

**FACTORS ASSOCIATED WITH ADVERSE PREGNANCY OUTCOMES
AMONG WOMEN WHO DELIVERED AT INTERMEDIATE HOSPITAL OSHAKATI**

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ABSTRACT

Globally an estimate of 350 000 to 500 000 women die annually from preventable causes related to pregnancy and childbirth. An adverse pregnancy outcome is an incident which reduces the chance of having a healthy baby, two or more 1st trimester miscarriage. Previous studies reveal that adverse pregnancy outcomes were threatening the lives of both the mother and child. The burden of adverse pregnancy outcomes among women who deliver at Intermediate Hospital Oshakati is a major public health concern. It has frequently been reported in the local media that adverse pregnancy outcomes among women in Namibia is a common occurrence. The objective of this study was to determine and describe the factors associated with adverse pregnancy outcomes and compare the adverse pregnancy outcomes between teenage and older mothers.

A quantitative analytical, contextual, cross-sectional study was conducted. Pregnant women who delivered at Intermediate Hospital Oshakati from July to September 2015 were interviewed, using a structured questionnaire. Information on demographic, potential risk factors and adverse pregnancy outcomes were collected and analyzed using Epi info.

We enrolled a total of 306 pregnant women of whom 50% (n=153) were teenage and 50% (n=153) were older mothers. A total of n=164 (53.60%) had adverse pregnancy outcomes, whereas n=142 (46.40%) did not have adverse pregnancy outcomes. Significant bivariate results included regions (OR 0.33, 95%CI: 0.12-0.94, p=0.0314), residential areas (OR=0.43, 95%CI: 0.25-0.74, p=0.0021), gestational weeks (OR 0.75, 95%CI: 0.65-0.88, p=0.0004), BMI (OR 0.56, 95%CI: 0.32-0.98, p=0.0430), haemoglobin (OR 0.33, 95%CI: 0.16-0.69, p=0.0029), and blood pressure (OR 9.56, 95%CI: 1.19-77.5, p=0.0334).

The adverse pregnancy outcomes are a real public health issue, which need to be addressed. It is recommended that each district hospitals have specialists in obstetric care and advanced midwifery, and to sensitize all pregnant women about the adverse pregnancy outcomes and how to prevent it.

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DEDICATION

This thesis is dedicated to my loving husband, Israel Mungoba for his continuous encouragement, support and unconditional love and to my beautiful daughters, Tunohole and Twapewa-Ashihe as well as my lovely son Tuposhili-Tulongeni. Let my accomplishment be a source of inspiration.

DECLARATION

I, Teopolina Natangwe Mungoba, hereby declare that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree at any other institution of higher learning.

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Date

ABBREVIATIONS

ANC	Antenatal care
APOs	Adverse Pregnancy Outcomes
ART	Antiretroviral Therapy
BEmOC	Basic Emergency Obstetric Care
BMI	Body Mass Index
CDC	Center for Disease Control
CEmOC	Comprehensive Emergency Obstetric Care
CS	Caesarean Section
DHS	Demographic and Health Survey
DRC	Democratic Republic of Congo
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
IHO	Intermediate Hospital Oshakati
LBW	Low Birth Weight
MDGs	Millennium Development Goals
MMR	Maternal Mortality Rate
MoHSS	Ministry of Health and Social Services
MOWAC	Ministry of Women and Children's affairs
MTCT	Mother –to- Child Transmission
PHC	Primary Health Care
PTB	Preterm Birth
SGA	Small for Gestational Age
UNAIDS	Joint United Nations Program on HIV / AIDS
UN	United Nations
UNAM	University of Namibia

UNICEF	United Nations International Children's Emergency Fund
UNIFEM	United Nations Development Fund for women
UK	United Kingdom
WHO	World Health Organization

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CHAPTER 1

ORIENTATION AND BACKGROUND OF THE STUDY

1.1 INTRODUCTION

Globally, the leading cause of death among females aged 15-49 years old is maternal mortality (Benedict, Geoffrey & Kaontie, 2011). It is reported that globally an estimate of 350 000 to 500 000 women die annually from preventable causes related to pregnancy and childbirth. Namibia as a member of the international community with its own challenges in the health system has also contributed to these mortality figures (UN, 2010 & McKinsey, 2010). Each day approximately 800 women die from preventable causes related to pregnancy and childbirth resulting in an estimated 550 000 maternal mortality annually (WHO, 2005).

An adverse pregnancy outcome is an incident which reduces the chance of having a healthy baby, two or more 1st trimester miscarriage. The adverse pregnancy outcomes in the 2nd trimester were: pregnancy loss (>12 weeks), preterm birth, pre-eclampsia or eclampsia, fetal growth restriction, abruption placenta, fetal death/stillbirth or other conditions related to pregnancy loss (Winthrop-University Hospital, 2015).

Adverse pregnancy outcomes in rural Maharashtra, India (2008-2009) were carried out and indicated that women from tribal (Primary Health Care) PHC are exposed to higher risk of adverse pregnancy outcomes in the form of stillbirths. It was decided to study pregnancy outcomes, which serves as a proxy to the quality of maternal health care services; and while deliberating infant mortality, neonatal deaths received sufficient focus; however stillbirths are not taken into account adequately (WHO, 2007). Global estimates indicate that early neonatal deaths and stillbirths are of equal magnitude (WHO, 2006).

In 2010, the WHO, UNICEF, UNFPA and the World Bank estimated that about 260 women die per 100 000 live births worldwide, and most of these deaths occur in developing countries particularly in the Sub-Saharan Africa. These estimates indicate that Africa recorded the highest Maternal Mortality Ratio (MMR) of 620 per 100 000 live births, whilst Europe recorded the lowest maternal mortality rate of 16 maternal mortality per 100 000 live births (WHO, 2012).

Another study conducted at Parkland Hospital in India revealed that adverse pregnancy outcomes were a threat to the lives of both the mother and the child. The study showed that 1, 7% of almost 22 000 women delivering required admission to Intensive Care Unit (ICU) and the most common conditions compelling transfers are

hypertensive disorders 40%, obstetrical haemorrhage 15% and pulmonary insufficiency 9% (Cunningham, 2011).

In Canada postpartum haemorrhage is a major cause of maternal death and an important cause of severe maternal morbidity, therefore it represents a life-threatening obstetrical emergency (Wise & Clark, 2008). The increase in postpartum haemorrhage occurs against a background of increases in older maternal age, obesity, multiple births, deliveries to women with a previous caesarean section, induction and augmentation of labour and caesarean section deliveries (Joseph., Rouleau., Kramer., Young., Liston., Baskett, 2007).

In Pakistan the study reported that puerperal pyrexia and sepsis are highly preventable problems occurring among the leading causes of maternal morbidity and mortality not only in the developing countries but also in developed countries as well (Dushyant, 2007). A study conducted in Nigeria reported that puerperal sepsis is a second leading cause of death accounting for 26.3% of maternal deaths, while another WHO report estimated 358,000 maternal deaths yearly occurring due to child birth problems and out of these up to 15% are associated with puerperal sepsis (WHO, 2010). The puerperal sepsis/pyrexia presents commonly with fever and other symptoms like

pelvic pain, foul smelling vaginal discharge and delayed reduction of the uterine size (Van Dillen., Zwart., Schutte., Van Roosmalen, 2010).

In Norway other studies have primarily addressed physical abuse during pregnancy as a cause of adverse pregnancy outcomes. Violence against women is a significant public health problem, and a recent report from WHO states that 35% of women worldwide have experienced either physical or sexual intimate partner violence or non-partner sexual violence (Garcia-Moreno, 2013). Pregnancy does not protect women from violence and the prevalence of physical or sexual violence during pregnancy ranges from 3.4% to 11% in high-income countries. It is recognized that violence has an adverse outcomes on women's physical, sexual, reproductive and mental health (Garcia-Moreno, 2006).

Pre-eclampsia is one of the most common complications of pregnancy, with incidence rates in the United States of 2% - 7% among healthy, primiparous women. The only cure for preeclampsia is delivery. Consequently, pre-eclampsia remains one of the most common complications resulting in a medically indicated preterm delivery (Ananth & Vintzileos, 2006). Studies conducted previously indicate that maternal smoking increases the risk of several major pregnancy complications including

intrauterine growth restriction, placenta abruption, low birth weight and preterm delivery (Ananth & Cnattingius, 2007).

Sub-Saharan Africa accounts for half of the world's burden of maternal, newborn and child death with over 13 000 mothers, newborns and children dying every day (WHO, 2007). In Zimbabwe, perinatal mortality remains unacceptably high. In Harare, the capital city, perinatal mortality declined from 83 per 1000 live births in 1978, to 34 per 1000 live births in 1984 and has changed little since then. In 1983, an audit of all births occurring within the Greater Harare Maternity Unit (GHMU), which comprises of Harare Maternity Hospital (HMH) and the 12 municipal clinics in Harare, estimated perinatal mortality to be 34.5 per 1000 live births, with preterm birth being the leading cause of perinatal mortality, accounting for 19.3% of perinatal deaths (CDC, 2010).

Neonatal mortality in Botswana remains high, estimated at 46 per 1000 live births in 2004 (UNICEF, 2008). Low birth weight infants (< 2500 grams) are at risk for early death (United National Children's Fund & WHO, 2004). Weight by gestational age is an important outcome that controls for effects of prematurity and is interpreted as a proxy for intrauterine growth restriction (WHO, 2006).

The Government of Namibia along with other countries of the world, at the turn of the century adopted the Millennium Development Goals (MDGs), which are to be achieved by 2015. Goal number five (MDG 5) relates to maternal health and seeks a reduction by three quarters of the 1990 level of maternal mortality ratio by 2015. The Demographic and Health Survey (DHS) conducted in the year 2006 - 2007 in Namibia indicated that death associated with pregnancy and childbearing age were 449/100 000. This is a significant increase from 271/100 000 in 2000 (MoHSS & Macro International, 2008). As we are already in 2015, there is a real concern regarding whether Namibia will be able to achieve that target of reducing 75% of the year 1990's Maternal Mortality Rate (MMR) as set by MDG 5 by 2015.

