members at Intermediate Hospital Katutura and Windhoek Central Hospital Maternity Sections, for the assistance in helping me to retrieve data and for directing my study.
- My relatives and friends as well as colleagues, who assisted, encouraged and wished me well during this study endeavour.

DEDICATION

This thesis is dedicated to my late father, Mr Johannes Musimba. Thank you for laying a strong foundation for me to be God-fearing and disciplined woman, as well as supporting me and always encouraging me to study and taking my education serious. It is because of you that I am where I am today. Though you are not here today, I know you would have been proud of your baby girl. May you continue to rest in Glory.

DECLARATIONS

I, Kalista Sihako Runone, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

Kalista Sihako Runone		April 2023
Name of Student	Signature	Date

CHAPTER ONE

OVERVIEW OF THE STUDY

1.1. Introduction

Even though maternal and new-born outcomes have significantly improved over the past 20 years, stillbirth rates remain high around the world. Ishak & Khalil (2021) stated that although the cost is greatest in low- and middle-income nations, the fact that the majority of evidence comes from high-income countries presents a problem for researchers looking to apply their findings globally. Strong and broadly applicable evidence is needed to resolve this issue.

Adane et al., (2014) also stated that most pregnancies progress normally from conception to delivery. However, others do not go through smoothly because of intrapartum maternal, foetal, and health sector factors that place the mother, the foetus, or both at a higher risk of developing complications compared to pregnancies without those factors, and such pregnancies lead to the death of the babies, mothers, or both by the end of pregnancy and delivery. World Health Organization (2015) define stillbirth as the birth of a baby at or after 28 weeks gestation who does not show any signs of life. On the other hand, intrapartum stillbirth is defined by Abeje et al., (2014) as foetal deaths that occur during labour, where the baby does not show any signs of skin disintegration and is clinically described as fresh stillbirth

According to the United Nations Inter-agency Group for Child Mortality Estimation (2020), stillbirths lead to an enormous burden on the health system, especially in Low- and Middle-Income Countries (LMICs), and they cause a lot of grief and psychological costs such as depression for the women and their families

Stillbirths are delivered almost every day at different health facilities in Namibia. Although there are numerous causes of foetal fatalities, Ministry of Health and Social Services (2014) indicated that the majority of these deaths can be avoided if preventative steps are done and appropriate care is made available when necessary. UN IGME (2020) also agrees that some of the causes of these losses which include poor maternity and new-born care, a lack of funding for preventative measures and the health workforce, inadequate social acceptance of the burden that stillbirths place on families, measurement issues and significant data gaps, a lack of global and national leadership, and the absence of globally recognizable goals like the Sustainable Development Goals (SDGs), can be avoided. The UN IGME (2020) found that more than 40% of all stillbirths are intrapartum stillbirths, a tragedy that can be avoided with improved monitoring and prompt access to emergency obstetric care when necessary.

Perinatal mortality rates remain high in developing countries, of which Namibia is no exception. United Nations International Children's Emergency Fund (UNICEF) and WHO (2014) indicate that Namibia ranks 63rd in the world, in infant and perinatal mortality rate per 1,000 live births. The Khomas region where this study was conducted recorded the highest perinatal deaths with over 20 percent deaths in 2016 - 2017 (NSA, 2020). Additionally, the District Health Information Software (2014) of the Ministry of Health and Social Services (MoHSS) verified that there are progressive stillbirths at the maternity units of the hospitals under study, which is supported by the diagram in figure 1.1, which illustrates the regional distribution of stillbirths in Namibia between 2016 and 2017.

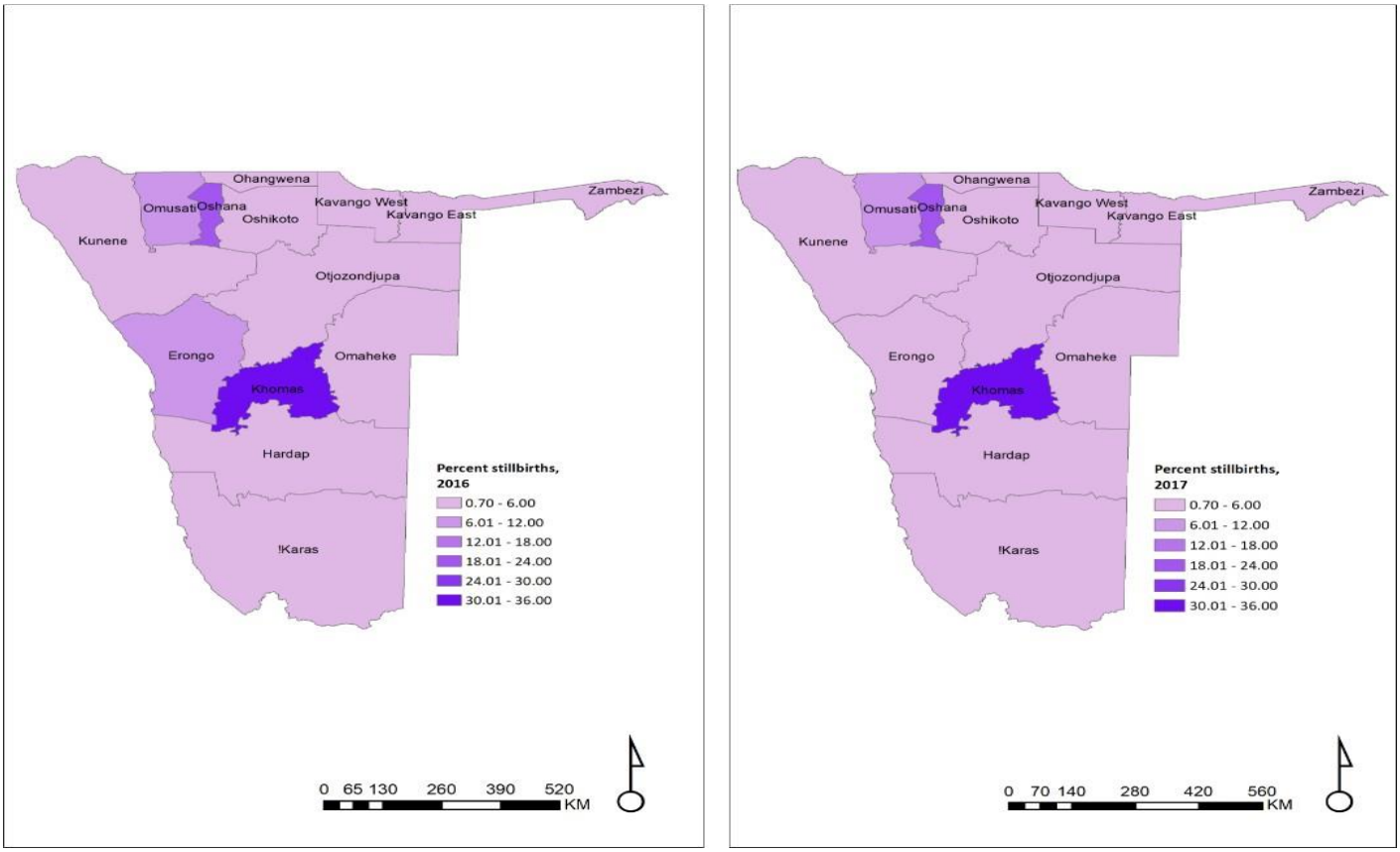

Figure 1.1. Percent regional distribution of stillbirths during 2016 and 2017 in Namibia

Millions of stillbirths remain uncounted for in the developing world. Phillips & Millum (2015) stated that estimates of the burden of disease which assess a population's mortality and morbidity by producing summary measures of health such as quality-adjusted life years (QALYs) and disability-adjusted life years (DALYs). WHO (2016) indicated that stillbirths (fetal deaths that occur in the later stages of pregnancy or during labour) are typically not counted as adverse health outcomes in these measures, nor was it fully recognized as an individual death by the International Classification of Diseases until they launched a separate classification system for perinatal mortality in 2016.

Additionally, the Namibian Statistics Agency (2020) also concur that due to data limitations in the denominator (live and stillbirths), the country's current stillbirth rate is not calculated.

This is supported by the Ministry of Health and Social Services' Maternal and Child Health report (2009), which confirms that stillbirths occurring after seven months of gestation and the first deaths around delivery are combined into the perinatal mortality rate. In many developing country settings, the lack of recognition and the unavailability of data on stillbirths has made determining the exact rates of stillbirth challenging, thereby relegating the subject to the back burner of health issues. Furthermore, priority-setting decisions based on these measures are thus likely to place little value on preventing stillbirths that occur worldwide each year.

In 2011, The Lancet published a ground-breaking series on stillbirths. The series' authors fought to shed light on the unacceptable toll of intrapartum stillbirths in low- and middle-income countries, as well as the regrettable absence of such tragic events from global tracking initiatives like the Millennium Development Goals, the Global Burden of Disease, and the United Nations (Lawn & Blencowe, 2016).

Therefore, an understanding of the factors contributing to stillbirths during the intrapartum period will facilitate the development of preventative strategies to reduce the associated burden of stillbirths.

1.2. Background of the study

According to the World Health Organization (2016), 2.7 million new-born babies die worldwide each year during pregnancy and childbirth, and 1.3 million of those deaths, or half of all stillbirths, occur during labour and delivery, with the majority resulting from preventable conditions.

Gordon et al., (2013) stated that the previous global health agenda did not feature intrapartum stillbirth, possibly because its impact had not been scientifically analysed or made known. Moreover, Aminu (2017) also confirmed that intrapartum stillbirth has not been widely studied, especially in low and middle-income countries (LMICs) and it has not been considered as part of major global maternal and child health strategies, even though the vast majority of stillbirths (98%) occur in low- and middle-income countries (LMIC), with more than half (55%) occurring in Sub-Saharan Africa. Furthermore, MoHSS (2009) indicated that these stillbirths reflect the quality of a country's healthcare system for pregnant women.

While some wealthy nations estimate a stillbirth rate (SBR) of 3 per 1,000 births, Aminu (2017) noted that stillbirth rates of 30 per 1,000 births and higher have been noted in a number of situations in Sub-Saharan Africa and Southeast Asia. Aminu's 2017 study found that Sub-Saharan Africa has a high stillbirth rate with notable geographical variations. Lawn et al., (2016), concur that Africa faces the highest burden of stillbirths.

The most recent estimate of stillbirths worldwide was made in 2009 by the World Health Organization. The reduction of stillbirths has progressed more slowly than the reduction of maternal or neonatal fatalities since tracking for stillbirths was not included in the Millennium Development Goals. In 2014 Every New-born Action Plan set the target of

reaching a national stillbirth rate of 12 or less per 1000 live births by 2030 and reducing within-country variations internationally. Stillbirths are still not taken into account when calculating the global burden or when setting global goals for the sustainable development goals (Blencowe, et al., 2016).

In response to this neglect, the WHO's Every New-born Action Plan (ENAP), which was introduced in 2014, offers a road map of tactical activities for putting a stop to preventable new-born mortality, including stillbirths. The inclusion of stillbirths on the international agenda demonstrates the present degree of dedication and drive in health development and care to make stillbirth visible and a top priority on the national health agendas of all nations. To prevent new-born deaths and stillbirths by 2020, the ENAP has a clear direction with specified global and national milestones to be met (WHO, 2015).

In 2009, the Namibian Ministry of Health and Social Services developed guidelines on essential and obstetric emergency care to address obstetric and neonatal related challenges in Namibia, in order to ensure positive outcomes of pregnancy and child birth. Despite the guidelines on essential obstetric emergency care by the MoHSS, the directives of the guidelines to render quality obstetric and new-born care and prevent deaths such as intrapartum stillbirths seem not to be applied.

However, improving survival at birth goes beyond developing guidelines, since several maternal, foetal and health service factors come into play to determine birth outcomes, and all of them may not be captured in the pregnant woman’s records during antenatal care and at the time of admission during labour.

The absence of intrapartum stillbirth as a priority area in the strategic document may be due to the lack of understanding of the causes of intrapartum stillbirths since there is a scarcity of research which focuses on intrapartum stillbirths, and lack of data on contributing factors to intrapartum stillbirths in Namibia. The limited focus on intrapartum stillbirths in the country makes the present study relevant. A clear understanding of the factors that contribute to these intrapartum stillbirths will facilitate the development of interventions to inform policy, programmes, and practice, to reduce preventable intrapartum stillbirths. This study, therefore, investigated the factors associated with stillbirths during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

1.3.Statement of the problem

Despite various efforts to curb the perinatal mortality in the country, intrapartum stillbirth still remains a concern in Namibia. There is a trend of increased intrapartum stillbirths at the state hospitals' maternity units as illustrated in figure 1.2.

Therefore, despite numerous interventions to improve birth outcomes, access to skilled birth attendants, and the abundance of health facilities, the main issue that served as the basis for this study was the country's continued high rate of intrapartum stillbirths and a lack of understanding of the factors that contribute to these numbers.

According to MoHSS (2014), Namibia has a general stillbirth rate of 17/1000 live births, which is around six times higher than that of industrialized nations. A major indicator of the standard of prenatal, obstetric, and postnatal care is the rate of stillbirths and neonatal death, and intrapartum stillbirths account for 38% of overall stillbirth rates (MoHSS, 2014).

The two primary hospitals in the Khomas Region tracked the number of intrapartum stillbirths, and between April 2016 and March 2019 there were 41232 deliveries, 613 of which were stillbirths (MoHSS, 2019). 186 of these stillbirths (intrapartum stillbirths) happened while the women were being cared for and monitored in the two maternity facilities at Windhoek Central Hospital and Intermediate Katutura Hospital, of which 427 were macerated (MoHSS, 2019).

The current report from maternal and child health shows a progressive increase in the stillbirth trend as illustrated by the figure below. From the figure, it is evident that fresh or intrapartum stillbirths is a progressive trend within the maternity units.

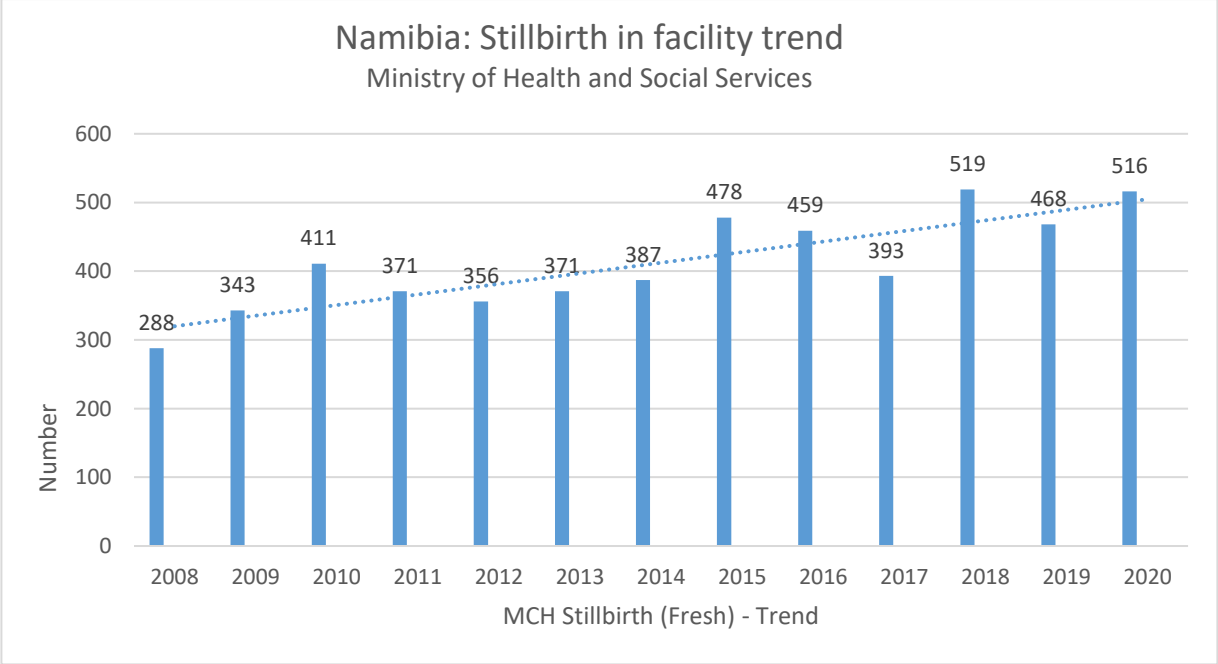

Figure 1.2. MCH stillbirth (fresh) – Trend (MoHSS, 2021)

Despite the trends indicating an increase in intrapartum stillbirths at the hospitals' maternity units, little is stipulated on the guidelines of the MoHSS on essential obstetric and emergency care regarding the management of mothers and their new-borns with regards to the reduction of intrapartum stillbirths.

In actual fact, little is known of the factors contributing to intrapartum stillbirths which can assist policy makers to develop and implement guidelines for the management of mothers and their new-borns to help reduce intrapartum stillbirths. This therefore, prompted the researcher to conduct a study to investigate the factors associated with intrapartum stillbirth.

1.4. The purpose of the study

The purpose of this study was to examine the factors associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

1.4.1. Hypothesis of the study

Four hypotheses were formulated for the purpose of this study. They are as follows:

Hypothesis 1:

H_0: Socio-demographic factors are not significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

H_1: Socio-demographic factors are significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

Hypothesis 2:

H_0: Maternal obstetric factors are not significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

H_1: Maternal obstetric factors are significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

Hypothesis 3:

H_0: Fetal related factors are not significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

H_1: Fetal related factors are significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

Hypothesis 4:

H_0: Modifiable related factors are not significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

H_1: Modifiable related factors are significantly associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

1.5.The objectives of the study

The objectives of the study were to:

- Identify the maternal, socio-demographic and obstetric factors associated with stillbirths during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia;
- Determine the fetal factors associated with stillbirths during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia; and
- Determine modifiable factors associated with stillbirths during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia.

1.6. Significance of the study

Interventions to minimise intrapartum stillbirths must be based on current information in order to be effective. However, there is a scarcity of such data from the demographic Health Information System. As a result, stakeholders have to create and implement programmes that are targeted at reducing intrapartum stillbirths based on inadequate and frequently obsolete information.

Phillips & Millum (2015) states that the maternal health is enhanced by several of the measures that are proven to lower stillbirths. The inclusion of stillbirths improves the measurable impact of interventions that enhance both the mother's and the fetus' health, which can justify giving these interventions more funding priority than alternatives.

The findings of the study were aimed at aiding the following areas in the profession:

Nursing Practice

It was thus hoped that the findings of this study could aid in the development of practical methods for preventing new-born mortality, specifically those resulting from the intrapartum period; thus, contributing to the achievement of the Sustainable Development Goals (SDGs).

Nursing Education

The findings of this study also identified factors linked to intrapartum stillbirths, which may help the management of the two hospitals and other decision-making bodies by providing up-to-date information about the programs to concentrate on for interventions aimed at reducing intrapartum stillbirths at the facilities. This also entails aiding decision-makers with the development of innovative ideas for attempts to improve the quality of care, as well as the modification and strengthening of control measures that might be useful in reducing intrapartum stillbirths.

Nursing Research

Furthermore, the study was aimed at providing baseline data for further and broader research in the country.

1.7. Delimitation of the study

This study was limited to Windhoek Central Hospital and Intermediate Hospital Katutura in the Khomas region in Namibia. Women who delivered at private healthcare facilities and in the community (home deliveries) were not included in the study, therefore, the study findings cannot be generalised to the whole population of Khomas region.

1.8. Definitions and operational concepts

Stillbirth: Stillbirth is defined as the birth of a baby who died before or during labour and delivery at 22 weeks of gestation or with a birth weight of 500g or a body length of 25cm (WHO, 2019). Stillbirth is defined as a baby born dead at 28 weeks of pregnancy, or a birth weight of 1000 g, or a body length of 35cm for international comparisons (WHO, 2019). The latter definition was employed in this study.

Intrapartum stillbirth: A baby who dies after 28 weeks of pregnancy, but before or during birth, is classified as intrapartum stillbirth (WHO, 2019)

Live birth: When a product of conception is completely expelled or extracted from its mother, it breathes or exhibits any other signs of life, such as heartbeat, umbilical cord pulsation, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached (WHO, 2019).

Stillbirth Rate: Stillbirth rate is the number of stillbirths per every 1,000 total births (live births + stillbirths) (WHO, 2019).

QALYs: Quality-Adjusted Life Year (Phillips & Millum, 2015)

DALYs: Disability-Adjusted Life Year (Phillips & Millum, 2015)

Lower Middle-Income Country: For the current 2023 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of $1,085 or less in 2021; lower middle-income economies are those with a GNI per capita between $1,086 and $4,255 (The World Bank, 2022).

Gestational age of the baby: This is categorised into three groups, namely, severe prematurity, preterm or term according to the following definitions (Ashish et al., 2016):

***Severe prematurity*:** which includes babies born at 28 - 31 weeks of gestation, estimated by the date of the mother's last menstrual period or based on clinical examination of the new-born (Ashish et al., 2016);

***Preterm birth**:* which includes babies born at 32 – 36 completed weeks of gestation, estimated by the date of the mother's last menstrual period or based on clinical examination of the new-born (Ashish et al., 2016); and

Term birth: which includes babies born at or after 37 completed weeks of gestation, estimated by the mother's last menstrual period or based on clinical examination of the new-born (Ashish et al., 2016).

1.9. Chapter summary

There is a trend of increased intrapartum stillbirths at maternity units of the two study settings. An overview of the background information on intrapartum stillbirths at maternity units was described in this chapter. The goal and objectives which were necessary to guide the study were outlined. The study significance was stated with regards to policy makers about the status of intrapartum stillbirths. In addition, key concepts in the study were defined as well as the limitations and delimitations of the study were outlined. The next chapter covers the literature review so as to contextualise the current study within the existing body of relevant literature.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter presents the review of literature that is relevant to the topic under investigation as a way to place the study in the context of the existing body of knowledge as well as to identify the gaps in the study area which attracts more studies. Karl (2021) and Paul & Criado (2020) assert that a literature review synthesizes earlier studies to enhance the foundation of knowledge and offers a thorough overview of the literature linked to an issue, theory, or approach. The purpose of the literature review in this chapter was to investigate the most recent information on the causes of intrapartum stillbirths.

The following electronic databases were searched. They were selected based on their relevance to the topic as well as their wide geographical coverage. The data bases included Google Scholar, Global Health, PubMed and Cochrane Library.

The literature review was conducted under the following headings: case definition for stillbirths, overview of intrapartum stillbirths on a global, sub-Saharan and Namibian perspective, universal factors associated with intrapartum stillbirths and strategies to reduce intrapartum stillbirths

2.2. Case definition for stillbirths

Hug et al. (2021) state that the term "stillbirth" normally refers to a baby who is born without any indication of life following a specific viability threshold, with viability typically being determined by gestational age, birthweight, or length at birth.