Since independence in 1990, Namibia has introduced various programs to address the health needs of women and children. The Safe Motherhood Initiative was introduced in Namibia in 1991 and the Roadmap for the Acceleration of the Reduction of Maternal and Child Health was introduced in 2006 (MoHSS, 2007). In Namibia, maternal mortality is one of the adverse pregnancy outcomes. The maternal mortality rate has increased over the past two decades, from 225 deaths per 100 000 live births in 1992, to 271 per 100 000 live births in the year 2000 and to 449 per 100 000 live births in 2006/2007 (MoHSS, 2011). However, during the period from 1st January

2008 to 31st May 2010 maternal deaths have been reported as indicated in Table 1 from the regions where the study was conducted.

Table 1.1 Maternal deaths reported in Namibia, 1st January, 2008 - 31st May, 2010

REGION	NUMBER OF REPORTED MATERNAL DEATHS
Otjozondjupa	8
Kavango	21
Oshikoto	16
Oshana	37
Omusati	9
Ohangwena	11
Kunene	1
Caprivi	10
GRAND TOTAL	113

Source: (MoHSS, 2011) [Regional annual report 2008/9 &2009/10]

The table above indicates that maternal deaths are still occurring in health facilities in Namibia with Oshana region reporting the highest cases. However it seems that the

full extent and information on maternal deaths in the country may not be known as the figures presented relate to health facility-based maternal deaths mostly reported in maternity wards. Therefore this study intends to rule out the factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati, Oshana region, in Namibia.

Oshana is one of the northern regions of Namibia, and has three towns, namely Oshakati, Ongwediva and Ondangwa as its capital with a catchment population of 176 674 people. The population grew at an annual rate of 0.9% between 2001 and 2011. The total population of women of child-bearing age for 15 to 49 years old is 46 446, which is 26% of the region's entire population (Census, 2011). The Oshana region is one of the three regions in Namibia without either a coastline or foreign border. The region shares its borders with the Ohangwena region to the north, Oshikoto region to the east, Kunene region to the south and Omusati region to the west. Oshana region has one district, one teaching referral hospital, one private hospital, five health centers, eleven clinics and forty-three outreach points.

1.2 STATEMENT OF THE PROBLEM

The burden of adverse pregnancy outcomes among women who deliver in the intermediate hospitals across the country is a major public health concern. It has frequently been reported in the local media that adverse pregnancy outcomes among women in Namibia is common. Despite the fact that the Oshana region came out sixth in terms of births recorded in all fourteen regions of Namibia, this northern region topped the maternal deaths' list with 21 deaths in 2012 (New Era newspaper, 2013). In an older annual report of the Ministry of Health, it is stated that the Oshana region registered the highest number of maternal mortality in 2006/7, 2007/8 and 2008/9 with 38, 27 and 42 respectively (MoHSS, 2011). This means that the Oshana region is vulnerable to adverse pregnancies among all fourteen regions across the country.

The adverse pregnancy outcomes affecting this hospital were recorded in 2011/12 and 2012/13: maternal deaths 34/10 446, neonatal deaths 369/10 446, perinatal deaths 403/10 446, premature births 879/10 446, caesarean sections 2448/10 446 (Intermediate Hospital Oshakati report, 2011/12 & 2012/13). The maternal mortality rate of Oshana region was 336 per 100 000 live births. The maternal mortality rate for April 2011- March 2012, April 2012- March 2013, April 2013- March 2014 were

288/100,000, 324/100,000 and 388/100 000 respectively. (Intermediate Hospital Oshakati report, 2014).

A significant number of adverse pregnancy outcomes have been recorded at Intermediate Hospital Oshakati, since this is a regional referral hospital for the other four surrounding regions: Kunene, Omusati, Ohangwena and Oshikoto (Intermediate Hospital Oshakati report, 2014). Based on information or evidence the Intermediate Hospital Oshakati prompted the researcher to carry out this study at this location in order to identify the main factors associated with adverse pregnancy outcomes and propose strategies which will contribute to improve the current trend. Against this background a prospective cross-sectional study was undertaken to assess the factors associated with adverse pregnancy outcomes among women who delivered at the Intermediate Hospital Oshakati during the study period.

1.3 PURPOSE AND OBJECTIVES OF THE STUDY

1.3.1 Purpose of the study

The purpose of the study was to determine the factors associated with adverse pregnancy outcomes among teenage and older mothers who delivered at Intermediate Hospital Oshakati in the Oshana region.

1.3.2 Specific objectives

The specific objectives of the study were to:

- 1) Determine the factors associated with adverse pregnancy outcomes.
- 2) Describe the factors associated with adverse pregnancy outcomes.
- 3) Compare the adverse pregnancy outcomes between teenage and older mothers.

1.4 HYPOTHESIS

Alternative hypothesis: There are factors associated with adverse pregnancy outcomes.

Null hypothesis: There are no associated factors with the adverse pregnancy outcomes.

1.5 SIGNIFICANCE OF THE STUDY

The findings of this study might highlight factors associated with adverse pregnancy outcomes; thereby informing policy-makers in planning strategies to reduce these adverse pregnancy outcomes. The information to be obtained might be able to contribute towards developing and strengthening health education sessions for

pregnant women about the adverse outcomes during pregnancy at Intermediate Hospital Oshakati, Oshana region, Namibia.

It is expected that the findings of the study might assist in strengthening strategies to reduce adverse pregnancy outcomes through the improvement of the quality of maternal health care services and consequently enhance the maternal health of women in the regions under study. This study should also assist Namibia in the journey to achieve its targets for the Millennium Development Goal 5 which is to reduce 75% of the Maternal Mortality Ratio of 225/100 000 by the year 2015.

1.6 OPERATIONAL DEFINITIONS

1.6.1 Adverse pregnancy outcome

An adverse pregnancy outcome is an incident which reduces the chance of having a healthy baby, two or more 1st trimester miscarriage. The adverse pregnancy outcomes in the 2nd trimester were: pregnancy loss (>12 weeks), preterm birth, pre-eclampsia or eclampsia, fetal growth restriction, abruption placenta, fetal death/stillbirth or other conditions related to pregnancy loss (Winthrop-University Hospital, 2015).

1.6.2 Maternal death

Maternal deaths are defined by the World Health Organization as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (Soleman, Chandramohan & Shibuya, 2006).

1.6.3 Perinatal death

Perinatal death refers to death of the fetus weighing at least 500g and more (or when birth weights are not available, after 22 completed weeks of gestation or with a crown-heel length of 25 cm or more) plus all early neonatal deaths within 1 week of birth (Soleman, Chandramohan & Shibuya, 2006).

1.6.4 Neonatal death

Neonatal death is death of a child dying within the first 28 completed days after birth (Soleman, Chandramohan & Shibuya, 2006).

1.6.5 Postpartum haemorrhage

Postpartum haemorrhage is defined as an estimated blood loss of ≥ 500 mL after vaginal delivery or ≥ 1000 ml after caesarean delivery or otherwise diagnosed by a care provider. Subtypes of postpartum haemorrhage are identified as: postpartum haemorrhage due to retained placenta (third stage placenta), postpartum haemorrhage due to uterine atony (occurring within 24 hours following delivery), delayed and secondary postpartum haemorrhage (occurring after the first 24 hours following delivery), postpartum haemorrhage due to coagulation defects (Joseph, et al.2007).

1.6.6 Caesarean Section

A caesarean section is defined as being an operative procedure, which is carried out under anesthesia where the fetus, placenta and membranes are delivered through an incision in the abdominal wall and the uterus. This is usually carried out after viability of fetus has been reached i.e. 24 weeks gestation onwards (Fraser, Cooper & Nolte, 2010).

1.6.7 Puerperal sepsis

Puerperal sepsis is defined as the infection of the genital tract occurring at labour or within 42 days of the postpartum period (WHO, 2011).

1.6.8 Pre-eclampsia

Pre-eclampsia is defined by the presence of elevated maternal blood pressure (systolic blood pressure >140 mmHg or diastolic blood pressure > 90mmHg in a woman who was previously normotensive prior to 20 weeks gestation) in combination with protein in the urine after 20 weeks gestation (WHO, 2011).

1.6.9 Low birth weight

Low birth weight infant refers to a baby born with a weight of less than 2500 grams. Low birth weight occurs as a result of preterm birth or a baby born small in size, in relation to its gestational age (Edmond & Bahl, 2006).

1.6.10 Teenage mothers

Teenage mothers are all mothers whose age at their last birthday was equal to or less than nineteen years (WHO, 2011).

1.6.11 Older mothers

Older mothers are all mothers whose age was greater than 19 years at their last birthday (WHO, 2011).

1.7 SUMMARRY

The foregoing chapter presented the overview of global, national and regional burden of adverse pregnancy outcomes. It also introduced the purpose and the objectives of the study and stated the problem to be addressed and the significance of the study. The hypotheses were also mentioned in this chapter. The limitations of the study and operational definitions were also presented.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents a review of existing literature on the adverse pregnancy outcomes (APOs) and Namibia background. The literature review linked the purpose of the study to various theoretical perspectives and the current nature of variables related to the phenomenon. The researcher conducted a literature review to generate a picture of what is known and not known about the problem and to document why a study needs to be conducted. Relevant literature includes only those sources that are pertinent to or highly important in providing the depth-knowledge needed to study a selected problem (Burns & Grove, 2011).

This study of APOs was done at Intermediate Hospital Oshakati (IHO) in Namibia. Namibia is situated in the south-western part of Africa and its size is 825 214 square kilometers. The country shares its borders with South Africa, Zimbabwe, Botswana, Zambia, Angola and South Atlantic Ocean to the west, and has a population of 2, 113 077 with an annual growth rate of 1.4%. The Country has relatively good roads and communication infrastructures. The 2011 census indicated that 57% of the population lives in communal areas and 43% in commercial urban centers (Census, 2011).

It is well noted that rural areas in Namibia are having insufficient maternal delivery services which may contribute to adverse pregnancy outcomes. In Namibia, maternal mortality is one of the adverse pregnancy outcomes. Maternal mortality is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO, 2005). Maternal mortality is usually due to direct or indirect causes. Direct maternal mortality are deaths resulting from obstetric complications of the pregnant state, from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above-mentioned. Indirect maternal mortality is from pre-existing disease or from a disease that developed during the pregnancy which was not due to a direct obstetric cause, but was aggravated by the physiological effects of pregnancy (WHO, 2005). It's been reported that, 98% of neonatal deaths take place in the developing world, and the highest risk is in Africa, where an average of 41 neonatal deaths occurs per 1000 live births (UNICEF, 2011).

Advanced maternal age continues to be associated with a range of adverse pregnancy outcomes including low birth weight, pre-term birth (Joseph, 2005 & Delbaere, 2007) stillbirth and unexplained fetal death (Hoffman, Jeffers, Carter, Duthely & Cotter, 2007) and increased rates of Caesarean sections (Janssens, Wallace, Chang, 2008). In

recent years, older women who become pregnant are more often primiparous and of better socio-economic status while in the past they were more often multiparous and of low socio-economic status (Carolan & Frankowska, 2011 & Chan & Lao, 2008).

Chen (2007) reported that early pregnancy has been discussed as an independent risk factor for adverse pregnancy outcomes. Large epidemiologic studies on this topic were however largely reported from high or medium income countries showing conflicting results. Moreover, few contemporary studies control for socioeconomic status and other variables, such as body mass index (BMI) and parity that may also influence pregnancy outcomes.

2.2 STUDIES CARRIED OUT IN OTHER COUNTRIES

A previous study done in Norway indicates that neonatal death is one of the adverse pregnancy outcomes in that country due to a history of sexual violence. Preterm birth (PTB), low birth weight (LBW), small for gestation (SGA) was a common and costly health problem in Norway (Green, Damus & Simpson, 2005). Garcia-Moreno et al. (2013) found out that in Norway several pathways between sexual violence and adverse pregnancy outcomes are suggested. A direct pathway of sexual violence can result in immediate complications such as bleeding and rupture of membranes, which can lead to a PTB. There are more indirect pathways mediated by stress and stress

responses or by behavioural factors such as smoking or substance abuse, used to cope with the negative consequences of violence.

According to Garcia-Moreno, et al. (2013) the prevalence of adverse neonatal outcomes was generally highest in the youngest <20 years and the oldest age groups ≥ 35 years among smokers and women with primary school education. A body mass index ≥ 30 (IBM) was associated with PTB, LBW and BMI ≥ 20 with SGA. Women who reported mental distress also reported more PTB, LBW and SGA.

Furthermore a total of 4, 7% delivered prematurely, 2.7% had children with a birth weight <2500g and 8.1% children were small for gestational age (Green, Damus & Simpson, 2005). Approximately 1 in 10 babies are born preterm worldwide and prematurity is considered to be the leading cause of death for newborns. Low birth weight (LBW) can be a consequence of preterm birth (PTB) or intrauterine growth restriction, the latter leading to the birth of small for gestational age (SGA) infants (WHO, 2012). Studies suggested that some biological risk factors for PTB and LBW are: multiple pregnancies, previous PTB, uterine or placental abnormalities, maternal age, socioeconomic status, ethnicity, maternal weight, substance abuse, stress, depression and violence (WHO, 2012).

Furthermore in Thailand, anaemia has been claimed to be the most common nutritional disorder in pregnancy across the world and the impact of anaemia on other adverse pregnancy outcomes (e.g. PTB, LBW and SGA) is controversial. Some studies reported the association between high haemoglobin concentration and adverse pregnancy outcomes (Abeysena, Jaywardana & Seneviratne, 2010). In addition, these researchers found that low haemoglobin concentration in the first trimester was a risk of LBW and SGA. The findings may be explained by reduced oxygen transportation from mother to fetus and may reflect inadequate iron reserves during early pregnancy (Jehan, McClure & Salat, 2007).

In 2008, the World Health Organization (WHO) estimated that 1, 86 million cases of syphilis occurs globally among pregnant women each year and that a large proportion of them was untreated or inadequately treated. Up to one third of the women attending antenatal care (ANC) clinics were not tested for syphilis (WHO, 2011). Another study concluded that if syphilis was left untreated during pregnancy, it could lead to fetal loss or stillbirth, neonatal death, prematurity, low birth weight or congenital syphilis. Programs that include syphilis testing coupled with appropriate and prompt penicillin treatment for pregnant women who test positive for *Treponema pallidum* infection have been shown to be effective in reducing adverse pregnancy outcomes (Hawkes, 2011). Most of the previous studies reported that a higher proportion of adverse

pregnancy outcomes were among untreated women with syphilis (range: 53.4-81.8%) than among women without syphilis (range: 10.2-20.8%).

A study done in Australia found that women who are overweight or obese at the start of pregnancy are at increased risk of hypertensive disorders of pregnancy, gestational diabetes, delivery complications such as prolonged delivery and higher rates of caesarean sections (Guelinckx, Devlieger, Beckers & Vansant, 2008). Few studies have also reported that complications due to obesity lead to excess health care service use, including increased length of hospital stay and during and immediately after pregnancy (Callaway, Prins, Chang, & McIntyre, 2006). According to Nohr, Vaeth, Baker, Sorensen, Olsen & Rasmussen, (2008) in another study conducted in Australia, independent of pre-pregnancy BMI, excess weight gain in pregnancy was associated with increased risk of large for gestational age infants, caesarean section delivery, low apgar score and postnatal weight retention in the mother.

The other findings of pre-pregnancy obesity and excess weight gain associated with caesarean delivery, pregnancy complications, birth complications and placenta weight are consistent with previous studies (Fredrick, Williams, Sale, Martin & Killien, 2008). The other findings showed that there was no association between pre-

pregnancy obesity and premature birth with caesarian delivery (Hauger, Gibbons, Vik, & Belizan, 2008).

A study conducted in South Australia revealed that the prevalence of obesity among women bearing children is rising and has important implications for obstetric care. The study also found that increasing maternal body mass index (BMI) was associated with adverse health outcomes for both the mother and her baby. Mothers who are overweight or obese during pregnancy and childbirth, as measured by increasing maternal body mass index (BMI), are known to be at risk of significant antenatal, intrapartum, postpartum and neonatal complications. Antenatal complications include recurrent miscarriage, congenital malformations, pregnancy induced hypertension, pre-eclampsia, gestational diabetes mellitus and venous thromboembolism (Bodnar, Catov, Klebanoff, Ness & Roberts, 2007).

Overweight and obese women are more likely to be induced and require a caesarean section. Infants of overweight and obese mothers are often macrosomic and require prolonged hospital admissions (Doherty, Magann, Francis, Morrison & Newnham, 2006). In addition, children who are large for gestational age at birth, and hence likely to be exposed to an intrauterine environment of either diabetes or maternal obesity, are at risk of developing a metabolic syndrome, thus perpetuating the cycle of obesity

and insulin resistance in subsequent generations (Boney, Verma, Tucker & Vohr, 2005).

In the United Kingdom (UK) both pre-pregnancy maternal underweight and obesity are associated with countless of adverse pregnancy outcomes for both mother and child, which impact their health and wellbeing, and draw substantially on limited health services resources (Ehrenberg, 2011). Women who are underweight at conception are at risk of fetal growth restriction, premature delivery and low birth weight (Salihu, Lynch, Alio, Mbah, Kornosky & Marty, 2009). At the other end of the BMI spectrum, maternal obesity is commonly associated with an excess of risks that generally increase with degree of overweight including hypertensive disorders, gestational diabetes, stillbirth, induction of labour, caesarean delivery, large for gestational age and preterm birth (Dennedy, Avalos, O'Reilly, & Dunne, 2012).

The study in the UK demonstrates that weight change during the inter-pregnancy interval is strongly associated with the risk of experiencing a range of pregnancy complications in the second pregnancy. This was true for women experiencing particular complications for the first time and for all women irrespective of their previous first pregnancy history. The data herein for women encountering a

complication for the first time in the second pregnancy can be directly compared with the previous ten-fold larger population based study (Villamor & Cnattingius, 2006).

In Canada, it was found that postpartum haemorrhage is a major cause of maternal death and severe maternal morbidity, increased in frequency from 1991-2004. The increases in postpartum haemorrhage and severe postpartum haemorrhage have also been reported in Australia, Ireland, Scotland, Norway and the United States during the same time period (Joseph, et al. 2007). The findings further indicated that there was an increase in postpartum haemorrhage between 1991 and 2004 and in severe postpartum haemorrhage between 2003 and 2007 in Canada. The increase was driven by 43% in atonic postpartum haemorrhage with blood transfusion and 22% in atonic postpartum haemorrhage with either suturing, ligation of pelvic vessels or embolization (Joseph, et al. 2007). A recent database report from Nova Scotia documented a 24% increase in postpartum haemorrhage from 2004 to 2005, from 5,0% to 6,2%, followed by a 29% increase between 2006 and 2007, from 6,2% to 8.0% (Nova Scotia Atlee Perinatal Database Report, 2000-2009).

Another study conducted in Canada found that advanced maternal age is associated with several adverse pregnancy outcomes, hence these pregnancies are considered to be “high risk.” Pregnancy at advanced maternal age, defined as age 35 years or older, is associated with several adverse outcomes including preterm birth, low birth weight,

still birth, chromosomal defects, labour complications and caesarean section (Hung, 2008). The concept of risk at advance maternal age may be composed of two components: the physiological challenges because of an aging reproductive system, and the social disclosure of risk and timing of childbearing (Carolan & Nelson, 2007). A researcher from Canada recommended that this finding of risk at advance maternal age has important implications for practice and public health education. The risks must be tangible in order to be recognized and potentially addressed by women. Interventions to decrease unhealthy behaviours should target this concept to change risk perception. Furthermore the researcher suggested that when individuals have less experience or knowledge of risks; the media (e.g. documentary movies) can play an important role in increasing their understanding of those risks (Williamson & Weyman, 2005).