World Health Organization (2019) defined stillbirth as the birth of a baby at 22 weeks of pregnancy or with a birth weight of 500g or a body length of 25cm, who died before or during labour and delivery. For international comparisons, the WHO defines stillbirth as a baby born dead at 28 weeks of gestation, or with a birth weight of 1000g or a body length of 35 cm, and intrapartum stillbirth as all fresh stillbirths and stillbirths whose mothers arrived at the facility with fetal heart sound present.

WHO's (2019) International Classification of Disease (ICD), using the ICD 10th and 11th revisions, define late fetal death as the in-utero death of a baby (i.e., born with no signs of life at birth) with a birthweight of 1000g or more; or if birthweight is not available, at a gestational age of 28 weeks or more, or (if gestational age is not available) a body length of 35 cm or more at birth is used.

The United Inter-Agency Group for Child Mortality Estimation (UN IGME) and the Core Stillbirth Estimation Group (CSEG) also advises using gestational age rather than birthweight to determine a stillbirth because the two thresholds do not exactly match. They claim that gestational age is a more accurate indicator of viability and, hence, maturity. It is noteworthy that gestational age is the worldwide data source's most widely used parameter. For the purpose of determining gestational age, the first day of the most recent regular menstruation is used (WHO, 2021).

Furthermore, Hug et al., (2021) also acknowledges that even in circumstances in which early ultrasound dating scans are available, gestational age should be based on the best obstetric estimate to avoid recall errors and differences in the length of menstrual cycles. Recommendations from the UN IGME and the CSEG also include omitting the birth

length criterion and making a clearer distinction between stillbirth and fetal death. These recommendations are under review for inclusion in an updated edition of ICD-11.

In this study, the researcher defines a stillbirth as the birth of a baby with no signs of life during labour or birth, at or after 28 weeks of gestation, in accordance with these criteria. Data with 28 weeks or more gestation definition were extracted. When data were collected according to a different definition (e.g., based on birthweight or an alternative gestational age definition), stillbirth rates were adjusted in the modelling to allow for consistent international comparisons. For the estimates presented in this study, stillbirth rate was defined as the number of stillbirths at 28 weeks gestation or more per 1000 total births (i.e., livebirths plus stillbirths).

There are different terms which are used within this context. These terms are: stillborn, intrauterine death, fetal demise, fetal mortality, fetal death, fresh stillbirth and fetal loss. Other less specific terms that are used sometimes are: intrapartum death, perinatal audit, perinatal death, perinatal mortality, pregnancy loss.

2.3. Overview of intrapartum stillbirths

2.3.1. Global

The loss of a baby late in pregnancy remains too common. Peven et al. (2021) states that intrapartum stillbirths continue to be a problem that is frequently unrecognized and neglected despite the immense burden they place on women, families, and society. Since most deliveries now take place in hospitals, regular register-recording offers the opportunity to increase intrapartum stillbirths counting, albeit there is little research on this occurrence (Peven et al., 2021). The current study used data from maternal records to measure hospital intrapartum stillbirths.

Hug et al. (2021) predicted that the 2 million stillbirths that occurred globally in 2019 would all happen at 28 weeks or more of pregnancy, translating to a stillbirth rate of 13.9 per 1000 live births globally. The frequency of stillbirths per 1,000 live births in 2019 varied significantly by location, from 22.8 in West and Central Africa to 2.9 in Western Europe, according to their analysis. Eastern and Southern Africa, South Asia, and West and Central Africa, respectively, had the second and third highest stillbirth rates in 2019.

Hug et al. (2021) discovered that from 2000 to 2019, the world's annual rate of stillbirth rate reduction was 2.3 percent. In addition, 1.2 million intrapartum stillbirths can happen each year worldwide, with the majority of nations reporting that roughly half of all stillbirths occur during the intrapartum period, according to Newtonraj et al. (2017).

Hug et al. (2021) state that it is difficult to produce accurate and timely stillbirth data and statistics because stillbirths are frequently not recorded in many administrative registration systems of low-income and lower-middle-income countries, including civil and vital registration systems, medical birth or death registries (if available).

Hug et al., (2021) estimated that in the 20 years following 2000, there were around 48.2 million stillbirths worldwide, with an estimated 2 million women and their families having one in 2019. The report goes on to note that the slower progress in stillbirth prevention compared to decreases in neonatal mortality rate and mortality rate in children aged 1-59 months shows the lack of effort and funds being put into preventing avoidable stillbirths.

Furthermore, their predictions did not point to a global acceleration in the reduction of stillbirths over the previous ten years.

UNICEF & WHO (2014) recommends immediate action in accelerating progress and meeting the ENAP target of 12 or fewer stillbirths per 1000 total births in every nation by 2030.

Having pointed that out, emphasis should be placed on prioritising stillbirths and mobilizing essential resources globally. Special emphasis should be placed on LMICs to accelerate the much-needed results (UNICEF & WHO, 2014).

2.3.2. Sub-Saharan Africa

Every year, an estimated 2 million new-borns are stillborn, with 84 percent of them occurring in low- and middle-income countries (LMICs), particularly in South Asia and Sub-Saharan Africa (UN IGME, 2020). Africa, in comparison to other continents, has a high prevalence of stillbirths, particularly in Sub-Saharan Africa, where stillbirth rates are substantially higher than in other African countries. According to the UN-IGME (2020), the risk of stillbirth in West and Central Africa, Eastern and Southern Africa, and South Asia was approximately 8 times, 7 times, and 6 times greater in 2019 than in Western Europe.

UN IGME (2020) maintains that even though stillbirth rates in Sub-Saharan Africa have decreased slightly, the number of stillbirths has levelled off because the rise in birth-rates has offset the tiny declines in stillbirth rates. The study further suggests that to hasten development in South Asia and sub-Saharan Africa, coordinated initiatives are required. According to the above study, 56 nations will fail to reach the ENAP objective by 2030 if current trends continue, 48 of which are found in these high-burden zones. Only 34 nations are anticipated to reach the goal by 2050, with around 28 of these nations located in sub-Saharan Africa (UN IGME., 2020).

In Malawi, there were 20.3 stillbirths per 1,000 live births, compared to 34.7 in Zimbabwe, 38.8 in Kenya, and 118.1 in Sierra Leone, per the study by Aminu et al., (2019). All stillbirths occurred during the intrapartum phase in 50.7% of cases. The study also found that stillbirth death rates were roughly twice as high in South Asian regions as they were in sub-Saharan African regions (35.1 per 1000 births vs. 17.1 per 1000 births), and that in both regions, 40–45 percent of all pregnancy-related deaths and stillbirths occurred during labour, delivery, and the first 24 hours following delivery.

Omo Aghoja et al., (2014) also emphasised in their study that stillbirths are higher in poor countries and that 67% of stillbirths occur in rural areas, with 55% of these happening in Sub-Saharan Africa and South Asia, the same places where skilled deliveries and caesarean sections are much lower.

2.3.3. Namibia

According to MoHSS (2014), there are practically daily intrapartum stillbirths delivered at various hospitals in Namibia, and there are numerous reasons of fetal fatalities. However, the majority of these deaths might be prevented if precautions are taken and appropriate care is made available when it is necessary. Namibia is one of many developing nations with significant perinatal death rates. According to the perinatal and neonatal mortality report assessments of April 2010 - March 2012, the Khomas area, where this study was done, placed second in the nation with 64 fatalities per 1000 live births (MoHSS, 2014). According to the District Health Information Software of the Ministry of Health and Social Services, new-born fatalities are increasing per 1,000 live births at the hospital maternity units.

Blencowe et al., (2016) reported that there still remains huge variation in data availability and quality, especially over time, to enable improved tracking of intrapartum stillbirth rate trends. This is supported by the Ministry of Health and Social Services, Maternal and Child Health Report (2009) which confirms that stillbirths occurring after seven months of gestation plus the first deaths around delivery are combined into the perinatal mortality rate. Namibian Statistics Agency (NSA, 2020) also concurs that the current stillbirths' rate in Namibia is not calculated due to the limitations of data in the denominator (live and stillbirths). In many developing country settings, the lack of acknowledgement and shortage of data on intrapartum loss has made determining the exact rates of stillbirth challenging, thereby placing the problem at the back banner of health problems.

2.4. Universal factors associated with intrapartum stillbirths

Numerous factors have been associated with an increased risk of intrapartum stillbirths. Factors associated with intrapartum stillbirths may include sociodemographic factors, maternal factors such as medical complications during pregnancy, and complications during labour and delivery, and fetal factors as well as some of the modifiable factors (Aminu, 2017).

2.4.1. Maternal factors

Neogi et al., (2015) states that some of the maternal factors including complications during pregnancy, labour and delivery, history of bleeding during pregnancy or before delivery (antepartum haemorrhage), a record of high blood pressure or a history given by the mother (pre-eclampsia) and fever with or without rash as reported (suggestive of infections) are the major factors associated to intrapartum stillbirths.

Liu et al., (2014) similarly studied the major risk factors for stillbirths in distinctive trimesters of pregnancy in Taiwan and concluded that maternal age is one of the maternal factors influencing stillbirth. Being of younger age (≤25 years) is said to increase the chances of stillbirth, but then again Chapman and Charles (2013) found a significant association between maternal age and stillbirths. Kasengele et al. (2017) also confirmed that amongst the socio-demographic factors, only maternal age had a significant association whereby women younger and equal to 24 years were found to have increased risk of stillbirth compared to those who were 25 to 34 years. The study found no significant association between maternal residence, education, or occupation with stillbirth. On the contrary, Gardosi et al., (2013) who found that maternal age association had no significance on stillbirth.

On the other hand, a study by Omo-Aghoja et al., (2014), indicated a steady increase in stillbirth at the age of 30 and older and an association between rising maternal age and stillbirth. At age 30, stillbirth rates were found to be 11/1000, and by age 35, they had grown to 19/1000.

In a study by Oladapo et al., (2017), they found that parity was also a factor and that the rate of stillbirth increased in nulliparous mothers, who had a stillbirth rate of 23/1000, marginally ahead of grand-multiparous mothers, who had a stillbirth rate of 10/1000. Ashish et al., (2015) concluded that women with a history of previous stillbirths have an increased chance of having a stillbirth compared to those who have had none Null parity whereas Aminu et al., (2014) affirms that an increased parity were also linked to a higher rate of stillbirth. These factors prompt for excess healthcare and adequate health education to pregnant women who fall in one or more of the abovementioned categories.

Hypertensive disorders are one of the maternal illnesses that have been linked to stillbirth, according to numerous researchers (Awoleke & Adanikin, 2016; Khanam et al., 2017; Lori et al., 2014; McClure et al., 2017; Ugwa & Ashimi, 2015). In three investigations from Liberia, Tanzania, and India, the cause of stillbirth was determined to be sickle cell disease (Lori et al., 2014; Desai et al., 2017). In other studies, infections have also been linked to stillbirth (Awoleke & Adanikin, 2016; Ugwa & Ashimi, 2015).

Some studies have also found a connection between mothers' ANC attendance. According to Omo Aghoja et al., (2014), unbooked mothers experienced a stillbirth rate that was around four times greater than that of booked mothers. This conclusion was supported by a second study conducted in Nigeria, demonstrating the critical impact that ANC services have in lowering the rate of stillbirths (Oladapo et al., 2017).

In 298 cases (born to 294 women) with complete samples, a South African study found that maternal medical diseases were the most common causes of stillbirth in the women with available data, accounting for 64 (21%), with 56 (19%) cases having hypertensive disorders and six (2%) cases having diabetes (Madhi et al., 2019).

In a different study, it was discovered that medical conditions such diabetes mellitus, a history of mental illness, hypertension, pre-eclampsia, antepartum haemorrhage, and not receiving antenatal care were associated with stillbirths (Gardosi et al., 2013).

2.4.2. Obstetric factors in pregnancy during labour and birth

According to a study conducted in the Bangladeshi slums, obstetric difficulties were to blame for 61.4% of stillbirths. Preterm births, protracted labour, and failure to progress were some of the factors this study linked to intrapartum stillbirth (Nahar et al., 2013). The study made the point that the majority of these variables are responsive to

interventions, and as a result, it advised careful monitoring of the labour's progress, timely detection of difficulties, and efficient management.

Obstetric haemorrhage, non-obstetric complications, hypertensive disorders of pregnancy, and pregnancy-related infections accounted for more than three-quarters of intrapartum stillbirths (Aminu et al., 2019).

According to Kasengele et al. (2017), obstructed labour was the main reason for intrapartum stillbirths. Another study by Choudhury et al., (2018) noted that repeated pregnancies, obstructed labour, breech presentation, and fetal position were all linked to an increased risk of stillbirth.

Omo Aghoja et al. (2014) found that births aided by instruments increase the incidence of stillbirth, which is similar to the earlier study. However, the success of aided deliveries may also be influenced by the length of labour. Prolonged labour and difficult deliveries are signs that the mother need help giving birth. Additionally, it was shown that breech presentations had increased stillbirth rates. Caesarean section (C/S) deliveries are necessary should a problem arise because it was found that C/S is a protective factor against stillbirth (Omo Aghoja et al., 2014).

The study by Kasengele et al. (2017), which supports the aforementioned ones, discovered a high association between prolonged labour and obstetric factors. The chance of stillbirths was assumed to increase with a 12-hour labour. Low diastolic pressure of less than 80 mmHg was revealed to be important among maternal medical factors and to increase the chance of stillbirth. Malaria and maternal anaemia had no discernible connection to stillbirths.

2.4.3. Fetal factors

UNICEF & WHO (2014) states that failure to recognize high-risk fetuses during labour and take necessary action as a result causes neonate to require additional procedures both at birth and later in life, which is one of the leading reasons of intrapartum related death.

The likelihood of stillbirth has been linked to fetal variables such as decreased fetal movement, fetal malpresentation, and fetal distress (Nahar et al., 2013). Fetal reasons of stillbirth, including as congenital defects, infections, and intrauterine growth restriction, have also been reported, according to a study by Nahar et al., (2013). Fetal factors account for 6.7 percent to 30.0 percent of stillbirths in LMICs (Musafili et al., 2017).

Additionally, one of the fetal risk factors was preterm birth. Other fetal risk factors included prematurity (determined by the number of weeks of pregnancy calculated from the last menstrual period, verified from records, or inferred from history in the absence of records), low birthweight (if documented weight was available), and congenital malformations (CMF) elicited from history (Neogi et al., 2015).

Shikesho (2018) also found that among characteristics connected to the fetus, only low birth weight (2500g) was associated with stillbirth in her study on stillbirths in the Otjozondjupa region.

One of the most often studied causes of stillbirth is still the placenta, in particular placenta abruptio and placenta praevia (Litorp et al., 2015; Kaistha et al., 2016). Between 8.0 and 17.7% of stillbirths are attributable to placental issues (Lori et al., 2014; Ugwa & Ashimi et al., 2015).

2.4.4. Modifiable factors

Aminu (2017) employed the "three-delay" model, which was adapted from the WHO, to research the kinds of crucial delays and modifiable factors that contribute to intrapartum stillbirths.

The three delays are: delay 1: delay to seek health care, delay 2: delay to reach the health facility and delay 3: delay to provide care after arrival at the health facility (Aminu, 2017).

According to a study by Alyahya et al., (2021), 44.6 percent of deaths are thought to be the result of a delay in recognizing the need for care and making the decision to seek care (delay 1). The study concluded that most frequent causes were lack of awareness of when to seek care, failure to recognize a problem or warning signals, delayed or skipped antenatal care, financial constraints, and worry about the cost of care.

Delay 2 (delay in seeking care or reaching care) was found to be responsible for 3.4% cases. Delay 3 (delay in receiving care) was also found to be responsible for 30.7% deaths. The study also highlighted that some of the most common modifiable factors were the poor or lack of training that was followed by a heavy workload, insufficient staff members, and no antenatal documentation (Alyahya et al., 2021).

Aminu (2017) utilized cervical dilatation and fetal heart sound on admission as surrogates for late arrival at the healthcare facility in his study (first and second delays).

in addition, Aminu's study found that the state of the foetal heart sound was unknown to 15% of women who travelled from their homes at the time of admission and just 37% of the infants still possessed fetal hearts, the remaining 48% did not have a foetal heart sound on admission.

Furthermore, if the presence of a fetal heart sound at admission was taken into account as a proxy, it is likely that at least 48% of mothers who arrived late did so (Aminu, 2017).

In general, it can be said that the 22% of mothers who came at complete cervical dilatation were late because they were admitted when they were in active labour (cervical dilation of 4–9 cm). However, the accuracy of the results from the aforementioned proxies is primarily dependent on the reliability of the clinical evaluations (Aminu, 2017).

Alyahya et al. (2021) concluded that the formation of the facility-based death review committees was vital in identifying critical delays and modifiable factors, as well as developing initiatives and actions to address modifiable factors.

2.5. Strategies to reduce intrapartum stillbirths

Stillbirths are a major public health concern and a sensitive indicator of the quality of care around pregnancy and birth. Every New-born Action Plan (headed by UNICEF and WHO) and the UN Global Strategy for Women's, Children's, and Adolescents' Health (2016-2030), both called for an end to unnecessary stillbirths. Obtaining standardized assessment of stillbirth rates across nations is a first step in preventing stillbirths (Hug et al., 2021).

Omo-Aghoja et al., (2014) found that twenty-five to sixty percent stillbirths are reportedly not associated with an obvious cause. The study underlined the importance of knowledge on the causes and risk factors of stillbirths, highlighting that it will aid on designing appropriate preventive measures to reduce incidences.

Apart from the known deficiencies in labour care, attempts to improve the quality of care in low resource settings have also failed to address and integrate women’s birth experience into quality improvement processes (Oladapo et al., 2015).

The World Health Organization (WHO) has embarked on the Better Outcomes in Labour Difficulty (BOLD) project to improve the quality of intrapartum care in low- and middle-income countries. The main goal of the BOLD project is to reduce intrapartum-related stillbirths, maternal and new-born mortalities and morbidities by addressing the critical barriers to the process of good quality intrapartum care, and enhancing the connection between health systems and communities (Souza et al., 2015).

Oladapo et al., (2015) states that the project aims to accomplish this by creating two innovative service prototypes/tools: (1) an evidence-based, user-friendly labour monitoring-to-action decision-support tool (currently known as Simplified, Effective, Labour Monitoring-to-Action, or SELMA); and (2) innovative service prototypes/tools that are co-designed with users of health services (women, their families, and communities), as well as health providers, to encourage access to respectful, dignified, and emotionally supportive care for pregnant This two-pronged strategy is anticipated to have a favourable effect on key areas of healthcare quality that relate to both the delivery and experience of care (Oladapo et al., 2015).

By integrating SELMA and Passport to Safer Birth, the BOLD project is utilizing a cutting-edge strategy to improve the effectiveness of the care process inside the healthcare system while motivating the community to demand and use this improved care. The framework heavily references earlier conceptual models on social determinants of health, service quality, and skilled birth attendance (Maaloe et al., 2016, Munabi-Babigumira et al., 2017).

Within this framework, the WHO hypothesises that the quality of intrapartum care can be improved through the use of SELMA within facilities, by optimising labour

management and reducing unnecessary medical interventions and practices (Bohren et al., 2015).

WHO (2015) refers to a skilled birth attendant as a qualified health provider such as doctors, midwives and nurses, who have been prepared, skilled and trained, and are also regarded as experts and ready to bring about the change required in the reduction of intrapartum mortality. These qualified health care providers must also be capable of recognising, managing, and referring issues in mothers and new-borns There is significant evidence that neonates have a high likelihood of surviving in births attended by well-trained health personnel (Tura et al., 2013).

Al Kibria et al., (2017) proffer that the presence of skilled birth attendants (SBAs) is crucial in childbirth to reduce the perinatal mortality ratio and to achieve the new-born mortality target of the United Nations' Sustainable Development Goals (SDGs).

Hug et al. (2021) also suggest that a focus on closing data gaps in stillbirth rate statistics is required, particularly for sub-Saharan Africa and South Asia, to expedite progress in reducing stillbirths. The study also revealed that it has been difficult to understand the full burden of intrapartum stillbirths, which has made it difficult to take adequate action to prevent such mortalities.

Although information on intrapartum stillbirths is recorded in birth registers in most health facilities, in many countries, the appearance of the skin (fresh rather than macerated) is used as a surrogate marker for intrapartum stillbirth (Hug et al., 2021).

Namibia has not yet fully embarked on these strategies as they only adopted the recommendation in 2020 and currently the country is underway with trainings on the guidelines for the new recommendations. Full implementation is still to follow for the BOLD programme to be rolled out country wide.

2.6. Theoretical framework of the study

The theoretical framework of the caring process served as the study's foundation for delivering clinical care to mothers and new-borns during the intrapartum period. In order to reduce intrapartum stillbirths, a caring process that incorporates the nursing process, which included assessment, diagnosis, planning, implementation, evaluation, and record-keeping was used to care for mothers and new-borns.

Caring is a value-based concept in the nursing field. Esmaiel-Hajinezhad & Azodi, (2014) describes caring as a complex and highly subjective concept. The study further stated that Human Caring is seen as the origin and essence of nursing and it maintains human dignity in health care systems as a moral principle and measure of intervention and treatment. In other words, the ultimate goal of a nurse is quality caring of the patient and a high-quality caring is the right of all patients and a responsibility of all caregiver nurses.

The caring process includes nursing care interventions and medical treatment that are based on the concept of the nursing process which formed the theoretical framework of the study. The nursing process is the scientific instrument which enables heath care providers to render quality care.

According to Rivas et al., (2015), using the nursing process promotes reflective practice and the development of critical thinking. Simultaneously, possessing critical thinking abilities is necessary to apply the nursing process with methodological rigour and improving problem-solving in professional practice. Furthermore, the use of standardised nursing languages helps nurses to understand patients' needs with

precision and speed. It also helps to accurately name the problems of the patients through nursing diagnoses and facilitating the continuity of care between professionals by using a common language. In addition, the accurate use of nursing diagnoses facilitates the selection of more effective nursing interventions that lead to better outcomes.

A caring process consists of assessing care, planning care, implementing actions and evaluating the mother's and new-born's response to care. Thus, assessment, diagnosis, planning, implementation, evaluation and recording phases of the nursing process must be applied to the care of mothers and babies in order to minimise intrapartum stillbirths.