In a study conducted in Canada between married and unmarried women, infants of unmarried women fared worse than those of married women in terms of low birth weight, preterm birth and infant mortality. When unmarried women are distinguished by whether or not they have a regular partner, a gradient of increased risk of adverse outcomes has been observed for married mothers, unmarried mothers with a partner and unmarried mothers without a partner (Raatikainen, Heiskanen & Heinonen, 2005). Further distinctions have been hampered by the lack of fine categorizations of

these relationships. For example, it is unclear whether indicators of health and well-being among women without partners differ between never-married single mothers and those who have experienced divorce or separation (Young & Declercq, 2010).

Pregnancy is a critical period for maternal well-being and couples' arrangements and the assessment of associations of psychosocial problems around the time of pregnancy with more detailed categorization of unions is likely to improve the ability to discriminate who is at risk and who is not (Meadows, McLanahan & Brooks-Gunn, 2008).

The worldwide rise in caesarean section (CS) rates is becoming a major public health concern and cause of considerable debate due to potential maternal and perinatal risks, cost issues and inequality in access (Belizan, Althabe & Cafferata, 2007). According to recent data, in Middle Africa, only 1, 8% of all live birth deliveries occur by CS, compared to 24, 3% in North America (Betran, Merialdi, Lauer, Bing-Shun & Thomas, 2007).

In Pakistan a study was done to determine the risk factors and complications of puerperal sepsis at healthcare centers. The study found that the puerperal sepsis was highly reported in 84 (65.11%) women above the 31 years of age group and unbooked

grand multiparous in 101 (78,29%) women. The majority of these women 108 (83.72%) who were having prolonged rupture of membranes at the time of admission, the second stage of labour was prolonged therefore, the rate of second stage intervention by emergency Caesarean section 29 (22.48%) and instrumental delivery 22 (17.05%) (Shamshad, Saadia & Bushra, 2010).

In a study conducted by (Seale, Waniki, Newton & Berkley, 2009) it was emphasized that specific interventions are necessary for prevention and treatment of infection are good hand hygiene, use of antiseptic solution and appropriate antibiotic coverage. Increasing concerns of hospital and health care associated with infection control are currently recorded in many medical disciplines even in high income industrialized countries. With this experience there was increasing trends in the utilization of health facilities (Voss, 2009). In addition there was a strong need for good implementations of established infection control programs at all health facilities in Pakistan for prevention and control of infection (Tonic, Blanc, Croft & Choi, 2007).

2.3 STUDIES CARRIED OUT IN SUB-SAHARAN AFRICA AND NAMIBIA

In Africa, high rates of maternal and neonatal morbidity and mortality are a consequence of multiple causes including endemic infectious diseases (malaria, HIV/AIDS, tuberculosis), malnutrition and micronutrient deficiencies, child-birth

complications, newborn illness and inadequate antenatal and perinatal care due to financial and logistic constraints in these resource poor regions (Ramharter, 2005). Combination Antiretroviral Therapy (ART) is highly effective in reducing maternal mortality, morbidity, and Mother-to-Child Transmission (MTCT) of HIV and also allows for safe breast-feeding (Shapiro, Hughes, Ogwu, Kitch, & Lockman, 2010).

Each year over 4 million infants die in the first four weeks of life, globally (the neonatal period). It has been reported that 98% of neonatal deaths take place in the developing world, and the highest risk is in Africa, where an average of 41 neonatal deaths occur per 1000 live births (UNICEF, 2008). The leading biological causes of maternal death in Africa are haemorrhage, infections and hypertensive disorders, and these deaths are mediated by a complex set of underlying social, economic and behavioural factors, typically grouped into the “Three Delays” (Khan, Wojdyla & Say, 2006).

Botswana, a middle-income country in Southern Africa, has a well-developed medical infrastructure where 97% of women have access to antenatal care, 94% of births are overseen by a skilled attendant, and 80% of women can access hospital based obstetrical care for deliveries (UNICEF, 2008). However, neonatal mortality in Botswana remains high, estimated at 46/1000 live births in 2004 (UNICEF, 2008).

Botswana is in the midst of a generalized HIV epidemic, and up to a third of infants are born to HIV infected women (UNAIDS, 2010). In Malawi maternal mortality is high; the most recent national survey estimate is 675 maternal deaths/100 000 live-births during the period of 2004-2010 (Macro Malawi Demographic and Health Survey (2010).

Malaria and anaemia in pregnancy have been linked to low birth weight and adverse outcomes for the baby and severe antenatal anaemia in the mother and antimalarial prophylaxis is recommended, especially for low parity women (Bowie & Geubbels, 2013). Anaemia may also be unrelated to malaria, being also the result of other infections such as HIV or nutritional deficiencies (Munasinghe & Van der Broeke, 2013). Facility-based studies done in Malawi have estimated anaemia to cause 7% of 43 maternal deaths, 12% of 165 maternal deaths, 16% of 32 maternal deaths and 17% of 61 maternal deaths (Vink, De Jonge & Ter Haar, 2013).The contribution of malaria to maternal mortality in Malawi remains unclear.

An audit of maternal deaths in the southern region concluded that the quality of obstetric care went down in Malawi in the 1990s, and in general it is perceived that the health system deteriorated significantly during the 1990s (Ratsma, Lungu & Hofman, 2005). Translating the recent increase in institutional delivery in Malawi into

increased quality of routine and emergency care during and after delivery must be prioritized as part of continued efforts towards the strengthening of the health system in Malawi (Ministry of Health Malawi, 2010). The prevention of maternal deaths through an increased focus on family planning and liberalizing safe abortion services, and improving the timeliness of referrals from homes and health centers should also be priorities (Anwar, 2012).

A study done in Ghana found that physical violence in pregnancy has serious health consequences that could affect both the mother and child. The former United Nations Secretary-General, Kofi Annan, in 1999 said “Violence against women is perhaps the most shameful human rights violation and it is perhaps the most pervasive; it knows no boundaries of geography, culture or wealth. As long as it continues, we cannot claim to make real progress towards equality, development and peace” (UNIFEM, 2010). Indeed, violence against women is a global problem and it is present in every country, regardless of culture, ethnicity and socio-economic status (UNICEF, 2011). In pregnancy, violence can affect both the mother and her unborn baby. Maternal and perinatal complications can include depression, anxiety, drug abuse and alcoholism (UNICEF, 2011).

The adverse pregnancy outcomes such as perinatal death or preterm delivery were presented as a public health problem (Chambliss, 2008). Reducing child mortality is one of the Millennium Development Goals. To reach this goal it is important to identify the causes of child mortality. Reducing physical violence against pregnant women can, perhaps, contribute to reducing adverse pregnancy outcomes (United Nations, 2008). In Ghana physical violence against women is not uncommon. About 36, 6% of women aged 15-49 had experienced physical violence at some time, 5, 2% had experienced violence during pregnancy (Ghana Demographic and Health Survey, 2008). In Ghana, interventions and measures against violence towards women taken by their government include the passage of the Domestic Violence Bill in February 2007, which empowers the Ministry of Women and Children's Affairs to undertake actions against domestic violence such as rescue and rehabilitation of victims. Further actions of the Ministry of Women and Children's Affairs (MOWAC) include developing standards and performing research (Republic of Ghana, 2010).

Another study carried out in Dar es Salaam, Tanzania found out that timing the first pregnancy at a young age less than 18 years age is associated with adverse pregnancy outcomes including prematurity, low birth weight and possibly low Apgar score and maternal anaemia (Muganyizi & Balandya, 2013). Studies also indicate that becoming pregnant for the first time after 34 years of age is associated with countless of adverse

effects to the mother and baby (Carolan, Davey, Biro & Kealy, 2013). Kenny, Lavender, Mc Namee, O'Neill, Mills & Khashan, (2013) also reported that too early pregnant at the age of less than 18 years and above the age of 34 years at first child birth increase adverse fetal and maternal outcomes.

There is scanty literature in Tanzania on Healthy Timing and Spacing of Pregnancy. One longitudinal study in rural Tanzania indicated a high non-adherence (about 48.4%) to the recommended inter-pregnancy spacing (Exavery, Mrema, & Shamte, 2012). According to Tanzania Demographic and Health Survey, 23% of women are mothers by 19 years of age and 16% practice shorter inter-pregnancy intervals than 2 years. Based on current evidence, the WHO through its Technical Consultation and Scientific Review of Birth Spacing recommended that after a live birth, the recommended interval before attempting the next pregnancy is at least 24 months in order to reduce the risk of adverse maternal, perinatal and infant outcomes. It further recommends that, after a miscarriage or induced abortion, the minimum interval to next pregnancy is at least six months (WHO, 2007).

In addition, there has been an increase in the national contraceptive prevalence rate from 7% in 1991/92 to the current 27% for married women 15-49 years (NBoSaIM, 2011). It is recommended that policies be put in place to convey effective educational

messages on Healthy Timing and Spacing of Pregnancy as part and parcel of routine Family Planning services and that this education should respond to social and reproductive concerns of the users.

The Democratic Republic of Congo (DRC) and Zambia studies about tobacco use and second-hand smoke exposure during pregnancy indicated that there was an adverse pregnancy outcomes associated with stillbirth, preterm birth and reduced birth weight (Gupta & Subramoney, 2006). In addition to the potential hazards of use during pregnancy, smokeless tobacco products contain nicotine, numerous carcinogens and other toxicants and cause concerns of the oral cavity, esophagus and pancreas. The preliminary evidence suggests that in the Democratic Republic of Congo, many pregnant women view snuff and chewing tobacco as forms of medicine and use these products to treat flu, colds and other common ailments for their pharmacological effects or instead of alcohol. A better understanding of pregnant women's misperceptions about these forms of tobacco is urgently needed (Secretan, Strif, Baan, Grosse, Ghissassi, & Bouvard, 2009).

In many African countries, including Zambia and Democratic Republic of Congo, maternal and child health outcomes are often poor. The WHO's African region has the highest neonatal mortality rate in the world (43 per 1000 live births) and accounts for

43% of global deaths in children under the age of 5. Additionally, 19 of the 20 countries with the highest maternal mortality ratios are in the African region. African women bear the burden of nearly half of all global maternal deaths as a result of pregnancy and childbirth, overall maternal mortality is 910 per 100 000 live births. The WHO African Regional Health Report notes that efforts to improve maternal and child health outcomes are hampered by poverty, illiteracy, weak health systems, a shortage of skilled health workers, armed conflict and humanitarian emergencies, HIV/AIDS epidemic and other factors (WHO, 2006).