Assessment: Assessment is the first step of this caring process. It is applicable to the present study because if a doctor or a nurse/midwife monitors a mother in labour, conducts a delivery of a new-born, she/he is expected to observe this mother and the new-born and to determine their needs, problems and identify a problem. Toney-Butler & Thayer (2021) stated that in the assessment phase, a doctor or a nurse/midwife involves and collects information about the mother and this needs critical thinking skills in order to identify evidence of problems or risks for health problems

In this study, there was an assessment of objective data which was gained from the diagnostic observation made by the doctor and the nurse/midwife during history taking, vital signs, physical assessment and analysis of monitoring tools such as a the partograph, cardiotocographs (CTG) as well as sonars. Data was also obtained from

the mother's medical records (subjective data), and the health care team that worked with the patient.

Diagnosis: The second step in this caring process is diagnosis. Diagnosis is the judgment made based on the assessment data. Toney-Butler and Thayer (2021) define diagnosis as the formulation of a nursing diagnosis by employing clinical judgment to assist in the planning and implementation of patient care. However, a nursing diagnosis, according to NANDA, is defined as a clinical judgment about responses to actual or potential health problems on the part of the patient, family or community (Toney-Butler & Thayer, 2021).

In this study, diagnosis describes the condition of the mother as well as the baby's response during labour and upon delivery, by diagnosing complications before birth as well as the indications for instrumental or caesarean deliveries were used to justify medical and nursing interventions. Diagnosis of health needs is the basis for providing individualised care to both mother and baby.

Planning: According to Toney-Butler & Thayer (2021), planning stage is where goals and outcomes are formulated, that directly impact patient care, thus the doctor and the nurse/midwife have to plan according to the diagnosis made. These patient-specific goals and the attainment of such can assist in ensuring a positive outcome. Nursing care plans are essential in this phase of goal setting. Care plans provide a course of direction for personalised care tailored to an individual's unique needs. The overall condition and comorbid conditions play a role in the construction of a care plan. Care plans enhance communication, documentation, reimbursement, and

continuity of care across the healthcare continuum. The care plan should be specific to the health needs of the mother and baby.

In this study the planning of care was used to address the actual and potential problems that have been identified during the assessment phase to direct decision making as to what to be done next to the patient care. Decisions such as the type of delivery to be conducted such as spontaneous vaginal, instrumental or caesarean section deliveries come from the care plans and based on patient's condition.

Implementation: Toney-Butler & Thayer (2021) states that implementation is the step which involves action or doing, and the actual carrying out of nursing interventions as outlined in the plan of care. This phase requires nursing interventions such as observation, interpretation of data, direct or indirect care, medication administration, and the standard treatment protocols continuum which may include continuous assessment of change in the condition of the mother or baby

In this study, the actual implementation or action that was carried out to deliver the mother was considered as the implementation phase. The actual delivery whether it was a spontaneous, instrumental or caesarean section delivery as planned.

Evaluation: Toney-Butler & Thayer (2021) stated that this final step of the nursing process is vital for a positive patient outcome. Whenever a healthcare provider intervenes or implements care, he/she must reassess or evaluate to ensure that the desired outcome has been met. Reassessment may frequently be needed depending upon the overall patient condition. The plan of care may be adapted based on new assessment data

With regards to the present study, evaluation refers to the appraisal of the effectiveness of the management intervention that was given to the mother and her baby.

Record keeping: Record keeping is performed continuously from admission. Record-keeping is the process of making an entry or storing of information on patient records in order to promote and maintain patient safety (Taiye, 2015).

In this study, this is the adequate and complete recording of all activities that the health care providers have done on the mother and the foetus, during the intrapartum period. Therefore, the records of care given to a mother during labour, delivery and immediately after, should reflect the observation and interpretation of the data, and the provisional interventions that were implemented towards the management of the mother and baby as well as the outcomes.

2.7. Chapter summary

The relevant literature was reviewed and presented appropriately in this chapter. The literature study emphasized, from a global, sub-Saharan, and Namibian perspective, the factors associated to intrapartum stillbirths. The study thoroughly examined the common causes of intrapartum stillbirths, including maternal, obstetric, fetal, and modifiable factors. The nursing process, which served as the study's theoretical foundation, was also covered. Chapter 3 details the research design and methods used to research the problem.

CHAPTER THREE

RESEARCH METHODS

3.1. Introduction

In Chapter two, the literature review was conducted to contextualise the current study with the existing body of knowledge. This chapter describes and explains the research design and method used in this study. Aspects such as target population, sample and sampling, data collection instrument (the checklist), procedure for data collection, data analysis, validity and reliability and research ethics applied to the study are discussed.

3.2. Research design

According to Kumatongo & Muzata (2021), the quantitative approach entails a systematic, objective process with positivism roots that use deductive reasoning. Brink et al., (2018), describes positivism as a systematic research method which emphasises the importance of observable facts. Utilizing quantifiable and numerical data, quantitative design is empirical.

A quantitative research approach was chosen as the appropriate research method to gather, quantify and analyse the data. Quantitative approaches enable the researcher to enumerate data to enable the generalisation of the results from the sample to the population of interest (Houser, 2013). In addition, this study used factors that were observed rather than changed by the researcher. Conclusions are therefore founded on non-experimental, objective, and systematic observation.

This study was a descriptive, cross-sectional retrospective study to review intrapartum stillbirth cases that occurred between April 2016 and March 2019 at Windhoek Central

Hospital and Intermediate Hospital Katutura. The study employed the descriptive approach to determine the factors associated with stillbirth during intrapartum care.

A descriptive design was chosen as it could provide the researcher with information on patterns of intrapartum stillbirth's occurrences according to different characteristics about the causes which may suggest areas for analytical studies in the future. It was also useful in gaining knowledge in an area where there had been little investigation, which was the situation in this study.

In a retrospective study, the researcher studies events that have already occurred and have been recorded and have their explanation in the past (Houser, 2013).

In this study, events that had already occurred that led to intrapartum stillbirths were studied and analysed by auditing records of mothers whose babies had died during labour and delivery while the mother was admitted at the two hospitals in Windhoek, Namibia.

3.2.1. Population

The statistics indicate that between April 2016 and March 2019, there were 41232 deliveries and 613 stillbirths, 427 macerated, while 186 were fresh stillbirths which happened while the women were admitted (intrapartum) in Windhoek Central Hospital and Intermediate Hospital Katutura (MoHSS, 2019).

The target population in this study was all records N=186 (113 from Katutura Intermediate Hospital and 73 from Windhoek Central Hospital) of mothers who delivered intrapartum stillbirths in the two above mentioned hospitals during the period from 1 April 2016 to 31 March 2019. This period was selected because of the highest rates of intrapartum stillbirths recorded during this period.

3.2.2. Study setting

This study was carried out in Khomas region, in the Windhoek district, which is located centrally in Namibia. The region has two main public health facilities of which one is a national referral hospital and the other an intermediate hospital, where all deliveries from the public sector are supposed to be conducted in the region. According to the Namibian Statistics Agency, Namibia's 2011 population and housing census (2014) shows that Windhoek District has a total population of 342 141, with almost equivalent numbers of women and men, with a growth rate of 3.1% per annum in 2011, growing continually due to an influx of people from all over Namibia. There are 12 public health facilities (five primary healthcare clinics, three primary healthcare centres, and two main hospitals, of which one is an intermediate hospital and another national referral hospital for specialised care, then there are two rural clinics on the outskirts of Windhoek).

Windhoek Central Hospital, maternity ward (antenatal ward) has a capacity of six (6) beds for active labour, fifteen (15) beds for antenatal problems monitoring and management of complications, one (1) delivery room and two operating rooms. HCPs are currently at 23 Registered Nurses, 6 Enrolled Nurses, and the ward has two (2) intern medical doctors, stationed in the ward at all times, one for theatre, and one for the ward.

Intermediate Hospital Katutura maternity ward (antenatal ward) has a bed capacity of sixteen (16) beds, four (4) delivery rooms, and one (1) theatre. HCPs are currently at twenty-three (23) Registered Nurses in the unit, and two (2) medical interns.

Medical officers and obstetricians (specialists) are not stationed in the unit. However, they come to do rounds and attend to patients with emergencies when called in and anaesthetists are also not stationed at the units, but they are called in when there is an emergency.

3.3. Sample size and sampling

Sampling is the process of selecting elements of the population for inclusion in a research study (O'Leary, 2014). The study included all cases of stillbirths recorded in the two hospitals between the period under review. For this study, the sample were the same (186 patient records). Given the small sample of 186 records (113 from Katutura Intermediate Hospital and 73 from Windhoek Central Hospital) of patients whose babies died during intrapartum period or soon after, from April 2016 – March 2019, at the maternity units of the study hospitals, all 186 records were included in the study to ensure the validity of the data. According to Grove et al., (2015), for a smaller population, there is no need to sample, instead, it is recommended to survey the entire/population to reduce margin error.

3.4. Research instrument

A pre- tested standardized data collection tool (checklist) was utilised for data collection. The checklist was an audit and review of stillbirths and a neonatal review form that the researcher adopted and modified from the WHO (2016) and Aminu (2017). The tool comprised of six (6) sections. Section one (1) was to determine the information on the identification and demographic factors such as the name of health facility and the level of care available. Section two (2) examined the maternal factors such as age, employment status, marital status, and referral. Section three (3) looked at the obstetric factors in pregnancy such as parity, type of pregnancy, antenatal care attendance, and ANC interventions. Section four (4) looked at the obstetric factors during labour and birth such as gestational age, cervical dilatation on admission, reason for admission, and date and time of admission and delivery. Section five (5) looked at the foetal factors such as weight of baby's sex, Apgar score, etc. Section six (6) looked at the causes and modifiable factors

such as probable cause of death, delay to seek health care, delay to provide care after arrival at health facility, whether the right intervention was used and if there was inadequate monitoring.

3.5. Procedure for data collection

The maternity records of all mothers who delivered intrapartum stillbirths from April 2016 and March 2019 at Intermediate Hospital Katutura and Windhoek Central Hospital, Khomas region, were included in the study. Therefore, once the researcher obtained consent from all the required authorities, the archived maternity records of all intrapartum stillbirth cases under the period of review were retrieved from the respective hospitals by the researcher.

The researcher assessed the notes from recorded cases and filled out the checklists by extracting data from the 186 patients' maternity records. Documentary evidence documented on the management of the mothers and their babies during the intrapartum period and soon after delivery were collected in order to identify factors associated with intrapartum related deaths at the maternity units.

Data were collected in the maternity section, where all records of patients are kept under lock and key. No records were removed from the maternity section so as to maintain confidentiality. Data was collected over a period of four months (between May and August 2021)

3.6. Data analysis

Data from the checklists were analysed using the Statistical Package for Social Sciences (SPSS) Version 27. Descriptive statistics in the form of frequency distributions of study variables and it was presented in the forms of tables, graphs and pie charts to describe the characteristics of the health facilities, mothers and of the babies who died during the intrapartum period and soon after. Frequency distribution and percentages were also produced to identify the causes and to determine factors associated with intrapartum stillbirths. Furthermore, bivariate analyses in the form of Pearson Chi-Squares test of association were obtained to determine whether there exists a significant association between different demographic, maternal, ANC, obstetric and fetal characteristics and intrapartum stillbirth.

The magnitude and direction of the association were assessed using symmetric measures such as Cramer's V statistic. In addition, a probit model was fit to the data to predict the likelihood of a baby's condition at birth, given a set of predictor variables such as mother's place of residence, causes of baby's death, mode of baby's delivery, presentation, mother's age and gestational age.

3.7. Validity and reliability

The quality of a research instrument is indicated by its validity and reliability. According to Brink et al., (2018), the validity of an instrument is an indication of how well the instrument reproduces the abstract concept being examined, whilst reliability deals with the consistency of the measurement of this instrument.

3.7.1. Validity

Validity has to do with whether the items in the tool are representative of the content

domain that the researcher intends to measure (LoBiondo-Wood et al., 2013). In this study internal, content and face validity were ensured.

I**nternal validity** of the assessment tool: the audit tool in this study was pre-tested to confirm whether it would be able to collect data to meet the study objectives, for instance, intrapartum management and treatment given to the mother and baby was not clearly stated and changes were done accordingly.

Content validity was ensured by the extent to which the audit tool represented the full domain of the content related to phenomena associated to factors contributing to intrapartum stillbirths. Considering that this instrument was adopted and modified, a medical doctor who is an expert in obstetrics was consulted to check the extent to which the instrument would represent the full domain of the content of the phenomenon related to intrapartum stillbirths under investigation. The subject expert assessed the clarity, relevance and simplicity of the content of the instrument. The tool was tested on ten records (five from each hospital under study) before the actual study to ensure that all important areas of concern were reflected in it.

According to Brink et al., (2018), **face validity** refers to the extent to which an instrument looks as though it is measuring what it is supposed to measure. Face validity was ensured by supervisors checking if the instrument appeared to measure what it was supposed to measure; inputs were given and corrections were made accordingly.

3.7.2. Reliability of the instrument

Reliability refers to the dependability or repeatability of a measure (Brink et al., 2018). This is the consistency of the data collection instrument in producing similar results when

used on different occasions under similar circumstances. In this study, equivalence and internal consistency were maintained to ensure the reliability of the checklist for data collection.

Equivalence: Equivalence reliability was maintained by using the same checklist to all the patients' files (Grove et al., 2013).

Internal consistency: Internal consistency is assessing how well test items measure the test content and construct. Osborne (2013) reveals that a test should demonstrate temporal consistency (test-retest reliability) by producing similar results with the same participants over time. In this study, internal consistency was maintained through pre-tests on 10 maternal records (five from each hospital under study). The researcher and an independent assistant (nurse) reviewed these 10 records separately and compared the results. Both the researcher and the independent assistant obtained the same results.

3.7.3. Pre-test

Brink, et.al., (2018) states that researchers sometimes decide not to conduct a pilot study, but test only certain aspects, such as the data collection instrument. A pre-test is done to investigate for possible flaws in the instrument, such as ambiguous instructions or wording, inadequate time limits, as well as variables defined by operational definitions are actually observable and measurable.

For this study, the checklist used was adopted from WHO and Aminu (2017) and was modified by the researcher. The researcher then had to pre-test the checklist by using 10 records of mothers (five from Windhoek Central Hospital and another five from Katutura Intermediate Hospital) whose babies died during intrapartum period. The pre-tested

records were selected from a time period that was not covered by the study period and were excluded out of the main study. A pre-test was conducted in order to determine whether the required data could be obtained to identify and correct the inadequacies in the instrument and to note the time for completion of each patient`s record. Through the pre-test, it was established that it takes 30 minutes to complete-check one record of the case of intrapartum stillbirth respectively. Furthermore, documented information in each of the files was assessed against the standards of one checklist (Guest & Namey, 2015). Adjustments were made to the checklist regarding the clarity and arrangements of some items. Adjustments such as the number of visits of ANC was changed from, 4 or more, 3, 2 and 1, to 3 or more, 1 to 2 or none to align with the content in the maternity register.

3.8. Research ethics

Ethical considerations refer to moral principles that call for respect of the rights of research participants by the researcher. There are three fundamental ethical principles that guide researchers during the research process: respect for persons, beneficence and justice (Brink, et.al., 2018).

3.8.1. Permission and informed consent

Permission was obtained from the University of Namibia's Research and Ethics Committee. Furthermore, the researcher also acquired permission from the National Health Research Unit of the Ministry of Health and Social Services and the specific hospitals. Since no face-to-face interviews were conducted in this study, there was no need to obtain informed consent from the mothers whose maternal records were being reviewed. However, sensitive information about the patient was handled responsibly.

3.8.2. Respect of persons

Stillbirth is a traumatic event and to avoid stirring past traumatic memories related to the event, records were preferred instead of face-to-face interviews. Reporting was collective and no names or identifying information on the mothers were reported.

3.8.3. Confidentiality and anonymity

The study used available data in medical records of the study subjects. The research subjects' anonymity and confidentiality were maintained by replacing the identity with study codes. No names or physical addresses were collected or transferred from the patients' records onto the data collection tools or were reported. Results were presented in frequencies and proportions rather than individuals so as to safeguard anonymity. The study ensured that all the information obtained from the patients' records would not be disclosed to anyone other than the research supervisors and individuals involved in the research. Furthermore, the research tools used in this study were kept under lock and key in a cabinet to prevent unauthorized persons from getting access to the raw data.

3.9. Chapter summary

This chapter described the research design, methods and procedures followed in the study. A quantitative, descriptive and retrospective method was used to investigate factors associated with intrapartum stillbirths at the maternity units of the two hospitals. The study population, relevant data collection methods and process of data analysis were outlined. The principles of validity and reliability as well as the ethical issues that were taken into consideration during the research process were discussed and explained. The next chapter, namely Chapter four, presents the research results

CHAPTER FOUR

PRESENTATION OF THE FINDINGS OF THE STUDY

4.1 Introduction

In this chapter issues of presentation of the findings and interpretation of the research was discussed. Data were analysed descriptively by means of SPSS version 27 computer software. The purpose of this chapter is to present the results of the study and report the results objectively. The results of the checklist are presented according to the sequence of the sections in the instrument used for data collection.

The results presented are taken from a sample of 186 cases of intrapartum stillbirths that occurred between the 1st of April 2016 to the 31st of March 2019.

This chapter is divided into six (6) sections as follows: Section one (1) presents information on identification and demographic factors such as name of health facility and level of care available. Section two (2) presents the maternal factors such as age, employment status, marital status and referral. Section three (3) presents findings of the obstetric factors in pregnancy such as parity, type of pregnancy, antenatal care attendance, and ANC interventions. Section four (4) presents at the obstetric parameters such as gestational age, cervical dilation on admission, reason for admission, date and time of admission and delivery, and so on during labour and delivery. Section five (5) presents the foetal parameters like baby's sex weight and Apgar score. Section six (6) presents the reasons and circumstances that could be avoided or modified, such as the probable cause of death, the time it took to seek health care, the time it took to offer care after arriving at a health facility, and if proper action was employed and whether the partograph used for example, and if there was a lack of oversight.

4.2. Presentation of results

4.2.1. Section 1: Identification and demographic characteristics

4.2.1.1. Type of health facility

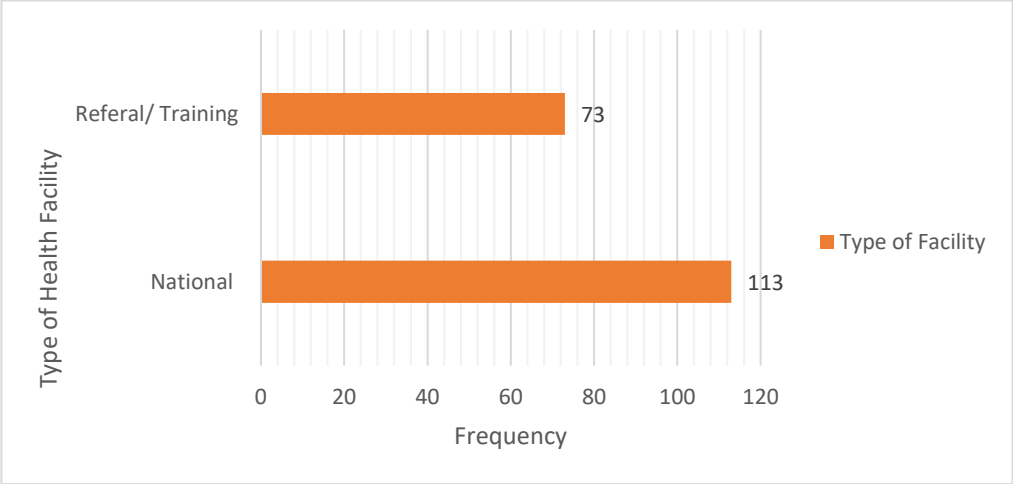

Figure 4.1: Type of health facility

The study was conducted in the two main facilities in the Khomas region and 60.8% (113) of mothers' records were obtained from the Intermediate Hospital Katutura which was classified as a referral or teaching health facility, whereas 39.2% (73) were from the Windhoek Central Hospital which was classified as a national health facility

4.2.1.2. Level of health facility

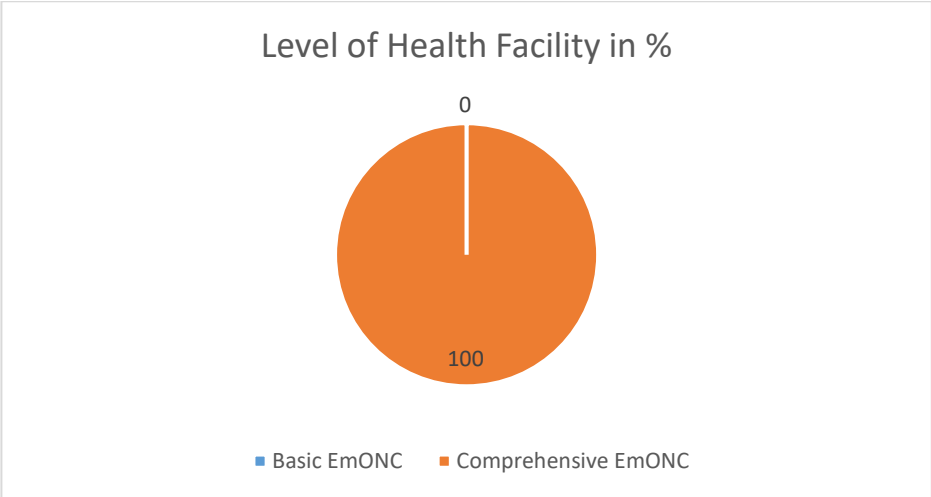

Figure 4.2: Level of health facility

Both facilities are comprehensive EmONC facilities

4.2.1.3. Helping Baby Breath (HBB) Facility?

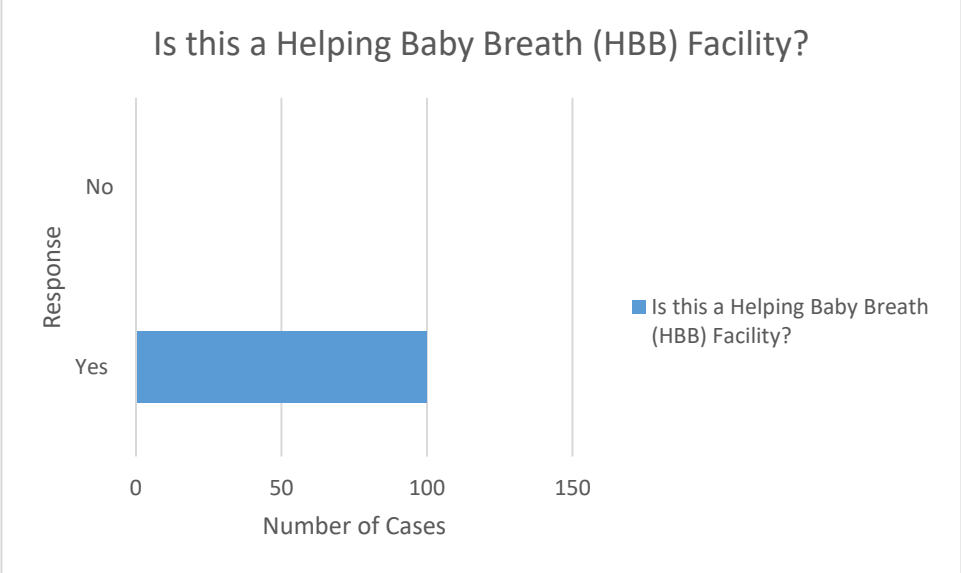

Figure 4.3: Helping Baby Breath (HBB) Facility

Both hospitals are classified as the Helping Baby Breath (HBB) facilities.

4.2.2. Section 2: Maternal characteristics

Maternal age and nationality

Maternal age was recorded in actual age. The average range of maternal age was 30. In this study, the youngest mother was 14 years of age whereas the oldest was 44 years old respectively. The mean age of the mothers was 29.78 years (SD = 6.6). All mothers were Namibian as the study did not record any mother who was a foreign national (see descriptive analysis on table 1).

4.2.2.1. Mother's place of residence

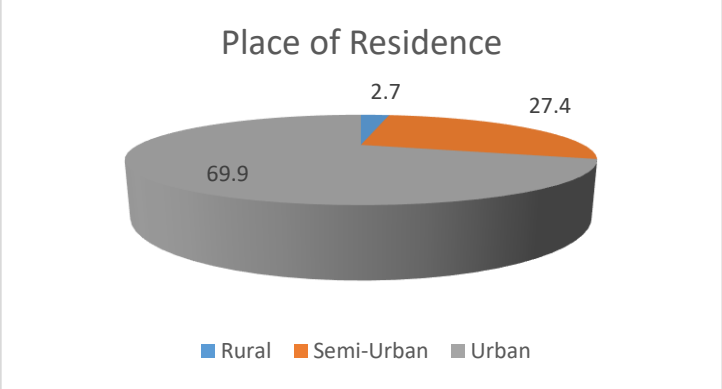

Figure 4.4: Mother's place of residence

The mother's place of residence was divided into 3 categories, namely, Urban, Rural and Semi-urban. The majority of the mothers (69.9%) lived in urban areas compared to a very few (2.7%) who lived in rural areas (on the outskirts of Windhoek or nearby farms), and 27.4 % lives in the semi urban which is the informal settlements of Windhoek.

4.2.2.2. Mother's employment status

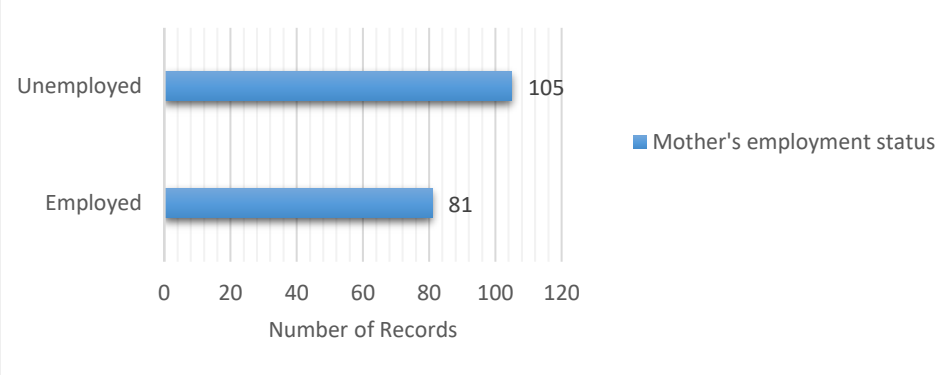

Figure 4.5: Mother's employment status

Mother's employment status was categorised into two groups as women who were employed and those who were unemployed.

The results showed that more than half of the mothers (56.5%) were unemployed, whereas 43.5 percent of the mothers were employed.

4.2.2.3. Mother's marital status

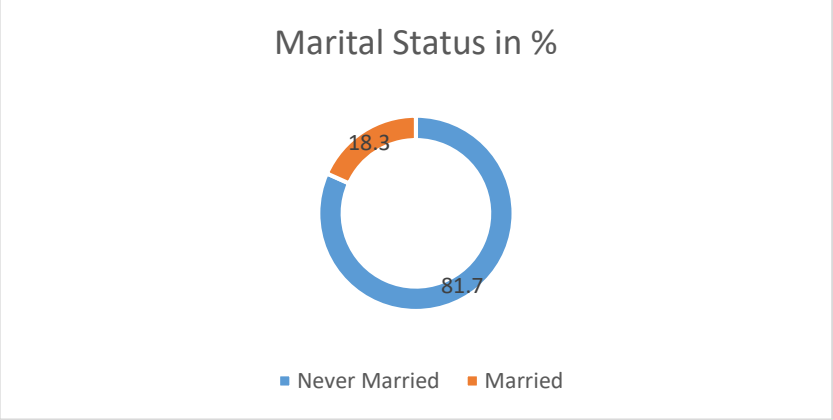

Figure 4.6: Mother's marital status

The participants were categorised according to their marital status, namely, Never Married, Married, Divorced and Widowed. The results revealed that 81.7% of the mothers were never married while 18.7% were married. There was no mother that indicated whether they were divorced or widowed.

4.2.2.4. Referral facility

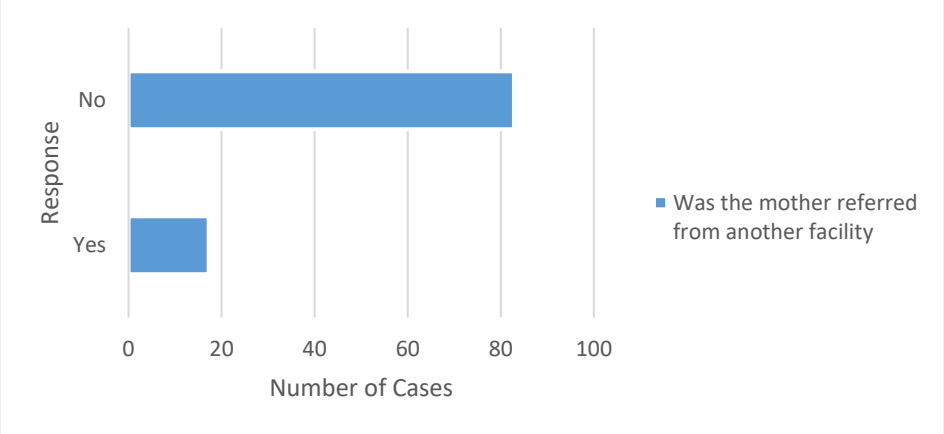

Figure 4.7: Referral status

The majority (82.8%) of the mothers arrived directly from home to be admitted into the facility for delivery, while 17.2% were referred from another health facility to either Intermediate Hospital Katutura or Windhoek Central Hospital.

4.2.3. Section 3: Obstetric characteristics in pregnancy

TABLE 4.1: OBSTETRIC CHARACTERISTICS IN PREGNANCY

Variables*	Frequency distribution	Percentage (%)
Type of Pregnancy		
Singleton	177	95.2
Multiple Gestation	9	4.8
Total	186	100
ANC Attendance		
Yes	142	76.3
No	44	23.7
Total	186	100
Number of ANC Visits		
1or 2	73	51.4
3 or more	69	48.6
ANC interventions (n=142 in attendance)		
Iron and Folate given		
Yes	142	100.0
Anti-Malaria prophylaxis		
Yes	1	0.7
No	141	99.3
Tetanus Toxoid given		
Yes	136	95.8
No	6	4.2
How Many Tetanus given		
TT1	8	5.9
TT2	10	7.4
TT3	9	6.6
TT4	7	5.1
TT5	91	66.9
Not indicated	11	8.1
Total	136	100.0

Variables*	Frequency distribution	Percentage (%)
HIV test done		
Yes	132	93.0
No	6	4.2
Known positive	4	2.8
If yes what was the HIV results		
Positive	23	15.9
Negative	122	84.1
If positive any Treatment		
On ART less than 4 weeks	2	9.1
On ART more than 4 weeks	12	54.5
Not given	1	4.5
Not indicated	7	31.8
Total	22	100.0
If no HIV test was done, ANC Attendance?		
Yes	6	17.6
No	28	82.4
Total	34	100.0
Syphilis test done		
Yes	142	100.0
Syphilis test Results		
Positive	1	0.7
Negative	102	70.8
Pending	41	8.5
Rhesus blood group checked		
Yes	141	99.3
No	1	0.7
Result		
Positive	93	65.0
Negative	5	3.5
Pending	45	31.5
Total	143	100.0

Variables*	Frequency distribution	Percentage (%)
Conditions present during this pregnancy and before onset of labour (n=186)		
Antepartum Haemorrhage		
Yes	40	21.5
No	146	78.5
Total	143	100.0
IF APH IS YES, THEN MENTION TREATMENT		
C/SECTION	3	7.5
SPONTANEUS VAGINAL DELIVERY	37	92.5
Hypertensive disorders		
Yes	17	9.1
No	169	90.9
Diabetes Mellitus		
No	185	99.5
Yes	1	0.5
Total	143	100.0
Premature rupture of membranes		
Yes	6	3.2
No	180	96.8
Anaemia		
No	186	100.0
Urinary tract infection		
Yes	4	2.2
No	182	97.8
Trauma		
No	186	100.0
Others specify		
Polyhydramnios	1	0.5
Premature labour	3	1.6

Mother's gravidity, parity and number of living children

The mother's parity and number of living children was recorded in actual number. The results showed that on average each mother was a gravida 3, with the highest gravidity being 9. The range in the mother's parity was 7. The minimum parity was 0 and the maximum was 7 as recorded in this study. The mean was 1.63 with a standard deviation of 1.39. Furthermore, the range on the number of living children was 7. The minimum number of children the mothers had was 0, whereas the maximum was 7. The mean average was 1.60 with a standard deviation of 1.34 (See Figure 1).

Type of pregnancy

Type of pregnancy was classified as singleton or multiple gestation. Multiple gestation included women pregnant with more than one foetus, while the singleton included women pregnant with only one foetus.

A majority (95.2%) of the pregnancies were singleton, whilst 4.8 % were multiple gestation.

Antenatal care (ANC) attendance

Antenatal care attendance was determined based on whether a mother attended any antenatal care (ANC) visits during which she received a clinical examination, counselling, tests and medication (if needed) from a skilled provider as per the guidelines. ANC was categorised into three groups as those who attended one or two ANC visits, those who attended three or more ANC visits and those who did not attend any ANC at all.

Out of the 186 cases in this study, almost one quarter at 44 (23.7%) of the mothers did not attend the ANC or were documented as un-booked, whereas 142 (76.3%) attended one (1) or more ANC visits.

Out of the of the mothers who attended the ANC, less than half (48.6%) of them attended three or more ANC visits during the pregnancy period, whereas 51.4% attended at least one or two ANC visits.

Antenatal care (ANC) interventions

All the mothers (100%) who attended the ANC were given iron and folate supplements during the visit(s). Less than 1% (0.7%) of the mothers who attended the ANC were given anti-malaria prophylaxis and this was a referral from outside of Khomas region (antimalarial treatment was not part of their antenatal care programme because the Khomas region is not deemed malaria endemic).

Nearly 5% (4.2%) of the mothers who attended the ANC were not given tetanus toxoid and 95.8% received a tetanus toxoid vaccine. Of those who were given tetanus toxoid, at least two thirds (66.9%) received TT5 doses. Tetanus vaccination was evaluated to see if antenatal services were complete, despite the fact that it was not directly associated to stillbirth.

HIV screening is by far the most commonly administered prenatal care intervention among the patients evaluated, with almost 90% coverage across the country. Overall, 93% of the mothers who attended the ANC visit(s) were tested for HIV. Of the mothers whose HIV test results were positive, 54.5% were on ART for more than 4 weeks. Out of the respondents who were not tested for HIV, 82.4% of them did not attend ANC. All the mothers 142 (100%) who attended the ANC visit(s) were screened for syphilis.

Out of the mothers who were tested for Syphilis during the ANC visit, only less than 1% had a positive result and did not receive any treatment, whereas 70.8% of them had a negative result while 28.5% had pending results.

Nearly all (99.3%) of the mothers who attended the ANC had their rhesus blood group checked and 65% of the mothers who were tested for rhesus blood group were positive, while 31.5% of the results were pending, and two mothers had their Rhesus results recorded from previous tests.

Conditions present during this pregnancy and before onset of labour

Antepartum haemorrhage (APH) was defined as vaginal bleeding prior to the onset of labour. This was categorised into two groups as those having any antepartum haemorrhage or none.

Out of all the records (186) admitted into the two facilities, 21.5% of the mothers had antepartum haemorrhage. Despite the fact that all women with APH were admitted to the hospital, only three (7.5%) had records of active intervention, such as blood transfusions and Caesarean sections. The remaining 37 (92.5%) patients who had no history of active intervention after admission were given the option of continuing with normal labour and giving birth via spontaneous vaginal delivery. There were 142 (80.2%) admissions with foetal heart sound present, 23 (13%) admissions with absent foetal heart sound, and 12 (6.8%) admissions where foetal heart sound was not examined. As for the remaining 9, it was not documented whether they had a foetal heart sound or not.

Hypertensive disorder in pregnancy was defined as a maternal diastolic blood pressure of 90 mmHg or more in two consecutive assessments, which were at least four hours apart during pregnancy. This included pregnancy induced hypertension, Pre-eclampsia and eclampsia, and this was categorised as those having the condition in the current pregnancy or not.

A total of 17 (9.1%) mothers have experienced a hypertensive disorder, whereas only 4 (2.4%) of the hypertension cases were found to have documented evidence of treatment.

Diabetes mellitus is a disease in which the body's ability to create or respond to the hormone insulin is impaired, resulting in improper carbohydrate metabolism and high blood glucose levels. Only one (0.5 percent) mother had hypoglycaemia, and she had been diagnosed with diabetes previous to the pregnancy.

All mothers had their haemoglobin levels measured at admission and at ANC to rule out anaemia (Hb>7 gm/L), but none of them were found to be anaemic. Similarly, although it was not a routinely tested diagnosis, there were fewer incidences of urinary tract infection (UTI), 4 (2.2 percent).

Only 6 (3.2%) of the mothers experienced a pre-labour rupture of the membrane (PROM) during their pregnancies and before onset labour. No epilepsy or trauma *(due to accident or gender-based violence)* was experienced by pregnant mothers during pregnancy and before the onset of labour.

4.2.4. Section 4: Obstetric characteristics during labour and birth

TABLE 4.2: OBSTETRIC CHARACTERISTICS DURING LABOUR AND BIRTH

Variables*	Frequency distribution	Percentage (%)
Place of delivery		
Health Facility	178	95.7
Born before arrival (BBA)	8	4.3
Total	186	100
Attendant at delivery		
Registered Nurse/Midwife	93	50.0
Enrolled Nurse/Midwife	4	2.2
Medical officers	79	42.5
Medical intern	1	0.5
Non-medical person	9	4.8
Total	186	100
Onset of labour		
Spontaneous	159	85.5

Variables*	Frequency distribution	Percentage (%)
Induced	8	4.3
C/S before onset	19	10.2
Total	186	100
On Admission was foetal sound present		
Yes	142	80.2
No	23	13.0
Not assessed	12	6.8
Total	186	100
Was partograph used		
Yes	80	45.2
No	97	54.8
Total	177	100.0
If yes Was partograph used correctly		
Yes	47	71.2
No	19	28.8
Total	66	100.0
Any obstetric complications		
No	8	11.9
Yes	59	88.1
Total	67	100.0
Foetal Presentation		
Cephalic	158	85.9
Breech	22	12.0
Other	6	2.2
Total	186	100.0
Mode of delivery		
Spontaneous vaginal delivery	117	62.9
Caesarean Section	63	33.9
Vacuum	5	2.7
Indications for instrument/caesarean delivery		
Severe PET	3	5.2
Placenta Abruptio	18	31.0
Prolonged 1st Stage	1	1.7

Prolonged 2nd Stage	2	3.4
Foetal Distress	16	27.6
Others	18	31.0
Total	58	100.0
Time between decisions for CS Instrumental and actual delivery		
Less than 30 minutes	6	9.7
Between 30 minutes – one hour	25	40.3
Greater than one hour	30	48.4
Not documented	1	1.6
Total	62	100.0
Mother outcome		
Alive	183	98.4
Died	3	1.6
Total	186	100
ANY MORBIDITY?		
No	50	84.7
Yes	9	15.3
Total	59	100.0

Gestational age and cervical dilatation on admission

Gestational age was recorded in actual weeks while cervical dilatation on admission was measured in centimetres. The lowest gestational age was 28 weeks and the highest was 41 weeks. The mean was 34.37 whereas the standard deviation was 4.092. Moreover, the minimum cervical dilatation on admission was 0 and the maximum was 10. The mean was 6.76 while the standard deviation was 2.894, respectively (See Figure 1).

Place of delivery

The results also showed that 95.7% of the babies were delivered at a health facility whilst only 4.3 % were born before arrival to the health facility.

Attendant at delivery

Attendants at delivery were classified as Registered Nurse/Midwife, Enrolled Nurse/Midwife, Medical officer, Medical intern, Non-medical person (this refers to where deliveries were done at home or enroute to the health facilities by community members). Half (50%) of the babies were delivered by a registered nurse/midwife, whereas 42.5% and 4.8% were delivered by medical officers and non-medical personnel respectively.

Onset of labour

The onset of labour was classified into three categories such as spontaneous, induced, and C/S before onset. The results show that 85.5% of the mothers had spontaneous onset of labour, 4.8 % was induced and the rest (10.2%) went for C/S before onset of labour.

Fetal sound on admission

Upon admission, 6.7% of the pregnant mothers were not assessed at all for a foetal sound whereas 13% experienced a complete absence of foetal sound. However, 80.2% of mothers came in with a foetal heart sound which indicates that the foetus died during intrapartum care.

Use of partograph

The results showed that partograph was not used on 54.8% of the pregnant mothers, whilst only 45.2% were used. Moreover, 4.8% were missing systems as there was no partograph opened on the mother's record. Out of the 97 (54.8%) records which indicated that partograph was used, 71.2% of these was used correctly, whereas, 28.8% indicated that it was not used correctly.

Obstetric complications

Obstetric complication during delivery was defined as any complication that a woman had during the intrapartum period, including: *Hypertensive disorder*, classified by maternal diastolic blood pressure greater than or equal to 90 mmHg in two separate recordings; *Antepartum haemorrhage* characterised by either placenta previa or abruptio; *Mal-presentation (Presentation* of the foetus in any position besides cephalic, i.e. with the top of the head appearing first); *Prolonged labour* (1^{st} or 2^{nd} stage of labour*)*, and *Obstructed labour*.

The results showed that 8.1% of the pregnant mothers experienced some obstetric complications during labour and birth, whereas 11.9% did not experience any complications during the intrapartum. The rest were not indicated whether they had any complications.

Presentation

Presentation was categorised as cephalic, breech or other, which could be transverse or oblique. Cephalic presentation during labour and birth was most common (85.9%) amongst the mothers, followed by breech (12%), and the rest were either oblique, transverse or not indicated.

Mode of delivery

Mode of delivery was categorised as spontaneous vaginal delivery, caesarean section or instrumental deliveries such as vacuum or forceps delivery. Most (62,9%) of the babies were delivered via spontaneous vaginal delivery without assistance, where as 33.9% were

delivered through the caesarean section. Only 2.7 percent of babies were delivered by suction, indicating that aided instrumental vaginal delivery was not widely used.

Indication(s) for instrumental / Caesarean delivery

The study found that the most common indication for caesarean section was placenta abruptio, which accounted for 31.0% of all the emergency deliveries. This was followed by foetal distress with 27.6%, severe pre-eclampsia with 5.2%, prolonged 1st stage with 1.7%, prolonged 2nd stage with 3.4%, and others, which included cord prolapse, elective caesarean sections due to foetal abnormalities, post-dates and some indications were not specified on the consent form or in the records which accounted for 31.0%.

Time between decisions for C/S or instrument and actual delivery of the baby

Only 2.7 percent (5) of the mothers had a vacuum delivery, whereas 33.9 percent (63) had a Caesarean section. The study found that 46.4% of the time between C/S or instrument decisions and actual deliveries is longer than one hour, whereas 40.3 percent of the time is between 30 minutes and one hour. Only 9.7% of the sessions lasted fewer than 30 minutes.

Mother's Outcome

Out of all the 186 mothers who were delivered at the two hospitals, 98.4% (183) of them were alive after giving birth. However, 1.6% (3) of the mothers demised. The study also found that 15.3% of the mothers suffered from some form of morbidity such as hysterectomy after a ruptured uterus, post-partum haemorrhage, multiple tears from the use of instruments or from difficult deliveries and this was shown to increase the hospital stay for these mothers.

4.2.5. Section 5: Fetal characteristics

TABLE 4.3: FETAL CHARACTERISTICS

Variables*	Frequency distribution	Percentage (%)
Sex		
Female	102	54.8
Male	81	43.5
Ambiguous Genitalia	3	1.6
Total	186	100.0
Baby condition at birth		
Alive	37	19.9
Fresh SB	149	80.1
If born alive –Follow-up question to baby's condition at birth		
Kept with Mother	1	4.8
Referred	20	95.2
Total	21	100.0
Time Interval within which the baby died-–Follow-up question to baby's condition at birth		
Same day but no time interval specified	20	71.4
Same day within 2 hours	3	10.7
Same day after 2 hours	5	17.9
Total	28	100.0
Any congenital anomaly noted		
Yes	23	12.4
No	163	87.6
Resuscitation attempted with Ambubag		
Yes	124	66.7
No	62	33.3
Condition of Placenta		
Normal	125	72.3
Placenta Abruption	43	24.9
Enlarged Placenta	2	1.2
Placenta sent for histology	3	1.7

Variables*	Frequency distribution	Percentage (%)
Condition of Umbilical Cord		
Normal	163	94.2
Cord around the neck	3	1.7
Cord Prolapse	5	2.9

Weight of the baby

The baby's weight was measured in kilogrammes. On average, the study revealed that each baby weighed 2.082 kg. The lowest weight of the baby was 0.805kg and the highest was 4.200kg, whereas the standard deviation was 0.88.

Sex

The study found that the majority 54.8% (102) of the babies were females, whereas the males were only 43.5% (81). However, there was a small number of ambiguous genitalia (where the sex of the baby could not be determined because of severe deformity) where 1.6% (3) accounted for the rest of the babies.