In Uganda the study found that during pregnancy, malaria is a common cause of complications to both the mother and her unborn child. The mother may develop severe malaria, severe anaemia, and placental malaria, or may die. The fetus may be aborted, prematurely delivered or stillborn and the baby may have a low birth weight (Adeyemi, Adekunle & Akinota, 2007). The prevention and control of malaria during pregnancy is therefore crucial as it helps to promote the health of the mother and her unborn child. There are currently two methods for malaria control during pregnancy being promoted by the Ministry of Health in Uganda. These are chemoprophylaxis using sulfadoxine-pyrimethamine and insecticide treated net (Ministry of Health, Republic of Uganda, 2007). In Uganda the national target of 50% of households to be covered with insecticide treated net by the year 2007 has not been met thus leaving

many pregnant women at risk of malaria infection during pregnancies (Ministry of Health, Republic of Uganda, 2007).

Neonatal mortality is still a significant public health problem worldwide, and accounts for more than 60% of newborn deaths before their first birthday (UNICEF, 2008). Nigeria was reported to be one of the highest rates of neonatal deaths in Africa (home (National Population Commission, 2008). The majority of these deaths are caused by preventable or treatable diseases, such as infectious diseases, which contribute to approximately 36% of these deaths (Lawn, Cousens & Zupan, 2005).

Furthermore other studies done on neonatal mortality in Nigeria have indicated that low birth weight, lack of antenatal care, maternal illness, mother's age, prematurity and birth asphyxia are linked with neonatal mortality, but these studies were all hospital-based case-control and experimental studies (Onayade, Sule & Elusiyan, 2006). The study recommended that traditional birth attendants should be provided with training or refresher training on delivery, how to recognize signs of pregnancy complications and how to measure the new-born's weight at birth, because approximately 62% of mothers in Nigeria deliver their new-borns at home (National Population Commission, 2008).

In Namibia maternal mortality is one of the adverse pregnancy outcomes, where the maternal mortality ratio has increased over the past two decades, from 225 deaths per 100,000 live births in 1992, to 271 per 100,000 live births in 2002, to 449 per 100,000 live births in 2006/2007 (MoHSS & Macro International, 2008). The survey on maternal death (2010) was done in Namibia in the eight regions which form the North East, North West and Central parts of Namibia; whereas it showed an increase in maternal deaths with Oshana recording the highest maternal deaths (37) from 2008 to 2010.

Namibia has launched the Roadmap to Accepting the Reduction of Maternal Mortality and Child Morbidity. The roadmap aims to reduce the maternal mortality ratio of 1990 by three quarters by 2015, to reduce mortality of 20/1000 live births by 25% by 2015, to reduce the teenage pregnancy rate by one quarter from 15% to 13% by 2015 (MoHSS, 2007).

In a National survey conducted in 2006 to assess the availability of basic and emergency obstetric care in Namibia, it was found that Namibia has only four facilities offering all eight signal functions that meet the WHO standard for Comprehensive Emergency Obstetric Care (CEmOC) facilities. There were no Basic Emergency Obstetric care (BEmOC) facilities in Namibia and most obstetric

emergency services are performed at CEmOC facilities. The four health facilities providing all the eight signal functions are in the central and northern regions, two in Windhoek, one in Otjiwarongo and one in Onandjokwe (MoHSS, 2006). Maternal and Peri/Neonatal Death Reviews are also considered important monitoring mechanisms in the Roadmap to accelerate the reduction of Maternal Mortality and Child Morbidity in Namibia.

Presently a woman in Namibia is said to be almost 100 times more likely to die during pregnancy than a woman in Europe. This difference partly reflects Namibia's high rate of HIV/AIDS infection (18.8% of women at the country's antenatal clinics are HIV-positive) and partly reflects limited access to health facilities (McKinsey, 2010). The most common direct causes include severe bleeding or haemorrhage (25%), infections (13%), unsafe abortions (13%), eclampsia, (12%), obstructed labour (8%) and other direct causes (8%). Indirect causes account for 20% of maternal deaths and they include malaria, anaemia, HIV/AIDS and cardiovascular disease (WHO, 2005).

The survey found that the common direct obstetric causes of maternal deaths in Namibia have been reported as severe pre-eclampsia, haemorrhage, obstructed or prolonged labour, complications of abortion and post-partum sepsis. Indirect causes of maternal mortality are mainly related to the high HIV/AIDS prevalence (MoHSS,

2006). It is estimated that 15% of pregnant women will experience at least one life-threatening complication during delivery in Namibia (WHO, 2009). WHO (2009) further reported that the chances of a woman dying in pregnancy or childbirth and post-partum are highest where women do not deliver in health facilities or delivery is not attended by a skilled birth attendant, basic interventions and supplies for emergencies and delivery are lacking or in short supply, or where an effective and timely referral system is lacking.

In 2006, 81% of births in Namibia were reported to have taken place in health facilities while 94% of births in urban areas and 73% of births in rural areas were reportedly attended by skilled birth attendants, though regional variations existed with Khomas region recording the highest (95.3%) while Kunene reported the lowest with only 54.4% of births attended by skilled birth attendants (MoHSS & Macro International, 2008).

2.4 SUMMARY

The foregoing chapter reviewed the literature, in the context of the framework of the study, factors associated with adverse pregnancy outcomes. It also covered the studies carried out in other countries and studies carried out in sub-Saharan Africa and Namibia. The possible factors that contribute to adverse pregnancy outcomes were

discussed. The main objective was to search for literature to situations related to adverse pregnancy outcomes worldwide. Additionally, this chapter was compared with different authors' views on factors associated with adverse pregnancy outcomes. Some of the biological risk factors discussed in this chapter included: multiple pregnancies, previous preterm birth, uterine or placental abnormalities, maternal age, socioeconomic status and ethnicity maternal weight. In addition some factors associated with adverse pregnancy outcomes were: substance abuse, stress, depression, physical violence, low haemoglobin, overweight and syphilis.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter provides an outline on how the research process was carried out and how data was collected and analyzed. It takes an in-depth look at both the design and methodology of the research. This study focused on the study population, sampling techniques, sample size, research instruments, research ethics and the control measures taken to ensure validity and reliability. The main purpose of the study was to determine the factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati in the Oshana region.

3.2 RESEARCH DESIGN

The study was a quantitative analytical, contextual, cross-sectional study on every pregnant woman giving birth at Intermediate Hospital Oshakati. This design fits the study since it was used to assess the factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati, in Oshana region.

The researcher described what activities were done in the field with a view to reaching a conclusion about the research problem (Welman, Kruger & Mitchell, 2009). McGivern (2006) stated that research design has two tier processes: in the first level research design is about the logic of the research, its framework and structure. The cited author further stresses that the structure may comprise a cross sectional, a longitudinal or a case study. Decisions on units of analysis are also made in the first level of research design and include the 'who' or 'what' to question or to observe.

The secondary level of research design is about the research process: what type of data (primary or secondary, qualitative or quantitative or a combination), what method of data collection, what sampling strategy, and so on (McGivern, 2006). McGivern (2006) eludes that the first level is about designing the overall structure of the research so that it can deliver the sort of evidence one needs to answer the research problem, and the second level concerns decisions about how to collect that evidence.

Welman, Kruger, et al. (2009) stated that in research design researchers have to specify the following: the number of groups that should be used (necessary to decide which statistical technique to use), whether these groups are to be drawn randomly from the populations involved and whether they should be assigned randomly to groups and what exactly should be done with them in case of experimental research?

3.2.1 Quantitative Research

Quantitative research is a formal, objective and systematic process in which numerical data are used to obtain information about the world and aims to analyze, compare and describe different variables. The quantitative approach towards scientific inquiry emerged from a branch of philosophy called logical positivism, which operates on strict rules of logic, truth, laws and predictions (Burns & Groove, 2009).

Quantitative research was conducted to test theory by describing variables, examining relationships among variables and determining cause-and effect interactions between variables (Burns & Groove, 2009). The quantitative analytical research approach was considered to be suitable for comparing and describing the factors associated with adverse pregnancy outcomes between teenage mothers and older mothers at Intermediate Hospital Oshakati.

3.2.2 Cross-Sectional study

Cross-sectional study is a research study that collects data on subjects at one point in time (Van der Walt & Van Ransburg, 2008).

3.3 RESEARCH METHODS

The researcher used a structured questionnaire with closed-ended questions to collect data through face-to-face interviews, in order to determine factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati.

3.3.1 Study Population

The population is defined as a particular group of individuals or elements, who are the focus of a research study (Burns & Grove, 2011). In a research context, population refers to the universe of inquiry or, put another way, to the people, organizations, events or items that are relevant to the research problem (McGivern, 2006). It is important to define the population of interest as precisely as possible. Any flaws in the definition of the population will mean flaws in the sample drawn from it (McGivern, 2006). On the other hand Welman, Kruger et al. (2009) define population as the study object that consists of individuals, groups, organizations, human products and events, or conditions to which they are exposed. A research problem relates to a specific population and the population encompasses the total collection of all units of analyses about which the researcher wishes to make specific conclusions (Welman, Kruger et al., 2009).

The way in which a study population is defined depends on the issues the research aims to address. For example, if a study of the health and social welfare needs of older people has been commissioned to help develop policy in relation to community health activities the researcher may decide that those in residential care, nursing homes or hospitals are not part of the relevant population (McGivern 2006).

McGivern (2006) further categorizes population as a target and survey population, respectively. Moses and Kalton (cited in McGivern 2006) make a distinction between these two populations. The targets population is the one from which the results are required and the survey population is that actually covered by the research. The two populations should ideally be the same but for practical reasons they may not be. The population of this study is defined as all pregnant women giving birth at Intermediate Hospital Oshakati during the period of study of four months. The following criteria should be considered:

3.3.2 Inclusion criteria

Inclusion criteria are characteristics that the subject or element must possess to be part of the target population (Burns & Grove, 2011). This study included all pregnant women giving birth at Intermediate Hospital Oshakati during the study period.