Baby's condition at birth

The study revealed that 80.1% of the babies delivered were fresh stillbirth, whereas 19.9% were born alive and died soon after or within 24 hours of birth, due to complications during labour and delivery. The study also showed that 95.2% of the babies born alive were referred to the prem unit after delivery, whereas only 4.8% was kept in the ward with the mother.

The study indicated that some babies 71.4% died on the same day they were born. However, the time interval was not specified, whereas 17.9% and 10.7% died on the same day within 2 hours and same day after 2 hours respectively.

Congenital abnormalities at birth

The study also found that 12.4% of the babies had congenital abnormalities, whereas the rest did not have any congenital abnormalities.

Resuscitation attempted with Ambubag

The study indicated that 66.7% of the babies delivered were noted to have been resuscitated after birth, where as 33.3% were not resuscitated.

Placenta and umbilical cord condition

The study revealed that 72.3 % of the mothers had a normal placenta after delivering their babies, while 24.9% experienced placenta abruptio.

It was also found that 94.2 % of the babies had a normal umbilical cord after delivering their babies, while 1.7% was found to have had a cord around the neck, whilst the cord prolapse rate was 2.9%, and for two patients, the placenta was sent for histology due to some abnormalities which were noted.

4.2.6. Section 6: Causes and modifiable characteristics

TABLE 4.4: CAUSES AND AVOIDABLE/MODIFIABLE CHARACTERISTICS

Variables*	Frequency distribution	Percentage (%)
Most Probable Cause of Death		
Asphyxia	75	51.0
Prematurity	12	8.2
Placenta Abruptio	34	23.1
Multiple Congenital Abnormalities	11	7.5
Others	15	10.2
Total	147	100.0
Delay to seek health care		
Yes	54	29
No	132	71.4
Total	186	100.0
Delay to reach the health facility		
Yes	66	35.5
No	120	64.5
Delay to provide care after arrival at health facility		
Yes	32	17.2
No	154	82.8
Were instructions guidelines and or protocols followed		
Yes	129	69.4
Was the right intervention used?		
Yes	106	57.0
No	80	43.0
Was relevant and adequate documentation made		
Yes	112	60.5
No	73	39.5
Total	185	100.0
No	57	30.6

Most probable cause of death

Over half of the new-borns, 51% died as a result of suffocation, according to the most likely cause of stillbirth assigned by healthcare providers (HCPs) in the maternal record. Placental diseases (primarily antepartum haemorrhage as a result of placenta abruptio and others) were the second most common cause of stillbirth with 23.1%, followed by preterm 8.2% and various congenital abnormalities 7.5% (which included anencephaly, hydrocephalus, spina bifida).

Late arrival at facility (1st and 2nd delays)

Delay to seek health care

Cervical dilatation on admission was utilised as a proxy for being late to the hospital. Only 45% (84) of the 186 mothers in this study had a record of vaginal examination on admission, whereas the remaining 55% (102) did not have a record of vaginal examination on admission or were not eligible for one.

This group's cervical dilatation data revealed that 13.1% (11) were admitted in early labour, while the remaining 86.9% (73) were admitted in active labour. The median cervical dilatation, which was 6.76, was calculated, with a standard deviation of 2.894, as stated in table 1. It's worth noting that nearly a third of the mothers (29.8%) came to the clinic with a full cervical dilatation of 10 cm or a head on perineum.

Delay to reach the health facility

On admission, the foetal heart sound was used as a proxy for late arrival at the health facility. Mothers referred from other facilities who may have arrived late due to referral delays were also included in this phase of the analysis. Other facilities referred 32 (17.2%) of the patients, whereas 154 (82.8%) came from home.

Furthermore, 4.8 percent (9) of the 186 women admitted did not have information about the status of the foetal heart sound at the time of admission. A foetal heart was found in 80.2% (142) of the cases. The foetal heart sound of their kids was missing in 13% (23) of the cases when they were admitted.

Delay to provide care after arrival at health facility (3rd delay)

Two proxies were used to estimate delay at the health facility:

1. The time between admission and delivery; and

2. the time between the decision to have a Caesarean section and the actual delivery. The time between admission and birth is referred to as the "interval." A total of 171 people (91.9%) had their admission and birth time recorded. Women admitted with cervical dilation of less than 4 cm were excluded from this analysis to eliminate cases of misdiagnosis of labour. As a result, there were a total of 73 cases in this section.

As a result, the interquartile range (IQR) and median were determined instead. All women admitted with a cervical dilatation of 4 cm or more had a median duration between admission and birth of 95 minutes (or 1 hour, 35 minutes). Time between decision for Caesarean section/instrumental delivery and actual birth show that 48,4% of the durations between decisions for CS/instrumental and the actual deliveries exceed one hour, where as 40.3% of the durations lie between 30 minutes and one hour. Only 9.7% of the durations were less than 30 minutes.

About 30.6% of the pregnant mothers were not subjected to proper instructions, guidelines and protocols upon arrival at the health facilities. Following a request for recommendations for the management of significant conditions that contribute to stillbirth, HCPs agreed that the lack of clear management guidelines available to staff influenced the management of 30% of all cases.

On arrival at the health institutions, 43% of expectant moms were not given the appropriate interventions. Mothers were handled utilising at least one incorrect intervention at some point during the case management according to the records. Stillbirth case files were examined for completeness and accuracy of information needed to determine the cause of death or assess care quality, and 40 percent were found to be incomplete, erroneous, or both.

Figure 4.8. Descriptive statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Maternal age	186	30	14	44	29.63	6.611
Gravida	186	8	1	9	2.83	1.499
Para	186	7	0	7	1.63	1.389
Number of living Children	186	7	0	7	1.60	1.384
Gestational age (in Weeks)	182	14	28	41	34.34	4.093
Cervical dilatation on admissions (in cm)	84	10	0	10	6.76	2.894
Weight of the baby (in kg)	186	3.695	.505	4.200	2.08177	.880989
Apgar score at 1 minute (out of 10)	183	9	0	9	.83	1.738
Apgar score at 5 minutes (out of 10)	184	10	0	10	.71	1.819
Apgar score at 10 minutes (out of 10)	170	10	0	10	.35	1.369
Valid N (listwise)	74					

Figure 4.9. Descriptive Statistics on time difference

	N	Interquartile Range	Minimum	Maximum	Mean	Median (in minutes)	Std. Deviation
TIME DIFFERENCE IN MINUTES	69	255	0	1883	265.261	95	385.8749
Valid N (list wise)	69						

4.3. Bivariate analysis on factors associated with intrapartum stillbirths

The Appendices F-J present the bivariate analysis on the factors associated with Intrapartum stillbirths among women who delivered at Intermediate Hospital Katutura and Windhoek Central Hospital. These appendices show that in bivariate logistic regression analysis, the following factors were significantly associated with intrapartum stillbirth: Multiple congenital abnormalities, the delay to provide care after arrival at a health facility and placenta abruptio.

The mother's place of residence, the baby's condition at birth, recorded probable causes of death, attendance at ANC visits, indications for instrumental/caesarean delivery, and the interval between those decisions and the actual delivery were not found to be significantly associated with intrapartum stillbirths in this study.

4.3.1. Association between place of residence and baby condition at birth crosstabulation

Appendix D, presents the association between the place of residence and the condition of the baby at birth. For this analysis, the place of residence was classified into three categories, namely: Rural (Village outside Windhoek) and Urban (Town/within the suburbs) and Semi-urban (Shacks/informal settlements).

The analysis revealed that there is no evidence of a significant relationship (p-value = 0.497 > 0.05) between the mother’s place of residence and the baby’s condition at birth cross tabulation.

4.3.2. Association between recorded probable causes of death and ANC attendance crosstabulation

Appendix E, presents the association between the recorded probable causes of death and ANC attendance crosstabulation. The recorded probable cause of death that was analysed included asphyxia, prematurity, placenta abruptio, multiple congenital abnormalities and others (which included respiratory failure, ruptured uterus, intra-cranial bleeding, cord prolapse, meconium aspiration and PET). The study revealed that there was no evidence of a significant relationship (p-value = 0.167 > 0.05) between recorded probable causes of death and ANC attendance cross tabulation.

4.3.3. Association between indications for instrument/caesarean delivery and time between decisions for Caesarean Section or instrumental and actual delivery crosstabulation

Appendix F, presents the association between indications for instrument/caesarean delivery and time between decisions for C/S or instrument and actual delivery crosstabulation.

The indications for instrumental delivery and caesarean section where severe PET, placenta abruptio, prolonged 1st stage, prolonged 2nd stage, foetal distress and others (such as cord prolapse, elective caesarean sections due to foetal abnormalities, post-dates, and some indications were not specified on the consent form). Time between decisions for C/S or instrumental and actual delivery was categorised as less than 30 minutes, between 30 minutes to one hour, greater than one hour or it was not documented.

The analysis in the study revealed that there was no evidence of a significant relationship (p-value = 0.642 > 0.05) between indications for instrument/caesarean delivery and the time between decisions for C/S instrument and actual delivery cross tabulation.

4.3.4. Association between recorded probable causes of death and any congenital abnormalities noted cross tabulation

Appendix G, presents the association between recorded probable causes of death and any congenital abnormalities noted cross tabulation. The recorded probable cause of death was asphyxia, multiple congenital abnormalities, placenta abruptio, prematurity and other causes.

The results revealed that there is evidence of a significant relationship (p-value < 0.005, the Pearson Chi-Square value = 97.915 based 4 degrees of freedom) between the probable causes of death and whether or not any congenital abnormalities were noted. The babies who experienced any congenital abnormalities were more likely to die as a result of multiple congenital abnormalities (60.9%) compared to those who had asphyxia (17.4%), prematurity (4.3%), placenta abruption (8.7%), and other causes of death (8.7%).

Symmetric measures

The symmetric measures determine the strength or magnitude of the association/relationship between the two categorical variables. Cramer's V value = 0.729 (p-value < 0.001) which indicates that there is a strong and positive association between the probable causes of death of the babies and whether or not any congenital abnormalities were noted.

4.3.5. Association between mode of delivery, and if APH was present, what was the choice of treatment cross tabulation

The researcher further analysed the association between the mode of delivery and if they had APH, and what treatment option they had? Despite the fact that all women with APH were admitted to the hospital, only 7.5% (3) had records of active intervention, such as blood transfusions and caesarean sections. There were 92.5% (37) of the remaining patients who had no record of active intervention after admission.

As a treatment option, they were permitted to proceed with regular labour and give birth via spontaneous vaginal delivery. Of the mothers who were recommended for spontaneous vaginal delivery, 48.6% actually went on to deliver via emergency caesarean section.

4.3.6. Association between time between decisions for caesarean section/ Instrument and actual delivery and the delay to provide care after arrival at health facility cross tabulation

Out of all the records in the study, 33.9% (63) delivered by caesarean section and 2.7% (5) by vacuum delivery. Furthermore, 48,4% of the durations between decisions for CS/instrumental and the actual deliveries exceed one hour, where as 40.3% of the durations lie between 30 minutes and one hour. Only 9.7% of the durations were less than 30 minutes.

Upon further analysis, the study found that there was evidence of a significant relationship (p-value = 0.007, Pearson Chi-Square value = 12.055 based on 3 degrees of freedom) between the time of decisions for C/S or instrument delivery and actual delivery and the delay to provide care after arrival at health facility. Whereas, 24.2% of the respondents indicated that there was a delay to provide care after arrival at health facility.

Furthermore, the delay by more than one hour of the time between decisions for C/S or instrumental and actual delivery to provide care after arrival at the health facility is more likely to occur (86.7%), compared to mothers who waited for less than 30 minutes (6.7%) and between 30 minutes and one hour.

Symmetric measures

The Cramer's V statistic = 0.441 (p-value = 0.007) indicated a moderate positive association between time of decisions for C/S or instrument delivery and actual delivery and the delay to provide care after arrival at the health facility.

Goodness of fit

The ratio of the deviance value and its degrees of freedom = 1.034, while that of a Pearson Chi-square to its degrees of freedom = 1.098. Both ratios indicate that the data fits the probit model well.

Omnibus test

The omnibus test compares the fitted model (that is, the model containing a set of predictors) with null model (that is, the intercept only model). The results based on the Likelihood ratio Chi-Square value = 82.001, degrees of freedom = 14 and p-value < 0.001 show that the fitted model represents an improvement in fit over the intercept only model.

4.4. Parameter estimates

The results of the model effects show that only the probable causes of death of babies was found to be a significant predictor (Wald Chi-Square statistic = 9.903, degrees of freedom = 4, p-value = 0.042) of the likelihood of whether a baby is born alive or stillbirth before birth, during birth or after birth. There was no sufficient evidence that the mother's place of residence, mode of baby delivery, presentation of a baby, mother's age and gestational age had a significant effect on the likelihood of whether a baby is born alive or stillbirth (p-values = 0.328, 0.654, 0.948, 0.479 and 0.801 respectively all greater than 0.05).

After the probit model was fit to predict the likelihood of a baby born alive (with stillbirth being a reference category) given that the mother of a baby experiences a placenta abruption before birth. The value of the estimate (placenta abruption) B = -1.315 with a standard error of the estimate B = 0.4485, 95% Wald confidence interval for parameter B = [-2.194; -0.436], Chi-Square = 8.597 degrees of freedom, p-value = 0.003, Exp(B) = 0.268, 95% Wald confidence interval for the parameter contrast Exp (B) = [0.111; 0.647]. The value of the estimate B = -1.315 shows that babies whose mothers experience placenta abruptio were less likely to be born alive compared to those who experienced asphyxia, prematurity, multiple congenital abnormalities and other complications which may lead to the death of babies before birth, during birth or after birth.

Overall, the value of Exp(B) = 0.268 indicates that if the mother of a baby experiences placenta abruptio before the birth of a baby, then the probability that a baby will be born alive is 0.268 (that is only about 27 out of 100 babies will be born alive while the remaining 73% of the babies will be stillbirth), whereas the probability that a baby will be a stillbirth is 0.732 given that a mother experienced placenta abruptio before birth.

4.5. Chapter summary

This chapter presented the findings on the factors associated with intrapartum stillbirths. The results presented the identification and demographic factors, maternal factors, obstetric factors in pregnancy, obstetric factors during labour and birth, foetal factors and causes and avoidable/modifiable factors. The findings on the bivariate analysis on factors associated with intrapartum stillbirths and parameter estimates concluded the chapter. The next chapter presents the discussions, conclusions, recommendations and limitations of the study.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Introduction

The results of the maternity records reviews of 186 cases of intrapartum stillbirths between April 2016 and March 2019 were presented in the previous chapter. The Windhoek Central and Intermediate Hospital Katutura in Namibia's Khomas region served as the site of this retrospective, quantitative, descriptive study to evaluate the factors that contribute to stillbirth during intrapartum care as well as to identify areas of care that would require action at different levels to improve maternal and new-born health.

As the study was founded on the theoretical framework of the caring process as a guideline for providing clinical care to mothers and babies during the intrapartum period, the discussion of the results was presented in relation to the existing body of literature and in accordance with the nursing process (assessment, planning, implementation, and evaluation).

5.2. Discussion of results

The first section presents the discussions of the findings according to the assessment phase of the nursing process.

5.2.1. Assessment

The discussion under the assessment presents the findings of the demographic information, maternal factors and obstetric factors in pregnancy as well as during labour and delivery.

The findings on the demographic information with regards to the type of health facility the mother delivered in, level of Health Facility and whether this facility was a Helping Baby Breath facility. The maternal factors include, maternal age, mother's residence, employment status as well as marital status. Obstetric factors in pregnancy included parity, type of pregnancy, ANC attendance, ANC interventions, as well as conditions present during this pregnancy and before onset of labour. Obstetric factors during labour and delivery included gestational age, cervical dilatation, fetal heart rate assessment on admission, modes of delivery, weight of the babies and Apgar score are presented first.

5.2.2.1. Identification and demographic factors

The results of the study indicated that a total of 60.8% of the mothers' medical records came from the Intermediate Hospital Katutura and 39.2% from the Windhoek Central Hospital. Intermediate Hospital Katutura was classified as a referral or teaching health facility, whereas the Windhoek Central Hospital was classified as a national health facility. Both hospitals are comprehensive EmONC facilities and they are both the Helping Baby Breath (HBB) facilities.

The study found that 95.7% (178) of the babies were delivered at the health facility whilst only 4.3 % (8) were born before arrival to the health facility. These findings confirm the report by that WHO (2019), which states that the proportion of women who deliver in health facilities remains high.

A study by Goldenberg et al. (2015) found that while some stillbirth-causing conditions can be prevented or treated in outpatient settings during the antenatal period, hospital-based interventions during the intrapartum period will result in the greatest reductions. Therefore, it is imperative that mothers are educated as to the importance of hospital

deliveries and it can be concluded that mothers were advised properly to deliver in the hospital as the vast majority delivered in the hospital.

The maternal factors which also has an influence on the risk for intrapartum stillbirths and its results are presented in the next paragraph.

5.2.2.2. Maternal factors

The maternal factors that were included in the study was maternal age, the place of residence, employment status, marital status and referral status.

One of the variables linked to a higher risk of stillbirth is the age of the mother, therefore, assessing the mothers age is a key factor to identify risks associated to stillbirth during intrapartum care.

The study's findings indicate that the average maternal age range was 30, with the youngest mother being 14 years old and the oldest being 44 years old. The mean age of the mothers was 29.78 years (SD = 6.6).

A study done in South India by Mali et al., (2021) concluded that though advanced maternal age is a known risk factor for both increased perinatal morbidity and mortality, the majority of the stillbirths (82%) were seen in the women between the age group of 20 and 30 years.

This outcome is consistent with research findings that show the majority of women who experienced stillbirths were in the age range of approximately 30 with a mean age of 29. The study concluded that there was insufficient evidence to conclude that the mother's age significantly affected the likelihood of a live birth or stillbirth (p-values = 0.801 and more than 0.05, respectively).

Place of residence is an important determinant to the outcome of the new-born health as it can determine how fast the mother gets to the health facility.

Three classifications—Urban, Rural, and Semi-Urban—were made for the mother's place of residence. The study found that a very small percentage of mothers (2.7%) resided in rural areas (on the outskirts of Windhoek or nearby farms), while the majority of mothers (69.9%) lived in urban area, and 27.4% reside in Windhoek's informal settlements, which are semi-urban areas.

A study done in Nepal by Bhusal et al., (2019) found that women who lived in rural areas had a higher chance of stillbirth than those who lived in urban areas as a result of insufficient accessibility to the health care facility. In a study conducted in Nigeria, Mbachu et al. (2018) also revealed an unacceptablely high stillbirth rate in rural Nigeria. This study did not find any evidence of a significant relationship (p-value = 0.497 > 0.05) between the mother's place of residence and stillbirth.

Mother's employment status was another aspect that have been found to be associated with stillbirths. Assessing mother's employment can help health care workers to determine if the type of work the mother does (such as standing long hours, lifting heavy objects, vigorous physical activities, exposure to chemicals or radiation, etc.) will put the health of the mother and baby at risk. The study found that more than half of the mothers (56.5%) were unemployed, whereas 43.5 percent of the mothers were employed. This is a different outcome than what Okochi et al. (2018) found, who discovered that the employment status revealed that 137 (47.6%) of the women were unemployed and that, among the 151 (52.4%) employed people. However, a study done by Anyichie and Nwagu (2019), maintains that the prevalence of stillbirth was significantly associated with the maternal

level of education and occupation. This study did not find any association between the mother’s employment status and stillbirth.

Marital status has been linked to be associated to intrapartum stillbirths. Perhaps this association is related to the lifestyle of unmarried women and the availability of a support system during pregnancy and delivery.

The study revealed that the majority, 81.7% of the mothers were never married while 18.7% were married. Married women had a lower rate of stillbirths than unmarried women, according to both Tesema et al., (2021)'s study in East Africa and Bjerregaard-Andersen et al., (2018)'s study. Shapiro et al., (2018)'s study indicated a significant link between cohabiting and legally married women experiencing similar birth outcomes, whereas single women's outcomes were often much poorer.

Timely referral and improving access to quality intrapartum obstetric care have the potential to reduce the incidence of intrapartum, therefore, assessing which mothers needs referral and doing so early, can reduce the risk of intrapartum stillbirth. The study shows that 17.2% of mothers were referred from another healthcare facility to either the Intermediate Hospital Katutura or Windhoek Central Hospital.

Some studies have revealed referral status to be a significant predictor of stillbirth, (Okonofua et al., 2019). Kiondo et al., (2021) in a study done at Mulago hospital also concluded that referral to hospital was one of the predictors of intrapartum stillbirth in women delivering at that hospital. Therefore, it can be concluded that most mothers referred from other facilities were referred early and quite a small number arrived to the health facility late.

5.2.2.3. Obstetric factors in pregnancy

A number of obstetric factors in pregnancy were examined to understand their influence on the outcomes of the pregnancy. Important considerations among the maternal obstetric factors in pregnancy impacted on a woman ending up with an intrapartum stillbirth including the type of pregnancy, ANC attendance, ANC interventions, as well as conditions present during this pregnancy and before onset of labour such as antepartum haemorrhage, hypertensive disorders, anaemia, urinary tract infections, epilepsy and diabetes.

Patel (2015) stated that pregnancy complicated by multiples has been associated to stillbirths, therefore assessing the type of pregnancy can aid decisions on how to manage the mother during intrapartum period.

According to the study, 95.2% of pregnancies were singletons, whereas 4.8% involved multiple gestations. These results are consistent with a Jordanian study that found that only 5% of intrapartum stillbirths were attributable to multiple births (Khader et al., 2020). But contrary findings from the bulk of studies suggest that multiple births are linked to maternal conditions such preterm labour8+ and antepartum haemorrhage. In reality, the majority of twin pregnancies are linked to the delivery of small for gestational age infants. According to studies, mothers of twins who received quality obstetric care throughout their pregnancies and postpartum periods experienced less unfavourable results (Ashish et al., 2016).

Attending ANC provides an opportunity to ensure that best practices in ANC are initiated, comprehensive patient assessment is done, performance of key baseline investigations is done, a plan for ANC as a positive pregnancy experience is initiated, health education is given, preventative interventions are started as well as the development of a birth and

emergency plan developed (MoHSS, 2020). Good ANC attendance by a pregnant woman is linked to a successful pregnancy because potential risks are recognized and mitigation strategies are put in place.

This study revealed that about a quarter, 23.7% (44) of the women did not attend ANC at all. And from those who attended ANC, more than half (51.4%) of them only attended one or two visits whilst only 48.6% attended three or more visits. The complications that could arise during childbirth could not be foreseen by medical personnel as the patients did not have much exposure to be assessed accordingly.

The first ANC interaction should happen as soon as pregnancy is suspected or confirmed, preferably before 12 weeks of gestation for a healthy pregnancy experience, according to the Namibian Antenatal Care Guidelines MoHSS (2020). The updated recommendations urge all expectant mothers to have at least eight contact or ANC visits (MoHSS, 2020). This is in contrast to the study's findings, which indicated that the majority of mothers who delivered stillbirth attended just one or two ANC visits.

The results of this study are consistent with those of a study conducted in urban Guinea-Bissau, which found that the rate of stillbirths was 71/1000 if the woman did not attend any ANC visits against 36/1000 if she did. It is recommended that ANC attendance directly correlates with a significant decrease in stillbirths (Bjerregaard-Andersen et al., 2018).

This finding is supported by a subsequent study by Appiah et al., (2019), which also revealed that the number of ANC visits increased with the likelihood of a stillbirth decreasing with additional ANC visits. Further investigation found that there was no evidence of a significant association between recorded probable causes of death and ANC attendance (p-value = 0.167 > 0.05).

Substandard ANC interventions during pregnancy increases the chance of stillbirth during the intrapartum period. Every pregnant woman in Namibia should take iron and folate supplements, as well as tetanus and anti-malarial vaccinations (unless in areas where malaria is not widespread, such as Windhoek), according to the Namibian National Guideline for ANC (MoHSS, 2020). Although tetanus immunization was not directly linked to stillbirths, it was assessed to see if prenatal care was complete. Mothers should also undergo routine ANC tests for Rhesus blood grouping as well as haemoglobin (Hb), HIV and syphilis, Haemoglucotest (HGT), HBsAg, urine dipstick for glucose and protein, and other conditions.

The study discovered that during the visit, iron and folate supplements were given to all mothers (100%) who attended the ANC. Anti-malaria prophylaxis was given to less than 1% (0.7%) of the mothers who attended the ANC, and this was a referral from outside the Khomas region (antimalarial treatment was not part of their antenatal care programme because the Khomas region is not deemed malaria endemic).

Nearly 5% (4.2%) of the mothers who attended the ANC were not given tetanus toxoid and 95.8% received a tetanus toxoid vaccine. Of those who were given tetanus toxoid, at least two thirds (66.9%) received TT5 doses. Tetanus vaccination was evaluated to see if antenatal services were complete, despite the fact that it was not directly associated to stillbirth.

HIV screening is by far the most commonly administered prenatal care intervention among the patients evaluated, with almost 90% coverage across the country. Overall, 93% of the mothers who attended the ANC visit(s) were tested for HIV. Of the mothers whose HIV test results were positive, 54.5% were on ART for more than 4 weeks. Out of the

respondents who were not tested for HIV, 82.4% of them did not attend ANC. All the mothers 142 (100%) who attended the ANC visit(s) were screened for syphilis.

Out of the mothers who were tested for Syphilis during the ANC visit, only less than 1% had a positive result and did not receive any treatment, whereas 70.8% of them had a negative result while 28.5% had pending results.

Nearly all (99.3%) of the mothers who attended the ANC had their rhesus blood group checked and 65% of the mothers who were tested for rhesus blood group were positive, while 31.5% of the results were pending, and two mothers had their Rhesus results recorded from previous tests.

According to Afulani's (2016) research, receiving the recommended prenatal interventions reduces the stillbirth rate. He further aluted that t he number of stillbirths in the country might be significantly decreased if the basic package of ANC services is provided to every pregnant woman who interacts with the health system.

The study shows that the basic ANC package was given to all mothers who came to the health facility for ANC visit.

In health care settings, an assessment of associated obstetric factors during pregnancy or prior to the onset of labour aids in developing strategies for targeted interventions.

The study revealed that amongst the women who had intrapartum stillbirths, they had the following risk factors in pregnancy and before the onset of labour: *Antepartum haemorrhage (due to placenta abruptio)* which accounted for 21.5%, *hypertensive disorder* in pregnancy which accounted for 9.1% of the mothers, pre-labour rupture of the membrane (PROM) 3.2% *urinary tract infection (UTI)* 2.2%, and diabetes 0.5%.

Placental insufficiency, medical pregnancy complications, and hypertensive disorders of pregnancy are some of the factors associated with intrapartum stillbirths, according to Page et al., (2018)'s study findings.

Dagdeviren (2022) conducted a research that supported these findings and found that complications with the placenta, cord, and membranes accounted for at least 19.8% of all maternal complications.

The doctors and midwives can develop delivery plans in advance rather than waiting for complications to develop by assessing the obstetric history and diagnosing the problems. For example, a pregnant mother with hypertension disorders can be treated and delivered before a condition like eclampsia develops. Mengesha & Dangisso, (2020) also agrees that early identification and management of mothers with obstetric complications could reduce burden of preventable stillbirths.

5.2.2.4. Obstetric factors during labour and birth

One of the fundamental skills needed by obstetric service providers admitting women for labour in medical facilities is the capacity to assess obstetric characteristics such. gestational age, presentation and cervical dilatation, fetal heart rate assessment on admission and baby's condition at birth such as the weight. If these conditions are misdiagnosed, it could lead to unnecessary obstetric interventions and unfavourable obstetric outcomes, such as intrapartum stillbirth and their results are discussed below.

According to the following definitions, the baby's gestational age was divided into three groups as severe preterm, preterm, or term: Preterm birth included infants born between 32 and 36 completed weeks of gestation, while term birth included infants born at or after

37 completed weeks of gestation, as determined by the mother's last menstrual period or based on a clinical examination of the new-born. Severe preterm infants are those born between 28 and 31 completed weeks of gestation.

The study found that, on average, most babies were born at 34 weeks of gestation. At or after 37 weeks of pregnancy, 38.5 percent of the infants were delivered. Preterm (before 37 weeks of pregnancy; 29.1%) and extremely preterm (between 28 and 31 weeks of pregnancy; 29.1%) births comprised up the remainder (between 32 and 36 weeks; with 32.4 percent).

In their study, Lavin, Preen, and Pattinson (2016) found that there was an increase in stillbirths with gestational age between 33 and 37 weeks in all provinces that they studied. These findings are consistent with this study that indicated that babies delivered between 32 and 37 weeks of gestation had the highest stillbirth rate.

According to a population-based study by Dahlen et al., (2021), it was concluded that though the risk varied by gestational age of labour onset, there was no gestational age for which any of these risks were significantly lower.

Cephalic, breech, or other presentations which could be transverse or oblique were all classified. The mothers' most frequent delivery was cephalic presentation (85.9%), which was followed by breech (12%). Mal-presenting mothers were 3 times more likely than their peers to give birth to a stillborn child (Gizawa et al., 2021).

Only 45% (84) of the 186 mothers in this study had a record of a vaginal examination upon admission, while the remaining 55% (102) did not have one or were not eligible for one, according to the study.

Cervical dilatation data for this cohort showed that 13.1% (11) of admissions were for early labour, while the remaining 86.9% (73) were for active labour. With a standard deviation of 2.894, the median cervical dilatation, which was 6.76, was estimated. Notably, 29.8% of the mothers arrived at the clinic with a head on perineum or a full cervical dilation of 10 cm. Non-vertex foetal presentations and a ruptured cervical membrane, according to Agena & Modiba (2020), were predictors of intrapartum stillbirth. Agena & Modiba (2020) has found that breech presentation, abnormal fetal position has been associated to stillbirth. Health facilities could avert unnecessary foetal loss by undertaking timely actions to manage obstetric emergencies on admission to labour.

Assessment of the fetal heart status of unborn babies on admission help nurses and doctors to detect any complications that might arise, and to determine whether the baby is at risk or not. The study found that 6.7% of the pregnant mothers were not assessed at all for a foetal sound, whereas 13% experienced a complete absence of foetal sound. However, 80.2% of mothers came in with a foetal heart sound which indicates that the foetus died during intrapartum care, during delivery or soon after delivery.

Ashish et al., (2019)'s large multicentric observational research found that 46% of intrapartum stillbirths recorded during the study had foetal heart sounds at admission. In addition, the study concluded that difficulties during labour were present in 23.3% of intrapartum stillbirths. This conclusion is consistent with the study's findings that the majority of babies had a fetal heart sound on admission and only developed complications during labour and deliveries.

Intrapartum stillbirth is associated with new born baby weight. The weight of the infant was reported in kilograms. The study found that each infant weighed 2.082 kg on average. The baby's weight ranged from 0.805 kg to 4.200 kg, with a standard deviation of 0.88 kg. This study found that 7.5% of stillbirths were caused by preterm. According to Dase et al., the main factor contributing to intrapartum foetal causes of stillbirths was prematurity (2020). Extreme preterm, which can account for a prevalence of up to 20.38% high, was found to be the most frequent cause of stillbirths in a different study by Shanker et al. (2020). Also supporting the aforementioned is Ashish et al(2016b)'s finding that intrapartum stillbirths were five times more likely to be delivered preterm than at a term gestation. However, this was not the case in this study.

The results of the model effects also show that there was no sufficient evidence that the presentation of a baby and gestational age had a significant effect on the likelihood of whether a baby is born alive or stillbirth (p-values = 0.654, 0.948, 0.479 and 0.801 respectively all greater than 0.05).

5.2.2. Diagnosis

The decision made based on the assessment data is the diagnosis. According to Toney-Butler and Thayer (2021), diagnosis is the creation of a nursing diagnosis using clinical judgment to help with the planning and delivery of patient care.

In this study, diagnosis describes the condition of the mother as well as the baby’s response during labour and upon delivery, by diagnosing complications before birth were used to justify medical and nursing interventions. Diagnosis of health needs is the basis for providing individualised care to both mother and baby.

Obstetric complications occurring during labour or delivery, including mal-presentation and prolonged labour, can cause detrimental, and potentially irreversible results to the foetus during the intrapartum period, thereby potentially leading to death if not diagnosed early. These intrapartum stillbirths might have been prevented if better obstetric care and foetal and maternal monitoring were available.

According to this study, the majority of mothers (88.1%) had some obstetric problems during labour and delivery, as opposed to the minority (11.9%) who did not. In agreement with this study, Ashish et al. (2016b) also concluded that women who experienced any obstetric complication during labour were four times more likely to have an intrapartum stillbirth.

A study done in Ethiopia by Mengesha and Dangisso (2020) concluded that mothers with a prolonged labour for more than 48 hours were 12 times more likely to develop stillbirths than those without a prolonged labour. Poor progress of labour is often attributed to obstructed labour which is a common risk factor for stillbirths. The results of the model effects show that only the probable causes of death of babies was found to be a significant predictor (Wald Chi-Square statistic = 9.903, degrees of freedom = 4, p-value = 0.042) of the likelihood of whether a baby is born alive or stillbirth before birth, during birth or after birth.

According to reports, asphyxia is the primary cause of intrapartum stillbirths, so it is crucial for medical professionals to diagnose and treat the problem as early as possible in order to prevent negative outcomes. The results showed that asphyxia, which accounted for 51% of all intrapartum stillbirths, was the most likely reason for stillbirth as identified by healthcare professionals (HCPs) in the maternal record.

According to a study by McClure et al. (2017), asphyxia may be the cause of up to 46.6 percent of stillbirths in six low- and middle-income countries, including Kenya. The study used computer-based algorithms to assign causes of stillbirth. Their findings seemed to agree more with those of the current study. Another study conducted in north central Ethiopia came to the same conclusion that the prevalence of birth asphyxia has persisted as a significant issue for public health in the area under study (Sunny et al., 2021).

A multi-centric study in South India reported frequencies of 24% by Ebenezer et al. (2019), and a single-centre study in Nepal reported incidences of 36%. The overall incidence of birth asphyxia recorded in developed countries ranges from 1.6% to 24%. (Sunny et al., 2021).

Similar rates of birth asphyxia, ranging from 15.9% to 22.3% in Africa, have been reported in systematic reviews and meta-analyses (Bruckmann, 2015; Sendekuet al., 2020; Workineh et al., 2020). Variations in the quality of perinatal and intrapartum treatment may be the cause of the observed occurrences' vast range.

Therefore, it is sufficient to draw the conclusion that those who died from asphyxia were maybe not diagnosed and responded to early or not managed on time to prevent the death because the aforementioned results are compatible with literature and the findings of this study.

Placental disorders have been found to increase the risk of intrapartum stillbirths. The study's findings indicate that placenta abruptio, caused by antepartum haemorrhage (APH), considerably increased the risk of stillbirth, accounting for 23.1% of intrapartum stillbirths.

The percentage of stillbirths connected to APH varies greatly in the literature. While, for instance, Kothiyal et al. (2018) reported as high as 22.36% in an observational study at a

tertiary care teaching hospital, Singh et al. (2021) showed 17% of stillbirths to be due to APH.

The probit model was found to be fit to predict the probability of a baby being born alive (with stillbirth serving as a reference category in this study), given that the mother of a new-born experiences a placenta abruptio before birth. Babies whose mothers had placenta abruptio were less likely to be born alive than those who had asphyxia, preterm, multiple congenital abnormalities, or other issues that could cause a baby to die before, during, or after birth, according to the estimate B = -1.315.

The probability that a baby will be born alive is, overall, is only about 27 out of 100 babies, and the remaining 73% of the babies will be stillbirth, if the mother of a baby experiences placenta abruptio prior to birth.

Globally, 7.4% of stillbirths are considered to be caused by congenital defects (Lawn et al., 2016). These values are typically higher in high-income nations. In contrast, congenital abnormalities are considered to be responsible for up to 11% of stillbirths in Canada and up to 21% in Ireland (Lawn et al., 2016).

In agreement with the current study, a hospital-based study conducted in north India identified congenital abnormalities as one of the most frequent causes of stillbirths, accounting for 9.3% of all stillbirths (Sharma, 2019).

Congenital abnormalities only account for a minor share of stillbirths in low-resource settings while more preventable causes of stillbirth make up the bulk of mortality. In low resource settings, congenital abnormalities were a less common cause of stillbirths, according to a similar multi-country study from Global Network (McClure et al., 2020). This study, which is consistent with the study results above, found that numerous

congenital abnormalities—such as anencephaly, hydrocephalus, and spina bifida—accounted for 8.2% of intrapartum stillbirths.

Umbilical cord abnormalities/accidents (UCA), which often refer to circumstances when fetal blood flow is diminished or interrupted due to the changed structure or function of the umbilical cord, were one of the other causes. Unfavourable pregnancy outcomes, such as stillbirth, delivery asphyxia, and emergency caesareans, are linked to UCA. 3.3% to 6.5% of stillbirths were caused by cord-related issues, primarily cord prolapse (Aminu, 2017). This study found that complications with the cord—including cord prolapse (2.9%), cord around the neck (1.7%), and cord submitted for histology (1.2%)—accounted for 5.8% of the stillbirths. These complications also fall under the umbrella of the studies mentioned above. There were no real knots found in the study. According to Hayes et al. (2020), stillbirths brought on by UCA range from 3.4% to 20%.

The majority of investigations have focused on the nuchal cord, a possible documented UCA in which the umbilical cord is coiled at least once around the neck of the fetus. Its incidence rises throughout gestation, peaking at birth. Although nuchal cord has been reported in isolated occurrences of stillbirth, findings from bigger studies are inconsistent, with some claiming significant associations and others reporting no influence of nuchal cord on stillbirth (Hayes et al., 2020). This study did not find any association and the nuchal cord accounted for very small number (1.7%) of stillbirths.

The midwives and doctors could diagnose prolonged and obstructed labour, antepartum haemorrhage as well as fetal distress by keeping an eye on the progress of labour. this will allow them to make decisions and plan timely interventions to save the babies. Improving access to quality maternal health care services and early detection and management of labour are of paramount importance to reduce stillbirths attributed to a prolonged labour.

5.2.3. Planning

This stage of the nursing care process involves creating a plan of care with suitable interventions that are legally documented.

Toney-Butler & Thayer (2021) assert that the planning stage is when objectives and goals are developed, which have a direct impact on patient care. As a result, the doctor and the nurse/midwife must plan in accordance with the diagnosis given. These patient-specific objectives and their accomplishment can help guarantee a successful outcome. In this stage of goal planning, nursing care plans are crucial. Care plans offer a roadmap for individualized care that is catered to a person's particular needs.

In this study the planning of care was used to address the actual and potential problems that have been identified during the assessment phase to direct decision making as to what to be done next to the patient care. Decisions such as the type of facility the patient must be delivered in, the expertise of the attendant needed during delivery come from the care plans and based on patient’s condition. Failure to plan makes it difficult for midwives to carry out instructions. This could lead to omissions and misadministration of treatment which may lead to stillbirths.

As part of the planning process, the health care personnel ensure the medical facility is set up to safely deliver mothers and their babies as well as manage with emergencies. 95.7 percent of the babies were delivered at the health facility, according to the report, while 4.3 percent were born before arrival. For the purpose of understanding the interventions that can prevent stillbirth, the metric of "facility delivery" is of little use. An emergency

obstetric and neonatal care capability, for instance, is the capacity to provide blood transfusions, neonatal resuscitation plus C/S, and other fundamental obstetric activities. A C/S could not be performed in 30% of the facilities classified as hospitals, according to a second survey of seven LIC. Frequently, anaesthesia was not accessible (Manasyan, 2013).

However, the metric of facility delivery is not sufficient to determine the facility's ability to prevent a stillbirth. Instead, for every facility, the availability of interventions to save the foetus, such as foetal monitoring and C/S, needs to be known as well as whether these interventions are available 24 h/day, 7 days/week. Simply noting whether the birth took place in a facility is insufficient (Goldenberg, 2015).

C/S can be done in the two facilities where the current study was conducted, however there are still some delays in performing emergencies C/S on time because an anaesthetist is not presently available 24 hours a day, seven days a week.

The probability of having safe delivery increases when there are qualified healthcare professionals present. The majority of the deliveries for the study cases were attended to by skilled medical personnel. The study show that a registered nurse or midwife delivered 50% of the new-borns, compared to medical officers who delivered 42.5% and non-medical workers who delivered 4.8% of the babies.

Skilled birth attendants who complete the screening and administer the preventative and therapeutic interventions necessary to save fetal life are needed to significantly reduce stillbirths. Medical officers, medical interns, registered nurses and midwives, as well as non-medical people (who delivered babies at home or while traveling to a medical facility) were the different categories of attendants at deliveries.

Al Kibria et al., (2017) proffer that the presence of skilled birth attendants (SBAs) is crucial in childbirth to reduce the perinatal deaths and to achieve the maternal and neonatal mortality target of the United Nations' Sustainable Development Goals (SDGs). However, even many birth attendants classified as skilled, do not have the medical or surgical skills to prevent stillbirths. For example, nurses, midwives, medical officers, and some physicians, even though classified as skilled, often cannot diagnose foetal distress, treat maternal diabetes, or perform a C/S. Preventing stillbirths requires sophisticated medical and surgical skills, including managing many medical and obstetric conditions and the most effective ways to reduce or eliminate risk without harming the mother or delivering an immature baby.

Hence the metric of "skilled birth attendant at delivery" does not describe the skills needed to save the life of a foetus (Goldenberg, 2015). There has been a reduction in skill delivery gap by 20% in 2017, according to the report from the MoHSS's situational analysis on human resources for health in Namibia (MoHSS, 2021).

5.2.4. Implementation

Implementation, according to Toney-Butler & Thayer (2021), is the stage that entails action or doing and the actual execution of nursing interventions as specified in the plan of care. Nursing interventions are needed throughout this phase, including observation, data interpretation, providing direct or indirect care, administering medications, and following the conventional treatment procedures continuum, which may include ongoing evaluation of changes in the mother's or baby's status.

In this study, the actual implementation or action that was carried out to deliver the mother was considered as the implementation phase. The actual monitoring of the

mother and baby as well as the delivery whether it was a spontaneous, instrumental or caesarean section delivery as planned, were used to justify implementation of medical and nursing intervention.

Monitoring of the fetal heart status of unborn babies help nurses and doctors to detect any complications that might arise, and to determine whether the baby is at risk or not. The study found that there was a sub-optimal fetal hearth rate monitoring (FHRM) and that more than half of the women (54,8%) was not monitored with a partograph, which supports Ashish's (2016) findings about inadequate fetal monitoring.

Foetal Heart Rate Monitoring (FHRM) per protocol was considered adequate when the foetal heart rate was measured at least every half an hour using the auscultation technique or cardiotocograph (CTG), during the intrapartum period. Any case where labour progression and FHRM was not adequately monitored using the partograph was categorised as partograph not used correctly. Ashish et al., (2016a) concluded that there was an increased risk of intrapartum stillbirth when foetal heart rate was inadequately monitored and when the progress of labour was not monitored using a partograph.

This study's findings are in line with those of Ashish et al(2016b)'s study, which further demonstrated that women whose FHRM was not performed in accordance with protocol and those for whom a partograph was not utilized were twice as likely to experience an intrapartum stillbirth.

This study determined that partograph use was adhered to when the partograph was utilized, that is, filled in for the progress of cervical dilation and the descent of the head, every half hour to monitor the foetal heart rate as well as assess the progress of labour.

The mode of delivery is an important determinant of the wellbeing of new-born babies. The method of delivery was classified as spontaneous vaginal birth, caesarean section, or instrumental births made using forceps or a vacuum. The majority of new-borns (62,9%) were born naturally vaginally, while 33.9% were delivered via caesarean section. The study found that there was a low prevalence of assisted instrument vaginal delivery and that just 2.7% of babies were delivered by suction, vacuum, or assisted instrument vaginal delivery. A study by Boyle, et al., (2017) indicated that women with stillbirth usually delivered vaginally regardless of whether labour was spontaneous or induced, which is consistent with this study findings.

Any effort to reduce stillbirths must include caesarean sections. One of the abilities required to reduce mortality is the ability to perform C/S safely. The C/S rate is a marker for population monitoring, but its significance in establishing whether procedures were carried out promptly for the right indications is significantly greater. Physicians have used C/S extensively in several nations to prevent stillbirths and for other reasons, frequently accounting for 30% or more of all deliveries (Goldenberg, 2015). The C/S rate in the findings from above is consistent with this study.

The results of the model effects also show that there was no sufficient evidence that the mode of delivery had a significant effect on the likelihood of whether a baby is born alive or stillbirth (p-values = 0.328 was greater than 0.05).

The study also revealed that 80.1% of the babies delivered were fresh stillbirth and that 19.9% were born alive. Out of the babies born alive, 95.2% of the babies were referred to the prem unit after delivery, with intrapartum related complications. The study also found that 71.4% of the babies born alive died on the same day they were delivered but the time

interval was not specified, whereas 17.9% and 10.7% died on the same day within 2 hours and the same day after 2 hours respectively.

In addition to C/S and improved obstetric care, studies have suggested that the implementation of **neonatal resuscitation** programmes has been shown to decrease **intrapartum stillbirth** rates (Versantvoort, 2020). This study revealed that 66.7% of the babies delivered in the two facilities were resuscitated.