3.3.3 Exclusion criteria

Exclusion criteria are those characteristics that can cause a person or element to be excluded from the target population (Burns & Grove, 2011).

This study excluded:

- The pregnant women who did not deliver at Intermediate Hospital Oshakati during the study period.
- All home delivery was excluded in this study.

3.4 SAMPLING

Sampling is a process of selecting subjects who are representative of the population being studied. Random sampling usually provides a sample that is representative of a population because each member of the population is selected independently and has an equal chance of being included in the study (Burns & Groove, 2011). The sample defines the selected group of people (or elements) who will participate in the study and samples should represent a population of people (Burns & Groove, 2011). Once the population is clearly defined a researcher must decide whether to collect data from every member or element of that population (usually defined as a census) or from a representative subset or sample of it (Mc Givern, 2006).

In most health and social research the population of interest is often too large for census to be practicable either in terms of time it would involve or cost. The argument for using a well-designed sample rather than a census rests on two issues: on the practical issue of the time and cost involved in administering it, and on the methodological issue of the ability of a sample to be representative of the population (Welman, Kruger et al. 2009).

Welman, Kruger et al. (2009) define a sample as a miniature image or likeness of the population. The aspect of generalizing is extremely important. It is only when the results can be generalized from a sample to a population that the results of research have meaning beyond the limited setting in which they were originally obtained. A sample must therefore be a true representative of the population: the sample must have the exact properties in the exact same proportions as the population from which it was drawn but in smaller numbers (Welman, Kruger et al., 2009).

3.4.1 Sample size

The researcher would like to determine the sample size for the comparison of adverse pregnancy outcomes between teenage and older mothers. Among the teenage mothers, it is estimated that 45% of adverse pregnancy outcomes and it is estimated this

percentage to 16% of adverse pregnancy outcomes among older mothers. The confidence interval of 95% wished for this difference is 5 to 25%, giving a standard error of 5%.

In each group, the sample size would be:

$$n > = [p_1 (100 - p_1) + p_2 (100 - p_2)] / e^2$$

$$p_1 = 45\%$$

$$p_2 = 16\%$$

$$e = 5\%$$

$$n > = [45 (100 - 45) + 16 (100 - 16)] / 5^2$$

$$n > = [45 \times 55 + 16 \times 84] / 5^2$$

$$n > = 153 \text{ subjects to be selected in group}$$

The sample size was 306 women delivering at Intermediate Hospital Oshakati.

3.4.2 Sampling method

Simple random sampling is the most basic of the probability sampling plans. It is achieved by random selecting elements from the sampling frame. If the sampling frame is small, researchers can write names on slips of paper, place them in a container, mix them well and then draw them out one at a time until they have reached the desired sample size or enter the sampling frame into a computer, which will then

randomly select subjects until the desired sample size is achieved (Burns & Grove, 2011).

In this study the simple random sampling was applied for each group using the random numbers generator table in Epi-info version 7. The simple random sampling method is chosen because it ensures a high degree of representativeness and it is highly demonstrative if all subjects participating are qualified to part take in the study. All pregnant women who delivered during the study period were be assigned a random number which was used the selection into the sample.

3.5 DATA COLLECTION

Data collection is the precise, systematic gathering of information relevant to the research purpose or the specific objectives, questions or hypotheses of a study (Burns & Grove, 2011). Data was collected through face-to-face interviews from July to September 2015, using a questionnaire. Study questionnaires were administered to each woman delivering at Intermediate Hospital Oshakati during the study. The questionnaires were administered by the researcher. The questionnaires were in English and translated verbally in the local language, and moreover contained close-ended questions.

The questionnaire captured the variables or indicators divided in section A, B and C. Section A was demographic characteristics of the patient: age, region, educational level, employment status, marital status, residential area. Section B addressed potential risk factors: gravidity, gestation, parity, HIV status, body mass index, haemoglobin, smoking and blood pressure. Section C focused on patient outcomes: maternal death, perinatal death, neonatal death, postpartum haemorrhage, caesarean section, puerperal sepsis, eclampsia, low birth weight and others.

The body mass index (BMI) of the mothers was taken using an electronic UNICEF Secca scale. The mothers were weighed and recorded in the questionnaires. The heights of the mothers were measured standing with their feet flat on the base of a special L-shaped, metal height measure. Heels, buttocks and backs were made to touch the backboard. The head was positioned so that the mother was looking directly forward. The electronic blood pressure apparatus was used to measure the blood pressure of the mothers. The level of haemoglobin was taken using the electronic haemoglobin machine.

Initially, a draft questionnaire was sent to two supervisors for their comments, before the questionnaires were finalized and distributed; the questions themselves were refined and modified based on the feedback received from the supervisors. The final

questionnaire was prepared after all the issues raised by them had been clarified and the questions reformulated correspondingly.

3.5.1 Validity

The validity of an instrument is a determinant of how well the instrument reflects the abstract concept being examined (Burns & Grove, 2011). The questionnaires were reviewed by experienced researchers to ensure content validity. In this study face validity and content validity were determined. To establish face validity, the questionnaire was submitted to three colleagues and two supervisors for this thesis. They were asked to evaluate the questions and the thesis outline in relation to the study objectives.

3.5.2 Reliability

Reliability is concerned with the consistency of the measurement method (Burns & Grove, 2011). Reliability as an instrument is the extent to which consistent measurements would be obtained if the same study was to be repeated (Christensen, Johnson & Turner, 2010). To determine reliability in this study, the same questionnaire was used to collect data from all participants. In this study reliability was tested through a pilot study and enhanced by the researcher's in-depth familiarity

with the environment in which the study was conducted. Reliability improves automatically when a researcher is familiar with the research environment.

3.5.3 Pilot study

A pilot study is a smaller version of a proposed study and researchers frequently conduct these to refine the methodology. Researchers might conduct pilot studies in a manner similar to that for the proposed study, using similar subjects, the same setting, the same treatment, the same data collection and analysis techniques (Burns & Grove, 2011). A pilot test was done prior to the actual data collection on participants with similar characteristics to the sample and any unclear items were revised. The researcher assesses relevance and accuracy of the questionnaire in terms of information retrieval and relevance.

3.5.4 Data collection procedure

The researcher administered a structured questionnaire to each woman who delivered at Intermediate Hospital Oshakati during the study. All interviews were conducted face to face by the researcher. Arrangements were made with the regional director, the hospital medical superintendent, the hospital nurse manager and supervisor for the maternity ward at Intermediate Hospital Oshakati, in Oshana region.

3.6 DATA ANALYSIS

Data analysis started soon after the data collection process began. Descriptive statistics were used to summarize the data which were presented as tables, graphs, charts. In addition, bivariate and multivariate analyses were performed. Bivariate analyses were performed to examine the nature of association between adverse pregnancy outcomes by selected socioeconomic and demographic background characteristics. Multivariate analyses using logistic regression was used to investigate which potential risk factors best explain and predict the health outcome (presence or absence of adverse pregnancy). In fact, the logistic regression was applied as the adverse pregnancy outcomes that were recorded as binary with two categories – the presence of at least one adverse pregnancy outcomes and absence of adverse pregnancy outcomes.

The dependent variables of the adverse pregnancy outcomes (maternal mortality, perinatal death, neonatal death, postpartum haemorrhage, puerperal sepsis, caesarean section and low birth weight) and the independent variables of the potential risk factors (region, educational level, residential area, age, gravidity, gestation, parity, HIV status, body mass index and low haemoglobin).

Categorical variables were compared using a Pearson chi-square test. Comparison of quantitative variables was performed using the t-test. A logistic regression analysis was performed to identify factors associated with adverse pregnancy outcomes. The following variables were introduced in the logistic regression model: age, sex, region, educational level, residential area, gravidity, gestation, parity, HIV status, body mass index and low haemoglobin.

Odds Ratios, 95% confidence intervals and p-values used to demonstrate statistical significance. Statistical analysis was performed using Epi-Info software version 7 (CDC, 2010). In all analyses, a p-value of less than 0.05 was considered statistically significant.

3.7 RESEARCH ETHICS

The ethical principles that were observed during the conduct of the study are discussed below:

3.7.1 Permission

Firstly, permission was obtained from the University of Namibia Postgraduate Studies Committee. The written proposal was reviewed by the committee to ensure that it adhered to ethical standards of scientific research methodologies.

Secondly, permission to conduct the study was sought from the Ministry of Health and Social Services. Permission was given to the Oshana Regional Director and arrangements made with the hospital medical superintendent, the hospital nurse manager and supervisor for the maternity ward at Intermediate Hospital Oshakati, in Oshana Region.

Thirdly, written consent was obtained from the participants (mothers). The researcher provided adequate information regarding the purpose, objectives and procedure of the study, about the rights of the participants. Information was also supplied to establish the credibility of the researcher.

3.7.2 Right of Privacy and Participation

Ethics in research refer to moral principles that call for respect and protection of the rights of research participants by researchers (Nengomasha, 2010). The right to privacy encompasses both the right to respect for the dignity of the patient, namely

his/her physical privacy, and the right to respect for the patient's secrets, namely confidentiality (Pera & Van Tonder, 2005).

The aims and objectives of the study were explained to the research participants where after informed written consent was obtained from women who delivered at Intermediate Hospital Oshakati before conducting the interviews. Information regarding voluntary participation in the study as well as the right to withdraw at any time during the study was explained to participants before commencement of the study. The culture of the subject was respected at all times. The privacy was maintained all the times.

3.7.3 Anonymity

Anonymity means that no one, including the researcher, should be allowed to identify subjects afterwards. Anonymity was adhered to throughout this study, as subjects were not identified either by name or residence. The results are also reported as averages and percentages and do not indicate any subject specifically.

3.7.4 Confidentiality

Participants were assured that their information would be treated with strict confidentiality and privacy; therefore the study documents were kept under lock and

key. No unauthorized person had access to the information. Participants' name did not appear on the instrument.

3.7.5 Benefit

The benefits of the research were explained to the respondents. For example, it was explained to mothers how they could benefit from knowing the factors associated with adverse pregnancy outcomes among delivering women, which prompted them to provide honest information. They were also informed that the results would be shared with relevant authorities for consideration in planning purposes.

3.8 SUMMARY

The foregoing chapter presented an in-depth discussion of research methodology. The aim was to outline how the researcher approached data collection methods, sampling and selection of the study population. Research design, research methods and data analysis were also discussed in this chapter. Explanations were also given as to how validity and reliability were ensured. Ethical issues of permission, confidentiality, anonymity, and benefit were discussed in this chapter.

CHAPTER 4

RESULTS OF THE STUDY

4.1 INTRODUCTION

This chapter presents the data analysis procedures that were used and the details of the findings of the research. Descriptive statistical analysis was used for the socio-demographic characteristics and other variables related to the health status of the participants. Logistic regression analysis was used to identify the potential risk factors of adverse pregnancy outcomes among pregnant women who delivered at Intermediate Hospital Oshakati. A comparison of adverse pregnancy outcomes between teenage mothers and older mothers was carried out using the Chi-square test. This epidemiological survey evaluated a total of 306 pregnant women delivered at the Intermediate Hospital Oshakati which of 50% (n= 153) were teenage mothers and 50% (n= 153) were older mothers. All the 306 women who met the eligibility criteria and were approached agreed to participate in the study, thus giving a 100% response rate.

The dependent variables in this study were having any of the following adverse pregnancy outcomes: maternal mortality, perinatal death, neonatal death, postpartum haemorrhage, puerperal sepsis, caesarean section and low birth weight. The independent variables were the potential risk factors including region, educational

level, residential area, age, gravidity, gestation, parity, HIV status, body mass index and low haemoglobin.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PREGNANT WOMEN WHO DELIVERED AT INTEREMEDIATE HOSPITAL OSHAKATI

A total of 306 pregnant women from Intermediate Hospital Oshakati were enrolled in the study from July to September 2015. Among the pregnant women 50% (n=153) were teenage mothers and 50% (n=153) were older mothers. Table 2 below shown the ages of pregnant women between 12 -15 and 16 -19 years were 11 (3.59 %) and 142 (46.41 %), respectively. The women aged between 32-35 and 36 - 45 years were 25 (8.17 %) and 27 (8.82 %), respectively.

Table 4.1: Age distribution of the women who delivered at Intermediate Hospital Oshakati, in Oshana Region, Namibia, July – September, 2015

Age group	Frequency (n)	Percent (%)
12-15	11	3.59%
16-19	142	46.41%
20-23	41	13.40%
24-27	31	10.13%
28-31	29	9.48%
32-35	25	8.17%
36-45	27	8.82%
Total	306	100.00%

The mean overall age (\pm SD) of pregnant women participating in the study was 23 ± 7.02 years. The median (IQR) age was 20 (19-29) years. The ages ranged from 12 years to 45 years.

Table 4.2 shows that the majority of the cases were coming from Oshana region 158 (n=51.63%) followed by Omusati region and Ohangwena region 61 (19.93%) and 47 (15.36%), respectively. Slightly over seven percent 22 (7.19%) were non-Namibian (Angolan). Oshikoto region reported 11 (3.59%), while Kunene reported 7 (2.29%). The women who delivered at Intermediate Hospital Oshakati come from the northern parts of Namibia and some from neighboring country Angola.

Table 4.2 Region of origin of the women who delivered at Intermediate Hospital Oshakati, in Oshana Region, Namibia, July – September 2015

Region	Frequency (n)	Percent (%)
Kunene	7	2.29%
Non-Namibian (Angola)	22	7.19%
Ohangwena	47	15.36%
Omusati	61	19.93%
Oshana	158	51.63%
Oshikoto	11	3.59%
TOTAL	306	100.00%

More than two thirds of the participants 267 (87 %), were unemployed, while 39 (13 %) were employed (Figure: 4.1).

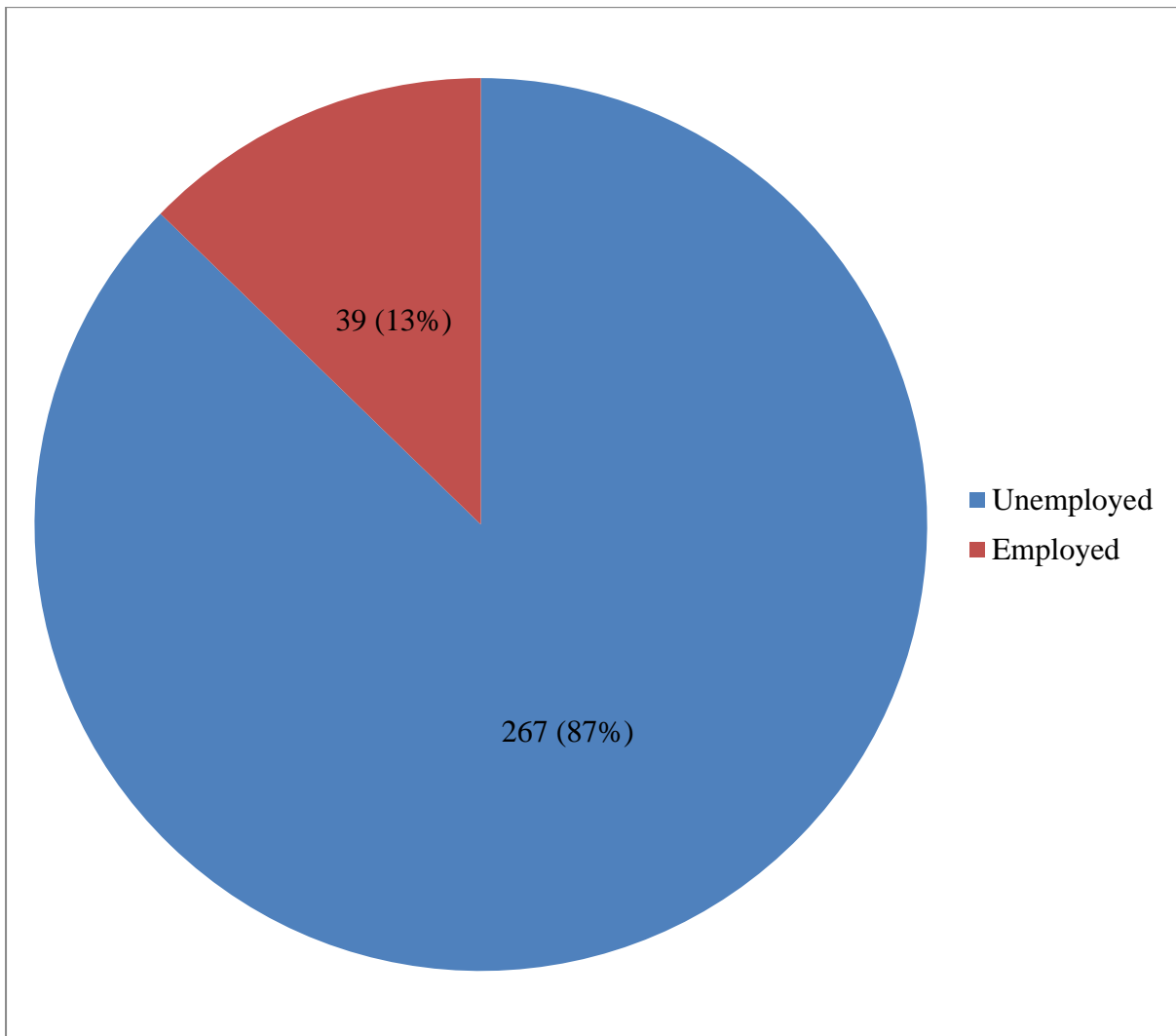


Figure 4.1 Employment status of the pregnant women who delivered at Intermediate Hospital Oshakati, July – September 2015

A majority of the participants 286 (93.46 %) were single, while 20 (6.54 %) were married. The divorced and widowed were not identified in this study (Figure 4:2)