In HIC, skilled clinicians often diagnose stillbirth as an infant born with no heartbeat, respirations or movement or Apgar scores of zero at 1 and 5 minutes, often despite attempts at resuscitation. However, in many LIC, with high rates of home births and unskilled attendants without access to basic equipment including stethoscopes, the attention to the new-born is often less than optimal, and the distinction between a live birth and stillbirth may not be clear.

This may help to explain why, despite the fact that new-born resuscitation most likely revives a depressed new-born, it appears in certain research that the practice reduces the likelihood of stillbirths (Goldenberg, 2013). Foetal and early neonatal mortality rates were formerly grouped under "perinatal mortality" due in part to this classification problem. Similar to this, some researchers have suggested a new category for "intrapartum-related deaths." No matter when a foetus or new-born dies, intrauterine hypoxia is categorized in this system as the cause of death (Goldenberg, 2015).

5.2.5. Evaluation

The evaluation used in this study focuses on monitoring and assessing the effects of nursing and medical interventions made in accordance with the care plan for the study cases. According to Toney-Butler & Thayer (2021), a successful patient

outcome depends on this last step of the nursing process. Every time a healthcare professional steps in or administers treatment, he or she must reassess or review to make sure the intended result was achieved. Depending on the overall patient status, reassessment may be required regularly. On the basis of updated evaluation results, the care plan may be modified.

With regards to the present study, evaluation refers to the appraisal of the effectiveness of the management intervention that was given to the mother and her baby. The modifiable factor with regards to the First, second and third delays as well as looking into whether instructions, guidelines and/or protocols were followed (action not taken; inappropriate action taken; delay in referral) and whether the right intervention were used 1for example, partograph used; inadequate monitoring, delay in calling for assistance; inappropriate discharge were employed in this phase.

From the documents reviewed, the findings indicated that a substantial percentage of moms arrived late, with up to 86.9% being admitted in active labour and nearly a third (29.8%) arriving with full cervical dilation of 10 cm or head on perineum.

The delay in the mother's arrival at the institution, however, was not the sole determinant in the findings. There were also reports of delays at the site. Women who came early enough waited far too long for an emergency caesarean section or instrument delivery, with the median time interval between decision for C/S and actual birth of around 176 minutes (or 2 hours, 54 minutes). This is clearly below the acceptable standard for time between decision and birth i.e. 30 minutes as recommended by the NICE guidelines.

According to the nice guidelines, decision-to-birth interval for unplanned emergency caesarean birth, is classified into two categories as follows:

Category 1: Caesarean birth is when there is an immediate threat to the life of the woman or foetus, is to perform caesarean birth as soon as possible, and in most situations within 30 minutes of making the decision.

Category 2: Caesarean birth is when there is maternal or foetal compromise which is not immediately life-threatening. Performing caesarean birth as soon as possible, and in most situations within 75 minutes of making the decision (NICE, 2021).

The results of this study also revealed that 48,4% which is almost half of the mothers had to wait more than one hour for a caesarean section after a decision was made, where as 40.3% had to wait between 30 minutes and one hour, and only 9.7% of the mothers were attended to in less than 30 minutes. This clearly indicates that there was a delay to provide care once the patients arrived at the health facility.

There is evidence of a significant relationship (p-value = 0.007, Pearson Chi-Square value = 12.055 based on 3 degrees of freedom) between time of decisions for C/S or instrument and actual delivery and the delay to provide care after arrival at health facility. A total of 24.2% of the respondents indicated that there was a delay to provide care after arrival at the health facility. Furthermore, the delay by more than one hour of the time between decisions for CS instrumental and actual delivery to provide care after arrival at health facility is more likely to occur (86.7%), compared to mothers who wait for less than 30 minutes (6.7%) and between 30 minutes and one hour.

Ashish et al. (2016b) came to the conclusion that timely management of complications during labor and early arrival to a facility within 30 minutes could have saved 17%, 37%, and 20% of stillbirths, respectively.

A significant number (30.6%) of the mothers in this study were not provided with the correct instructions, guidelines, and protocols when they arrived at the medical facilities. Similar to this, 43% of pregnant women were not provided with adequate interventions when they arrived at the medical facilities. The partograph was not used on more than half (54.8%) of the expectant mothers, whilst only 45.2% were used. Of the respondents who said they had used partographs, 28.8% stated that they hadn't used it correctly.

A study conducted in Ethiopia found that partograph use is not adhered to at all. This study demonstrated that health care practitioners generally did not adhere to all of the partograph's components in accordance with WHO criteria (one out of five charts were completed as per the WHO standard). When partographs were not completed in accordance with the WHO's criteria, more negative effects were documented (Gebrehiwot et al., 2020). According to the aforementioned figures, 43% of pregnant women were not given proper interventions when they arrived at the medical facilities and 54.8% of them were not monitored with a partograph, indicating that there was some degree of negligence on the part of health workers.

5.2.6. Record keeping

Record keeping as a theoretical framework applied to this study, focused on the verification of the accuracy and completeness of the maternity records for the study cases.

This included the accurate and complete recording of all activities that the health care providers have done on the mother and the foetus, during the intrapartum period.

Stillbirth case files were examined for completeness and accuracy of information needed to determine the cause of death or assess the quality of care, and 40 percent were found to be incomplete, inaccurate, or both.

These findings are consistent with a study that was done in Zanzibar by Housseine et al., (2020), which highlighted that the quality of intrapartum care has mostly been assessed by retrospective analysis of existing medical records and written records (e.g. partographs) in low-resource settings which are often incomplete, missing or inaccurate, and therefore might not reflect the actual care. Thus, the findings concluded that some of the records did not reflect all the necessary details that needed to be captured. This revelation shows that there is some negligence of record keeping among health care providers.

5.3. Chapter summary

Results of the study were discussed in relation to the existing body of literature and in accordance with the nursing process (assessment, planning, implementation, and evaluation).

Conclusions are presented in Chapter six, together with limitations and the recommendations made from the conclusions.

CHAPTER SIX

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

6.1. Introduction

This chapter presents a summary of the findings of the research based on the research objectives. It draws conclusions based on the findings and thereafter makes some recommendations for key stakeholders to ensure that the main aims and the objectives of the research are realised. The limitations of the study are also presented, highlighting the key strengths and weaknesses of the research.

6.2. Conclusion

The following conclusions have been drawn from the study findings and they are clarified in agreement with the research objectives.

The study concluded that there was a significant association between congenital abnormalities and placenta abruptio with intrapartum stillbirths. There is also a substantial association between the delay to provide care once the mother arrived at the health facility with intrapartum stillbirth. The study also concluded that intrapartum stillbirths accounted for one third (30%) of the overall stillbirths in the study settings.

The study found no sufficient evidence that the mother's place of residence, mode of baby delivery, presentation of a baby, mother's age and gestational age had a significant effect on the likelihood of whether a baby is born alive or stillbirth.

In order to realise the aim of the study, specific objectives were formulated and conclusions were drawn according to each objective.

This section of the chapter discusses whether or not the above objectives were answered.

6.2.1. Identify the maternal sociodemographic and obstetric factors associated with stillbirths during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia

The study found no sufficient evidence that the mother's place of residence, mode of baby delivery, presentation of a baby, mother's age and gestational age had a significant effect on the likelihood of whether a baby is born alive or stillbirth (p-values = 0.328, 0.654, 0.948, 0.479 and 0.801 respectively, all greater than 0.05).

6.2.2. Determine the foetal factors associated with stillbirths during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia

After the probit model was fit to predict the likelihood of a baby born alive (with stillbirth being a reference category) given that the mother of a baby experiences a placenta abruption before birth. The value of the estimate (B = -1.315) shows that babies whose mothers experience placenta abruptio were less likely to be born alive compared to those who experienced asphyxia, prematurity, multiple congenital abnormalities and other complications which may lead to the death of babies before birth, during birth or after birth.

The study concluded that, overall, (the value of Exp(B) = 0.268) if the mother of a baby experiences placenta abruptio before the birth of a baby, then the probability that a baby will be born alive is only about 27 out of 100, while the remaining 73% (0.732) of the babies will be stillbirth.

6.2.3. Determine modifiable factors associated with stillbirth during intrapartum care at the Windhoek Central Hospital and Intermediate Hospital Katutura in Khomas region, Namibia

The study found that one of the factors associated with intrapartum stillbirths is birth asphyxia accounting for more than half (51%) of intrapartum stillbirths. Antepartum haemorrhage due to placenta abruptio was also found to be associated with intrapartum stillbirth, accounting for close to one fifth (23.1%) of the stillbirths. This was followed by prematurity and multiple congenital abnormalities which accounted for 7.5% and 8,2% respectively.

The study also revealed that there was evidence of a significant relationship (p-value < 0.005, Pearson Chi-Square value = 97.915 based 4 degrees of freedom) between congenital abnormalities and intrapartum stillbirth. The babies who experienced any congenital anomaly were more likely to die as a result of multiple congenital abnormalities (60.9%) compared to asphyxia (17.4%), prematurity (4.3%), placenta abruption (8.2%), and other causes of intrapartum stillbirth (8.7%).

This study concluded that there was evidence of a significant relationship (p-value = 0.007, Pearson Chi-Square value = 12.055 based on 3 degrees of freedom) between decisions for caesarean section, instrumental and actual delivery and the delay to provide care after arrival at health facility. In addition, 24.2% of the records indicated that there was a delay to provide care after arrival at the health facility. Furthermore, the delay by more than one hour of the time between decisions for caesarean section, instrumental and actual delivery to provide care after arrival at the health facility is more likely to occur by 86.7%, compared to mothers who wait for less than 30 minutes with 6.7% and those that

wait for between 30 minutes and one hour to be done a caesarean section, instrumental and the time they actually get delivered.

The present researcher went further to analyse the prevalence of intrapartum stillbirths. The statistics indicated that between April 2016 and March 2019 there were 41232 deliveries and 613 stillbirths, 427 macerated, while 186 were fresh stillbirths which happened while the women were admitted (intrapartum) in Windhoek Central Hospital and Intermediate Hospital Katutura (MoHSS, 2019).

This gives a 30 percent prevalence of intrapartum stillbirths at the two hospitals during the period from the 1st of April 2016 to the 31st of March 2019. In conclusion, the study revealed that intrapartum stillbirths accounted for one third of the overall stillbirths in the study settings.

6.3. Limitations

The study was designed to analyse pre-existing data (data collection from the medical records of patients), and it was subject to numerous biases as a result. The study relied on the accuracy of written records of individuals and some data and variables were missing from the retrieved records. The major limitation of the study was the challenge of retrieving stored data. This is generally a limitation of retrospective studies and an example of poor data management practices that occur in health facilities especially in developing countries.

Other limitations that were encountered were that the quantitative structure of the study design also prevented further investigations into the causes of poor healthcare professional services and as a result, the study may have missed the opportunity to explore community-

level factors that contribute to intrapartum stillbirths, such as the reasons for delays in seeking care and getting health factors contributing to stillbirths in the community.

Home deliveries and patients who delivered in private hospitals and health centres or clinics were not included in this study; therefore, the findings did not represent the whole population of the Khomas region.

6.4. Recommendations

Based on the results of the study, the following recommendations are presented:

6.4.1 Recommendation to the Ministry of Health and Social Services

- In one-third of the instances, there were no guidelines and/or improper interventions, which should motivate an update and rapid implementation of the EmONC guideline to handle emergency obstetrics and new-born problems. All staff involved in providing care to mothers and babies should be aware of this.
- Stakeholders can campaign for making stillbirths a reportable event at the national and international levels. This will aid in the improvement of data documentation, gathering, and reporting; it will also stimulate additional reviews, as proposed by Aminu (2017), and it will aid in the improvement of record keeping and documentation in the study setting.

6.4.2. Recommendation at facility level

- With one-third of stillbirths occurring intrapartum, perinatal death evaluations should be encouraged at the facility level. Perinatal mortality auditing is a successful technique for improving care quality, and it has the potential to reduce perinatal deaths by up to 30% (Aminu, 2017). This might be done by a quality improvement or maternal death review team that already exists. Namibia has an existing review committee, but it has to be improved because audits aren't happening as frequently as they should and for all the stillbirths.
- Healthcare providers must be trained on how to perform perinatal mortality audits utilising the "no blame, no shame" approach, identifying features of inadequate care, and taking action to alter practice in order to conduct the evaluations effectively. Hospitals should be ready with staff, supplies and other resources needed to conduct emergency procedures, especially Caesarean sections to reduce delays observed in conducting the procedure. Actions should also address other delays identified in the facility. The MoHSS (2021) in its situational analysis have emphasised the need to pay attention to improving the skills of health workers, and this is supported by the WHO (2019) report that also emphasises the need for quality of care in MNCH services which is in serious need of improvement in many countries including Namibia, and this is a step in the right direction.
- Moreover, it was difficult for the researcher to find the records because most of the records were stored in boxes which were dusty. Therefore, the researcher had to wear aprons, gloves and a face mask in order to trace these records. Improving hospital records storage or migrating to an electronic data system could improve

accessing data for research as well as reviews, which in turn could be the key to reducing the proportion of stillbirths.

- If the WHO's Every New-born Action Plan's target of reducing the stillbirth rate in every country to less than 12 per 1,000 births by 2030 is to be met, urgent and coordinated action at the local and national levels is required to improve the quality of care provided to mothers and babies in health facilities.

6.4.3. Recommendation to health workers

Immediate effort is needed to reduce intrapartum stillbirths, and it should focus on the following areas:

• Despite the fact that more than half of mothers who had stillbirths went to antenatal care at least once or twice, with up to 86.9% admitted in active labour and nearly a third (29.8%) arriving at full cervical dilatation of 10 cm or head on perineum, and almost a third (29.8%) arriving too late for birth, this needs more comprehensive health teaching during prenatal visits. Mothers should be informed about the need of expert birth attendance and delivery in a health facility, and healthcare providers should collaborate with them to design feasible birth plans.

Community engagement programmes should address transportation issues for mothers and babies to the hospital. Immediate action to reduce intrapartum stillbirths could yield quick results, and it should address the following areas:

- Standards for ANC and intrapartum care services should be developed and implemented by HCPs. Standards for the use of the partograph or the new labour care guide, for example, could assist in minimising the time it takes to intervene,

resulting in fewer stillbirths due to hypoxia and perhaps a burst uterus, as well as APH due to abruptio. At all levels of the health system, including new clinical rules from the WHO (2018), recommendations on intrapartum care would improve labour monitoring and quality care (Sanghvi, 2019).

6.4.4. Recommendations for further research

Studying the quality of intrapartum care given to women would provide a better indicator of the quality of maternal and new-born health services.

The reasons for the mothers' late arrival, as well as the inadequate care they receive at the facility and the delays in receiving care once they have arrived at the health facilities should be explored in more studies.

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APPENDICES

APPENDIX A: ETHICAL CLEARANCE FROM THE UNIVERSITY OF NAMIBIA

UNAM
UNIVERSITY OF NAMIBIA

ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: SON /602/2020 **Date: 16 December, 2020**

This Ethical Clearance Certificate is issued by the University of Namibia Research Ethics Committee (UREC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the Faculty/Centre/Campus Research & Publications Committee sitting with the Postgraduate Studies Committee.

Title of Project: Factors Associated with Stillbirth During Intrapartum Care At the Windhoek Central and Katutura Intermediate Hospitals, Khomas Region Namibia

Researcher: KALISTA RUNONE

Student Number: 2001156260)

Supervisor: *Dr. E. Mulenga*

Campus: School of Nursing

Take note of the following:

(a) Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the HREC. An application to make amendments may be necessary.
(b) Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the HREC.
(c) The Principal Researcher must report issues of ethical compliance to the UREC (through the Chairperson of the Faculty/Centre/Campus Research & Publications Committee) at the end of the Project or as may be requested by HREC.
(d) The HREC retains the right to:

(i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,
(ii) Request for an ethical compliance report at any point during the course of the research;
(iii) Cognizance and the observation of Namibia's Research Science and Technology Act, 2004 which makes it compulsory for Non-Namibian based researchers to obtain the compulsory Research Permit from the National Commission on Research Science and Technology (NCRST), FIRST, BEFORE the research can commence.

HREC wishes you the best in your research.

Dr. J.E. de Villiers HREC Chairperson

Ms. P. Claassen: HREC Secretary

APPENDIX B: CONSENT MINISTRY OF HEALTH AND SOCIAL SERVICES

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198 | Ministerial Building | Tel: 061 – 203 2507
Windhoek | Harvey Street | Fax: 061 – 222558
Namibia | Windhoek | E-mail: itashipu87@gmail.com

OFFICE OF THE EXECUTIVE DIRECTOR

Ref: 17/3/3 KSR
Enquiries: Mr. A. Shipanga

Date: 22 January 2021

Ms. Kalista S. Runone
PO Box 8247
Bachbrecht
Windhoek

Dear Ms. Runone

Re: Factors associated with stillbirth during intrapartum care at the Windhoek Central and Katutura Intermediate Hospitals, Khomas 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;

3.4 A quarterly report to be submitted to the Ministry's Research Unit;

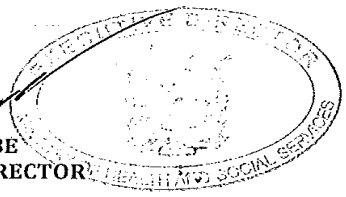
3.5 Preliminary findings to be submitted upon completion of the study;

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.

4. All the cost implications that will result from this study will be the responsibility of the applicant and **not** of the MoHSS.

Yours sincerely,



BEN MANGOMBE
EXECUTIVE DIRECTOR

"Health for All"

APPENDIX C: PERMISSION LETTER KATUTURA INTERMEDIATE HOSPITAL

Republic of Namibia

Ministry of Health and Social Services

Private Bag 13215 **WINDHOEK** Namibia	Intermediate Hospital Katutura Independence Avenue **WINDHOEK**	Telephone (061) 203 4004/5 Telefax (061) 222706

Enquiries: Dr. F. M. Shiweda

Date: 19 March 2021

OFFICE OF THE MEDICAL SUPERINTENDENT

Ms. Kalista S. Runone
P.O. Box 8247
Bachbrecht
Windhoek

Dear Ms. K. S. Runone

RE: **FACTORS ASSOCIATED WITH STILLBIRTH DURING INTRAPARTUM CARE AT THE WINDHOEK CENTRAL AND KATUTURA HOSPITAL, KHOMAS REGION, NAMIBIA.**

The above mentioned subject refers:

This office hereby grants you permission to do a research on factors associated with stillbirth during intrapartum care at Intermediate Hospital Katutura, Windhoek, Khomas Region.

Thank you.

Please provide this office with a copy of your findings.

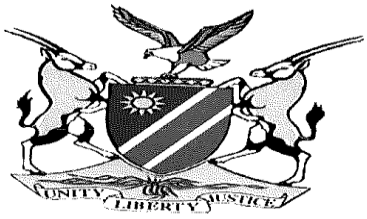
Yours in health,

19/3/2021

DR. F. M. SHIWEDA
CHIEF MEDICAL OFFICER

MINISTRY OF HEALTH
AND SOCIAL SERVICES
PRIVATE BAG 13215
WINDHOEK NAMIBIA
19 MAR 2021
INTERMEDIATE HOSPITAL KATUTURA

APPENDIX D: PERMISSION LETTER WINDHOEK CENTRAL HOSPITAL



Private Bag 13215 Windhoek Namibia	Harvey Street Windhoek Central Hospital	Tel. No: (061) 203 3024 Fax No: (061) 222886
Enquiries: Mrs. A.U.MOOTU	Ref.	Date: 19 March 2021

OFFICE OF THE MEDICAL SUPERINTENDENT

Ms. Kalista S. Runone
0812035815

Dear Ms. Runone

SUBJECT: PERMISSION TO CONDUCT A STUDY ON FACTORS ASSOCIATED WITH STILBIRTH DURING INTRAPARTUM CARE AT WINDHOEK CENTRAL HOSPITAL.

1. Reference is made to your application to conduct the above-mentioned study.

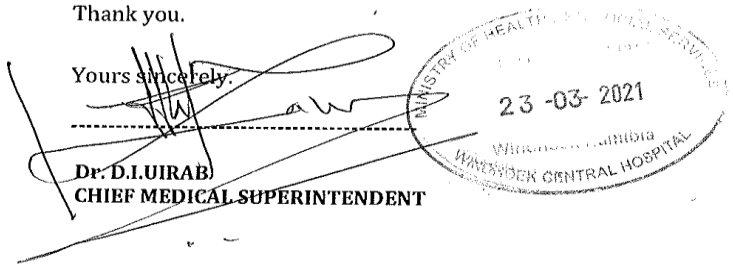
2. This letter serves to inform you that permission has been granted for you to conduct a study at Windhoek Central Hospital, on the above mentioned subject as you have requested and does not include any remuneration.

3. Patient/Client's information should be kept confidential at all times.

4. Preliminary findings to be submitted to Customer care office, Windhoek Central Hospital upon completion of the study.

Thank you.

Yours sincerely.



Dr. D.I.UIRAB
CHIEF MEDICAL SUPERINTENDENT

APPENDIX E: DATA COLLECTION CHECKLIST

PERINATAL DEATH REVIEW FORM

Instructions: (i.e. stillbirth during intrapartum care or within 24 hours after birth).

Health Facility	Date of Audit	Date of Data Collection

Record's Unique number: ……..

SECTION 1: **Identification and demographic factors**

Name of Health Facility: ……

District / Region: ……....

Type of Health Facility (tick one):

National	Referral / Teaching	Regional	District	General	Health Centre	Other (specify) ……

Level of Health Facility (tick one): Basic EmONC ☐ Comprehensive EmONC ☐

Is this a Helping Baby Breath (HBB) Facility? Yes ☐ No ☐

SECTION 2: **MATERNAL FACTORS**

Mother's Age: ..... (In years)

Mother's Address (tick one): Rural ☐ Semi-urban ☐ Urban ☐

Mother's Country / District:

……..

Mother's employment status: employed ☐ unemployed ☐

Mother's marital status:

Single ☐ married ☐ divorced ☐ widowed ☐

Was mother referred from another facility? Yes ☐ No ☐

If Yes, from which facility?

……..

SECTION 3: **Obstetric Factors** in **pregnancy**

Mother's Parity: Para …….. + …… No. of Children Alive …….……

Type of pregnancy (tick one): Singleton ☐ Multiple Gestation ☐

Antenatal Care Attendance: Yes ☐ No ☐

If yes, number of visits?

3 or more	1 or 2	none

ANC Interventions (tick all that apply):

Interventions	Yes	No	Follow-Up Questions	Response to Follow-Up Questions
Iron and Folate given?			If yes, for how long?	
Anti-malaria prophylaxis given?			If yes, how many doses?	
Tetanus Toxoid given?			If yes, how many doses?	
HIV test done?			If yes, +ve or –ve result? If +ve, on ARV?	
Syphilis test done?			If yes, +ve or –ve result? If +ve, any treatment?	
Rhesus blood group checked?			If yes, +ve or –ve result? If RhD –ve, Treatment?	

Conditions present during this pregnancy and before onset of labour (tick all that apply)

Conditions	Yes	No	Follow-Up Questions	Response to Follow Up Questions
Antepartum haemorrhage			If yes, mention treatment	
Malaria			If yes, mention Treatment	
Hypertensive disorders (PIH, pre-eclampsia, eclampsia)			If yes, mention Treatment	
Diabetes			If yes, mention Treatment	
Pre-mature rupture of membranes			If yes, mention Treatment	
Anaemia (Hb)			If yes, mention Treatment	
Urinary tract infection			If yes, mention Treatment	
Trauma (due to accident or gender-based violence)			If yes, mention Treatment	
Other (specify)			If yes, mention Treatment	

SECTION 4: **OBSTETRIC FACTORS DURING LABOUR AND BIRTH**

Gestational Age (in weeks): …….. Cervical Dilatation on Admission: ….……. cm

Reason for Admission:
……

Date of Admission (DD/MM/YYYY): ……..……Time of Admission: ……

Date of Delivery (DD/MM/YYYY): ……Time of Delivery: …….

Date of Discharge (DD/MM/YYYY): ……..

Place of delivery (tick one):

Health facility ☐ (specify) …….

Other ☐ (specify) …….

Attendant at delivery

RN/M	EN/M	Medical Officer	Medical intern

Onset of labour	spontaneous	induced	c/s before onset	Not indicated

On admission, was foetal sound present? Yes ☐ No ☐ Not assessed ☐

Was partograph used? Yes ☐ No ☐ Unknown ☐

If 'Yes', was partograph used correctly? Yes ☐ No ☐

If 'No', mention error:

……

Any Obstetric Complications?

……

……

Presentation (tick one):

Cephalic ☐

Breech ☐

Others (specify):

……

Mode of Delivery (tick one):

Spontaneous Vaginal Delivery ☐

Caesarean Section ☐

Vacuum ☐

Forceps ☐

Others (specify): .....

Indication(s) for Instrumental / Caesarean Delivery:

…..…….....

……

Time between decisions for CS / instrumental and actual delivery of the baby:

Less than 30 minutes ☐ 30 minutes - 1 hour ☐

Greater than 1 hour ☐ How Long? .....……. Not documented ☐

Mother's Outcome: Alive ☐ Died ☐

Any Morbidity? (Specify) …….

SECTION 5: **Fetal factors**

Weight of the baby (in grams): …….

Sex: Female ☐ Male ☐

Baby's Condition at Birth: Alive ☐ Fresh SB ☐ Macerated SB ☐

Any congenital anomaly noted: ……..……

Apgar Score: At 1 min: …….. At 5 min: …….. At 10 min: …….

Resuscitation attempted with Ambubag? Yes ☐ No ☐

If born alive, select one: Kept with Mother ☐ Referred ☐

If born alive, state when the baby died: ……..…… (Hours after delivery)

Placenta and umbilical condition

……
……
……

SECTION 6: CAUSES AND MODIFIABLE FACTORS

Probable Cause(s) of Death:

(E.g. congenital anomaly, HIV, hypertension, placenta previa, asphyxia, umbilical prolapse, ruptured uterus, etc.). If more than one cause, list the most likely cause(s) first.

1. ……

2. ……

3. ……

4. ……

Modifiable Factors: Use comment section for clarifications.

Factors	Yes	No	Support with facts
Delay to seek health care			
Delay to reach the health facility			
Delay to provide care after arrival at health facility			
Were instructions, guidelines and/or protocols followed? (action not taken; inappropriate action taken; delay in referral			
Was the right intervention used? e.g. partograph used; inadequate monitoring, delay in calling for assistance; ; inappropriate discharge			
Was relevant and adequate documentation made?			
Others (specify):			

APPENDIX F: MOTHER'S PLACE OF RESIDENCE * BABY CONDITION AT BIRTH CROSSTABULATION

			Baby condition at birth		
			Alive	Fresh SB	Total
Mother place of residence	Rural	Count	1	4	5
		Expected Count	1.0	4.0	5.0
		% within Mother place of residence	20.0%	80.0%	100.0%
		% within Baby condition at birth	2.7%	2.7%	2.7%
		% of Total	0.5%	2.2%	2.7%
	Semi-Urban	Count	13	38	51
		Expected Count	10.1	40.9	51.0
		% within Mother place of residence	25.5%	74.5%	100.0%
		% within Baby condition at birth	35.1%	25.5%	27.4%
		% of Total	7.0%	20.4%	27.4%
	Urban	Count	23	107	130
		Expected Count	25.9	104.1	130.0
		% within Mother place of residence	17.7%	82.3%	100.0%
		% within Baby condition at birth	62.2%	71.8%	69.9%
		% of Total	12.4%	57.5%	69.9%
Total		Count	37	149	186
		Expected Count	37.0	149.0	186.0
		% within Mother place of residence	19.9%	80.1%	100.0%
		% within Baby condition at birth	100.0%	100.0%	100.0%
		% of Total	19.9%	80.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.398[a]	2	.497
Likelihood Ratio	1.348	2	.510
Linear-by-Linear Association	1.005	1	.316
N of Valid Cases	186		

APPENDIX G: RECORDED PROBABLE CAUSES OF DEATH * ANC ATTENDANCE CROSSTABULATION

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.458[a]	4	.167
Likelihood Ratio	7.176	4	.127
Linear-by-Linear Association	1.645	1	.200
N of Valid Cases	184		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.59.

			ANC Attendance		
			Yes	No	Total
RECORDED PROB CAUSES OF DEATH	Asphyxia	Count	71	23	94
		Expected Count	71.5	22.5	94.0
		% within RECORDED PROB CAUSES OF DEATH	75.5%	24.5%	100.0%
		% within ANC Attendance	50.7%	52.3%	51.1%
		% of Total	38.6%	12.5%	51.1%
	Prematurity	Count	10	6	16
		Expected Count	12.2	3.8	16.0
		% within RECORDED PROB CAUSES OF DEATH	62.5%	37.5%	100.0%
		% within ANC Attendance	7.1%	13.6%	8.7%
		% of Total	5.4%	3.3%	8.7%
	Placenta Abruptio	Count	25	11	36
		Expected Count	27.4	8.6	36.0
		% within RECORDED PROB CAUSES OF DEATH	69.4%	30.6%	100.0%
		% within ANC Attendance	17.9%	25.0%	19.6%
		% of Total	13.6%	6.0%	19.6%
	Multiple Congenital Abnormalities	Count	14	1	15
		Expected Count	11.4	3.6	15.0
		% within RECORDED PROB CAUSES OF DEATH	93.3%	6.7%	100.0%
		% within ANC Attendance	10.0%	2.3%	8.2%
		% of Total	7.6%	0.5%	8.2%

Others	Count	20	3	23
	Expected Count	17.5	5.5	23.0
	% within RECORDED PROB CAUSES OF DEATH	87.0%	13.0%	100.0%
	% within ANC Attendance	14.3%	6.8%	12.5%
	% of Total	10.9%	1.6%	12.5%
Total	Count	140	44	184
	Expected Count	140.0	44.0	184.0
	% within RECORDED PROB CAUSES OF DEATH	76.1%	23.9%	100.0%
	% within ANC Attendance	100.0%	100.0%	100.0%
	% of Total	76.1%	23.9%	100.0%

APPENDIX H: INDICATIONS FOR INSTRUMENT/CAESAREAN SECTION DELIVERY * TIME BETWEEN DECISIONS FOR CS INTRUMENT AND ACTUAL DELIVERY CROSSTABULATION

			Time between decisions for CS/Instrument and actual delivery				
			less than 30 minutes	Between 30 minutes – one hour	Greater than one hour	Not documented	Total
INDICATIONS FOR INTSTRUMENTAL/CAEAREAN DELIVERY	Severe PET	Count	0	0	3	0	3
		Expected Count	.3	1.3	1.4	.1	3.0
		% within INDICATIONS FOR INTSTRUMENTAL/CAEAREAN DELIVERY	0.0%	0.0%	100.0%	0.0%	100.0%
		% within Time between decisions for CS/Instrument and actual delivery	0.0%	0.0%	10.7%	0.0%	5.0%
		% of Total	0.0%	0.0%	5.0%	0.0%	5.0%
	Placenta Abruptio	Count	3	7	9	0	19
		Expected Count	1.9	7.9	8.9	.3	19.0
		% within INDICATIONS FOR INTSTRUMENTAL/CAEAREAN DELIVERY	15.8%	36.8%	47.4%	0.0%	100.0%
		% within Time between decisions for C/S Instrument and actual delivery	50.0%	28.0%	32.1%	0.0%	31.7%
		% of Total	5.0%	11.7%	15.0%	0.0%	31.7%
	Prolonged 1st Stage	Count	0	0	2	0	2
		Expected Count	.2	.8	.9	.0	2.0
		% within INDICATIONS FOR	0.0%	0.0%	100.0%	0.0%	100.0%

		INSTRUMENTAL/CAEAREAN DELIVERY				
		% within Time between for CS Instrument and actual delivery	0.0%	0.0%	7.1%	0.0%	3.3%
		% of Total	0.0%	0.0%	3.3%	0.0%	3.3%
	Prolonged 2nd Stage	Count	0	4	1	0	5
		Expected Count	.5	2.1	2.3	.1	5.0
		% within INDICATIONS FOR INTSTRUMENTAL/CAEAREAN DELIVERY	0.0%	80.0%	20.0%	0.0%	100.0%
		% within Time between decisions for C/S Instrumental and actual delivery	0.0%	16.0%	3.6%	0.0%	8.3%
		% of Total	0.0%	6.7%	1.7%	0.0%	8.3%
	Foetal Distress	Count	1	7	6	0	14
		Expected Count	1.4	5.8	6.5	.2	14.0
		% within INDICATIONS FOR INTSTRUMENTAL/CAEAREAN DELIVERY	7.1%	50.0%	42.9%	0.0%	100.0%
		% within Time between decisions for C/S Instrumental and actual delivery	16.7%	28.0%	21.4%	0.0%	23.3%
		% of Total	1.7%	11.7%	10.0%	0.0%	23.3%
	Others	Count	2	7	7	1	17
		Expected Count	1.7	7.1	7.9	.3	17.0
		% within INDICATIONS FOR	11.8%	41.2%	41.2%	5.9%	100.0%

	INTSTRUMENTAL/CAEAREAN DELIVERY					
	% within Time between decisions for C/S Instrumental and actual delivery	33.3%	28.0%	25.0%	100.0%	28.3%
	% of Total	3.3%	11.7%	11.7%	1.7%	28.3%
Total	Count	6	25	28	1	60
	Expected Count	6.0	25.0	28.0	1.0	60.0
	% within INDICATIONS FOR INTSTRUMENTAL/CAEAREAN DELIVERY	10.0%	41.7%	46.7%	1.7%	100.0%
	% within Time between decisions for C/S Instrumental and actual delivery	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	10.0%	41.7%	46.7%	1.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.485[a]	15	.642
Likelihood Ratio	14.544	15	.485
Linear-by-Linear Association	.090	1	.765
N of Valid Cases	60		

a. 18 cells (75.0%) have expected count less than 5. The minimum expected count is .03.

APPENDIX I: RECORDED PROBABLE CAUSES OF DEATH * ANY CONGENITAL ANOMALY NOTED CROSS TABULATION

		Any congenital anomaly noted		
		Yes	no	Total
Asphyxia	Count	4	90	94
	Expected Count	11.8	82.3	94.0
	% within RECORDED PROB CAUSES OF DEATH	4.3%	95.7%	100.0%
	% within Any congenital anomaly noted	17.4%	55.9%	51.1%
	% of Total	2.2%	48.9%	51.1%
Prematurity	Count	1	15	16
	Expected Count	2.0	14.0	16.0
	% within RECORDED PROB CAUSES OF DEATH	6.3%	93.8%	100.0%
	% within Any congenital anomaly noted	4.3%	9.3%	8.7%
	% of Total	0.5%	8.2%	8.7%
Placenta Abruptio	Count	2	34	36
	Expected Count	4.5	31.5	36.0
	% within RECORDED PROB CAUSES OF DEATH	5.6%	94.4%	100.0%
	% within Any congenital anomaly noted	8.7%	21.1%	19.6%
	% of Total	1.1%	18.5%	19.6%
Multiple Congenital Abnormalities	Count	14	1	15
	Expected Count	1.9	13.1	15.0
	% within RECORDED PROB CAUSES OF DEATH	93.3%	6.7%	100.0%
	% within Any congenital anomaly noted	60.9%	0.6%	8.2%
	% of Total	7.6%	0.5%	8.2%
Others	Count	2	21	23
	Expected Count	2.9	20.1	23.0
	% within RECORDED PROB CAUSES OF DEATH	8.7%	91.3%	100.0%
	% within Any congenital anomaly noted	8.7%	13.0%	12.5%
	% of Total	1.1%	11.4%	12.5%
Total	Count	23	161	184
	Expected Count	23.0	161.0	184.0

	% within RECORDED PROB CAUSES OF DEATH	12.5%	87.5%	100.0%
	% within Any congenital anomaly noted	100.0%	100.0%	100.0%
	% of Total	12.5%	87.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	97.915[a]	4	.000
Likelihood Ratio	61.700	4	.000
Linear-by-Linear Association	16.933	1	.000
N of Valid Cases	184		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.88.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.729			.000
	Cramer's V	.729			.000
	Contingency Coefficient	.589			.000
Interval by Interval	Pearson's R	-.304	.070	-4.308	.000[c]
Ordinal by Ordinal	Spearman Correlation	-.309	.069	-4.383	.000[c]
N of Valid Cases		184			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

APPENDIX J: MODE OF DELIVERY * IF APH IS YES, THEN MENTION TREATMENT CROSS TABULATION

			IF APH IS YES, THEN MENTION TREATMENT		
			C - SECTION	SPONTANEUS VAGINAL DELIVERY	Total
Mode of delivery	Spontaneous vaginal delivery	Count	0	19	19
		Expected Count	1.4	17.6	19.0
		% within Mode of delivery	0.0%	100.0%	100.0%
		% within IF APH IS YES, THEN MENTION TREATMENT	0.0%	51.4%	47.5%
		% of Total	0.0%	47.5%	47.5%
	Caesarean Section	Count	3	18	21
		Expected Count	1.6	19.4	21.0
		% within Mode of delivery	14.3%	85.7%	100.0%
		% within IF APH IS YES, THEN MENTION TREATMENT	100.0%	48.6%	52.5%
		% of Total	7.5%	45.0%	52.5%
Total		Count	3	37	40
		Expected Count	3.0	37.0	40.0
		% within Mode of delivery	7.5%	92.5%	100.0%
		% within IF APH IS YES, THEN MENTION TREATMENT	100.0%	100.0%	100.0%
		% of Total	7.5%	92.5%	100.0%

APPENDIX K: TIME BETWEEN DECISIONS FOR CEASAREAN SECTION/ INSTRUMENTAL AND ACTUAL DELIVERY * DELAY TO PROVIDE CARE AFTER ARRIVAL AT HEALTH FACILITY CROSS TABULATION

			Delay to provide care after arrival at health facility		
			yes	no	Total
Time between decisions for CS Instrumental and actual delivery	less than 30 minutes	Count	1	5	6
		Expected Count	1.5	4.5	6.0
		% within Time between decisions for C/S Instrumental and actual delivery	16.7%	83.3%	100.0%
		% within Delay to provide care after arrival at health facility	6.7%	10.6%	9.7%
		% of Total	1.6%	8.1%	9.7%
	Between 30 minutes – one hour	Count	1	24	25
		Expected Count	6.0	19.0	25.0
		% within Time between decisions for C/S Instrumental and actual delivery	4.0%	96.0%	100.0%
		% within Delay to provide care after arrival at health facility	6.7%	51.1%	40.3%
		% of Total	1.6%	38.7%	40.3%
	Greater than one hour	Count	13	17	30
		Expected Count	7.3	22.7	30.0
		% within Time between decisions for C/S Instrumental and actual delivery	43.3%	56.7%	100.0%
		% within Delay to provide care after arrival at health facility	86.7%	36.2%	48.4%
		% of Total	21.0%	27.4%	48.4%
	Not documented	Count	0	1	1
		Expected Count	.2	.8	1.0

	% within Time between decisions for C/S Instrumental and actual delivery	0.0%	100.0%	100.0%
	% within Delay to provide care after arrival at health facility	0.0%	2.1%	1.6%
	% of Total	0.0%	1.6%	1.6%
Total	Count	15	47	62
	Expected Count	15.0	47.0	62.0
	% within Time between decisions for C/S Instrumental and actual delivery	24.2%	75.8%	100.0%
	% within Delay to provide care after arrival at health facility	100.0%	100.0%	100.0%
	% of Total	24.2%	75.8%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.055[a]	3	.007
Likelihood Ratio	13.751	3	.003
Linear-by-Linear Association	6.011	1	.014
N of Valid Cases	62		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .24.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.441			.007
	Cramer's V	.441			.007
	Contingency Coefficient	.403			.007
Ordinal by Ordinal	Kendall's tau-b	-.345	.108	-2.988	.003
	Kendall's tau-c	-.322	.108	-2.988	.003
	Gamma	-.679	.192	-2.988	.003
	Spearman Correlation	-.359	.111	-2.979	.004[c]
Interval by Interval	Pearson's R	-.314	.115	-2.561	.013[c]
N of Valid Cases		62			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis. c. Based on normal approximation

APPENDIX L: FITTING A GENERALIZED LINEAR **MODEL PROBIT MODEL**

Categorical Variable Information

			N	Percent
Dependent Variable	Baby condition at birth	Alive	37	20.6%
		Fresh SB	143	79.4%
		Total	180	100.0%
Factor	Mother place of residence	Rural	5	2.8%
		Semi-Urban	47	26.1%
		Urban	128	71.1%
		Total	180	100.0%
	RECORDED PROB CAUSES OF DEATH	Asphyxia	93	51.7%
		Prematurity	13	7.2%
		Placenta Abruptio	36	20.0%
		Multiple Congenital Abnormalities	15	8.3%
		Others	23	12.8%
		Total	180	100.0%
	Mode of delivery	Spontaneous vaginal delivery	111	61.7%
		Caesarean Section	63	35.0%
		Vacuum	5	2.8%
		Other	1	0.6%
		Total	180	100.0%
	Presentation	Cephalic	154	85.6%
		Breech	22	12.2%
		Other	4	2.2%
		Total	180	100.0%

Goodness of Fit[a]

	Value	Df	Value/df
Deviance	167.532	162	1.034
Scaled Deviance	167.532	162	
Pearson Chi-Square	177.897	162	1.098
Scaled Pearson Chi-Square	177.897	162	
Log Likelihood	-83.766		
Akaike's Information Criterion (AIC)	195.532		
Finite Sample Corrected AIC (AICC)	198.077		
Bayesian Information Criterion (BIC)	240.233		
Consistent AIC (CAIC)	254.233		

Dependent Variable: Baby condition at birth
Model: Mother place of residence, RECORDED_CAUSES_DEATH, Mode of delivery, Presentation, Mother age, Gestational age
a. Information criteria are in smaller-is-better form.
b. The full log likelihood function is displayed and used in computing information criteria.

Omnibus Test[a]

Likelihood Ratio Chi-Square	df	Sig.
82.001	14	.000

Dependent Variable:

Baby condition at birth

Model: Mother place of residence,

RECORDED_CAUSES_DEATH,

Mode of delivery, Presentation,

Mother age, Gestational age

a. Compares the fitted model against

the null model.

Tests of Model Effects

Source	Type III		
	Wald Chi-Square	df	Sig.
Mother place of residence	2.229	2	.328
RECORDED_CAUSES_DEATH	9.903	4	.042
Mode of delivery	1.624	3	.654
Presentation	.106	2	.948
Mother age	.501	1	.479
Gestational age	.063	1	.801

Dependent Variable: Baby condition at birth

Model: Mother place of residence, RECORDED_CAUSES_DEATH, Mode of delivery, Presentation, Mother age, Gestational age

APPENDIX M: PARAMETER ESTIMATES

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
			Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper
[Mother place of residence=1]	-6.866	27573.5031	-54049.939	54036.207	.000	1	1.000	.001	.000	.[a]
[Mother place of residence=2]	-6.478	27573.5030	-54049.551	54036.595	.000	1	1.000	.002	.000	.[a]
[Mother place of residence=3]	-6.841	27573.5030	-54049.914	54036.232	.000	1	1.000	.001	.000	.[a]
[RECORDED_CAUSES_DEATH=1]	-.563	.3265	-1.203	.077	2.976	1	.085	.569	.300	1.080
[RECORDED_CAUSES_DEATH=2]	-.066	.5132	-1.072	.940	.016	1	.898	.936	.342	2.561
[RECORDED_CAUSES_DEATH=3]	-1.315	.4485	-2.194	-.436	8.597	1	.003	.268	[0.111; 0.647]	.647
[RECORDED_CAUSES_DEATH=4]	-.288	.4666	-1.202	.627	.380	1	.538	.750	.301	1.872
[RECORDED_CAUSES_DEATH=5]	0[b]	.	.	.	.	.	.	1	.	.
[Mode of delivery=1]	6.533	27573.5030	-54036.540	54049.606	.000	1	1.000	687.530	.000	.[a]
[Mode of delivery=2]	6.687	27573.5030	-54036.386	54049.760	.000	1	1.000	801.722	.000	.[a]
[Mode of delivery=3]	7.280	27573.5030	-54035.793	54050.353	.000	1	1.000	1450.567	.000	.[a]
[Mode of delivery=5]	0[b]	.	.	.	.	.	.	1	.	.
[Presentation=1]	-.078	.7318	-1.513	1.356	.011	1	.915	.925	.220	3.880
[Presentation=2]	-.184	.7928	-1.738	1.370	.054	1	.816	.832	.176	3.934
[Presentation=3]	0[b]	.	.	.	.	.	.	1	.	.
Mother age	-.012	.0169	-.045	.021	.501	1	.479	.988	.956	1.021
Gestational age	.008	.0314	-.054	.069	.063	1	.801	1.008	.948	1.072
(Scale)	1[c]									

Dependent Variable: Baby condition at birth. Model: Mother place of residence, RECORDED_CAUSES_DEATH, Mode of delivery, Presentation, Mother age, Gestational age, a. Set to system missing due to overflow, b. Set to zero because this parameter is redundant, c. Fixed at the displayed value.