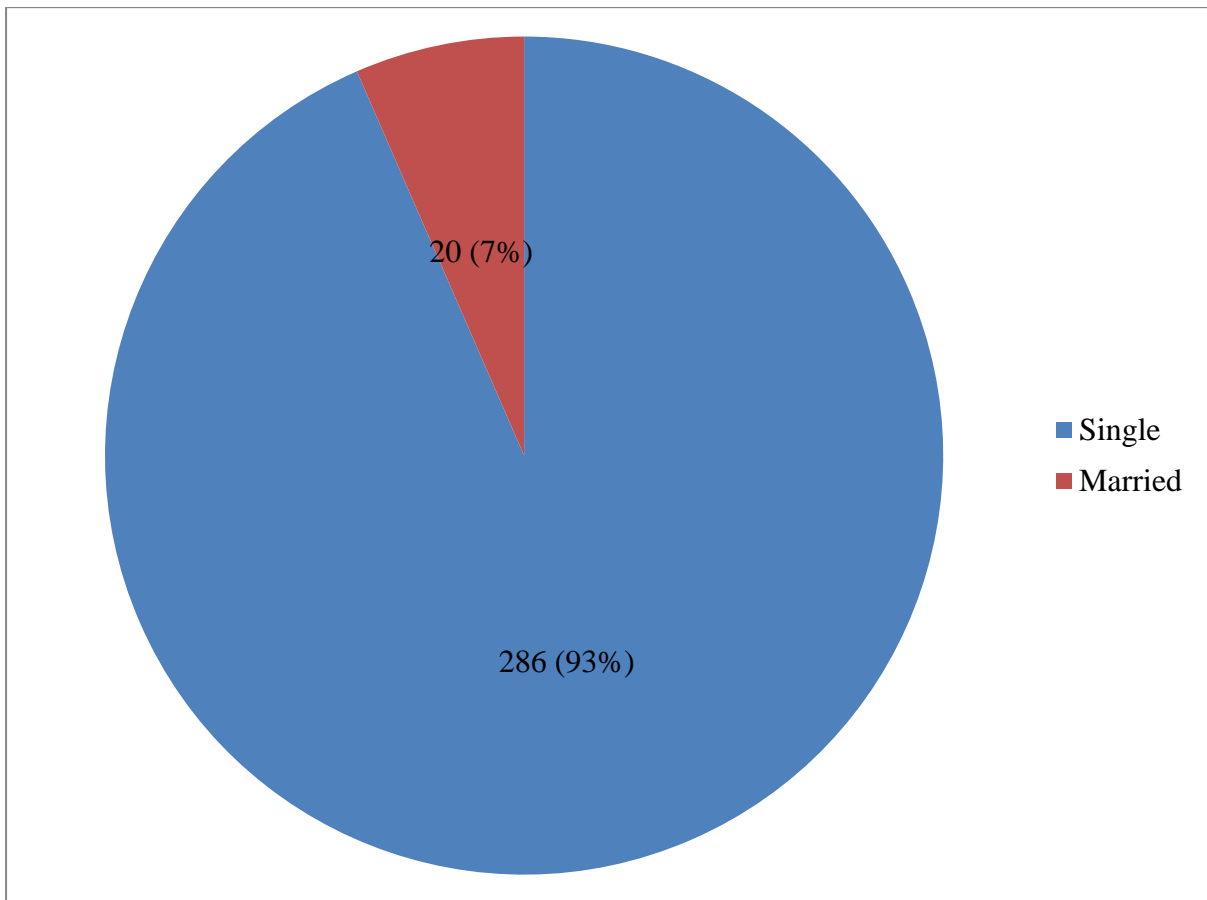


Figure 4.2 Marital status of pregnant women who delivered at Intermediate Hospital Oshakati, July – September 2015

The majority of the participants 232 (76 %) were from rural areas, while 74 (24 %) were residing in urban areas (Figure: 4.3).

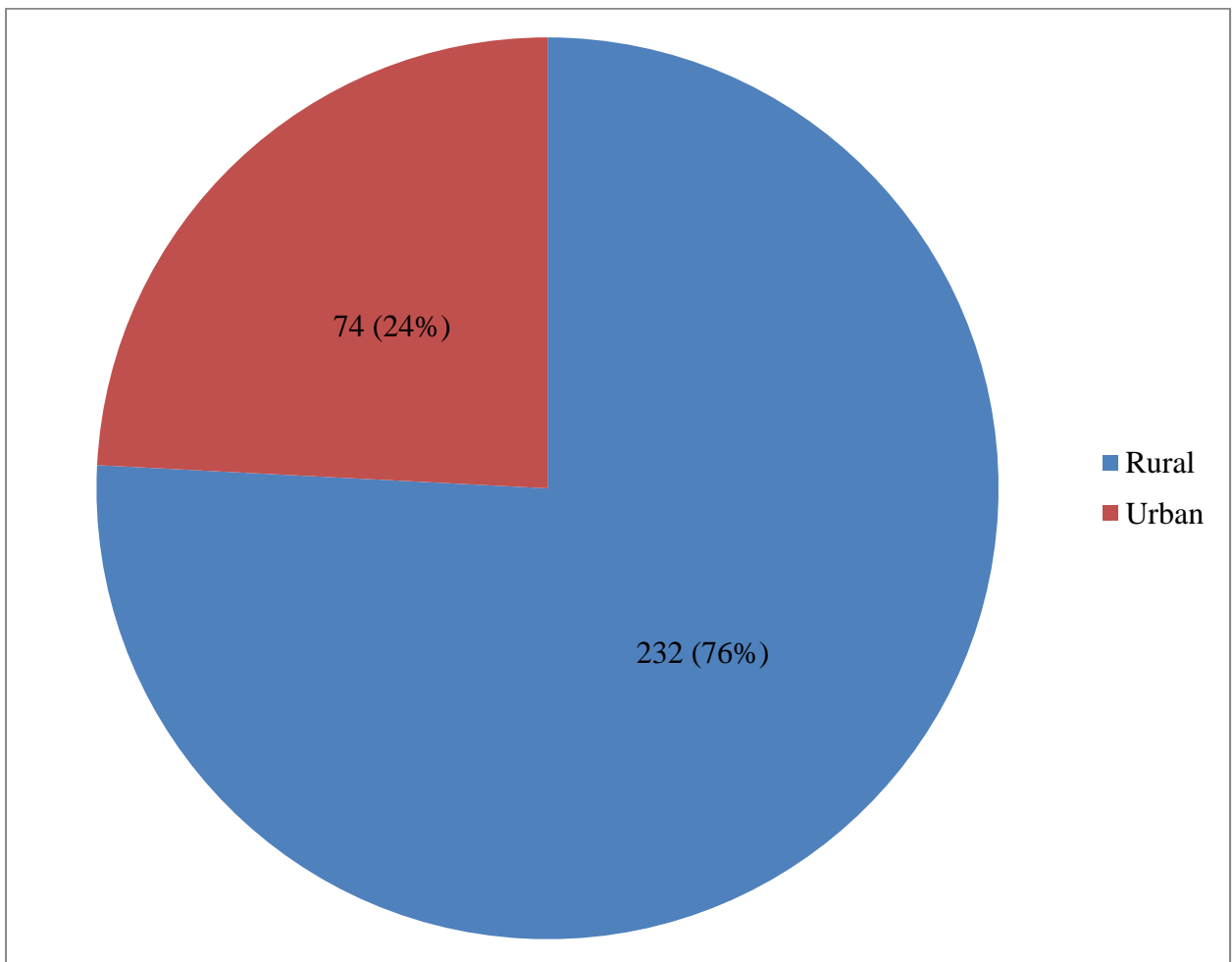


Figure 4.3 Residential areas of pregnant women who delivered at Intermediate Hospital Oshakati, July – September 2015

The majority of participants had attended up to secondary school 228 (74, 51 %), followed by primary education 45 (14, 71 %). The least of participants were not attending formal education 22 (7.19 %), while those with tertiary educations were 11 (3, 59 %) (Table: 4.3).

Table 4.3 Highest educational level of the women who delivered at Intermediate Hospital Oshakati, in Oshana Region, Namibia July – September 2015

Highest Educational level attended	Frequency (n)	Percent (%)
Non-formal Education	22	7.19%
Primary Education	45	14.71%
Secondary Education	228	74.51%
Tertiary Education	11	3.59%
TOTAL	306	100.00%

4.3 POTENTIAL RISK FACTORS OF WOMEN WHO DELIVERED AT INTERMEDIATE HOSPITAL OSHAKATI.

The gravidity of these women ranged from 1 to 9. The majority of participants had a gravidity of 1 (one), 177 (57.84%) followed by gravidity 2 with 56 (18, 30 %). The gravidity 7, 8 and 9 reported least with 1 (0, 33 %), 3 (0, 98 %) and 1(0, 33 %), respectively (Figure: 4.4).

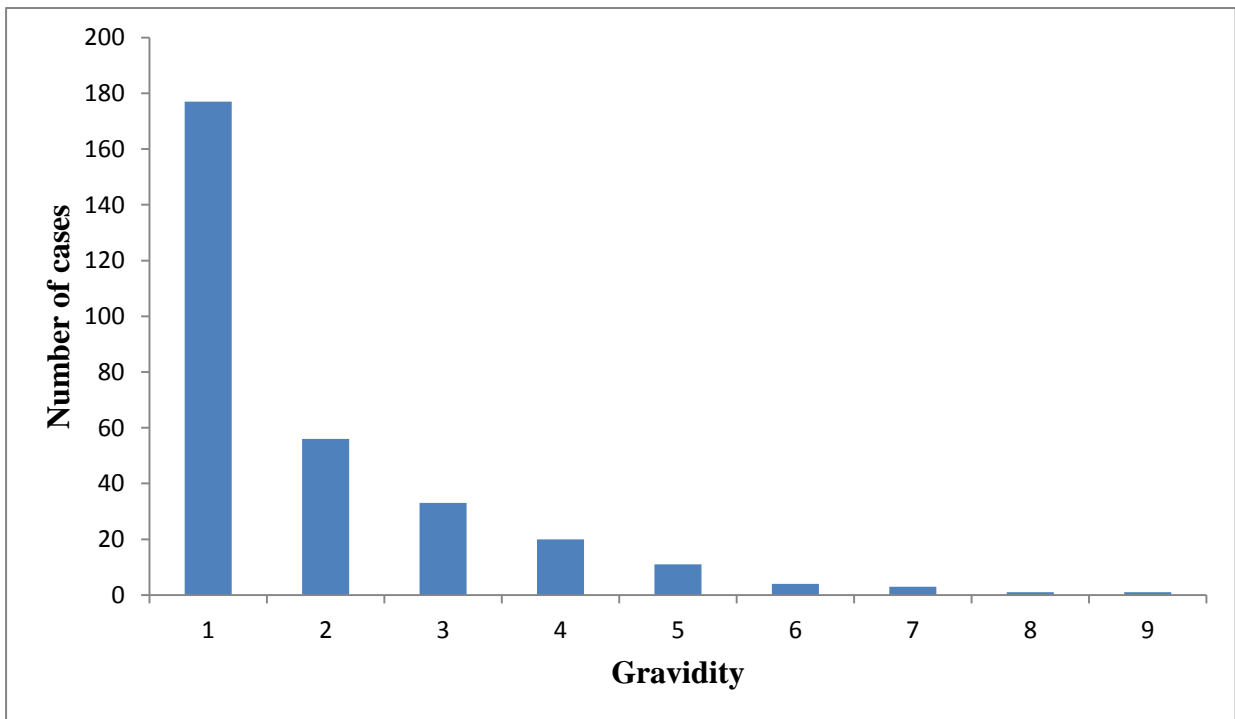


Figure 4.4 Gravidity of the pregnant women who delivered at Intermediate Hospital Oshakati, July – September 2015

The parity ranged from 0 to 9 and 174 (56.86 %) women had not given birth before.

The majority of participants' parity was 1 reported 174 (56.86 %) women with their

first baby, followed by parity 2 with 56 (18, 30 %). The parity 6, 7, and 9 reported 3 (0, 98 %), 2 (0, 65 %) and 1 (0, 33 %), respectively (Figure: 4.5).

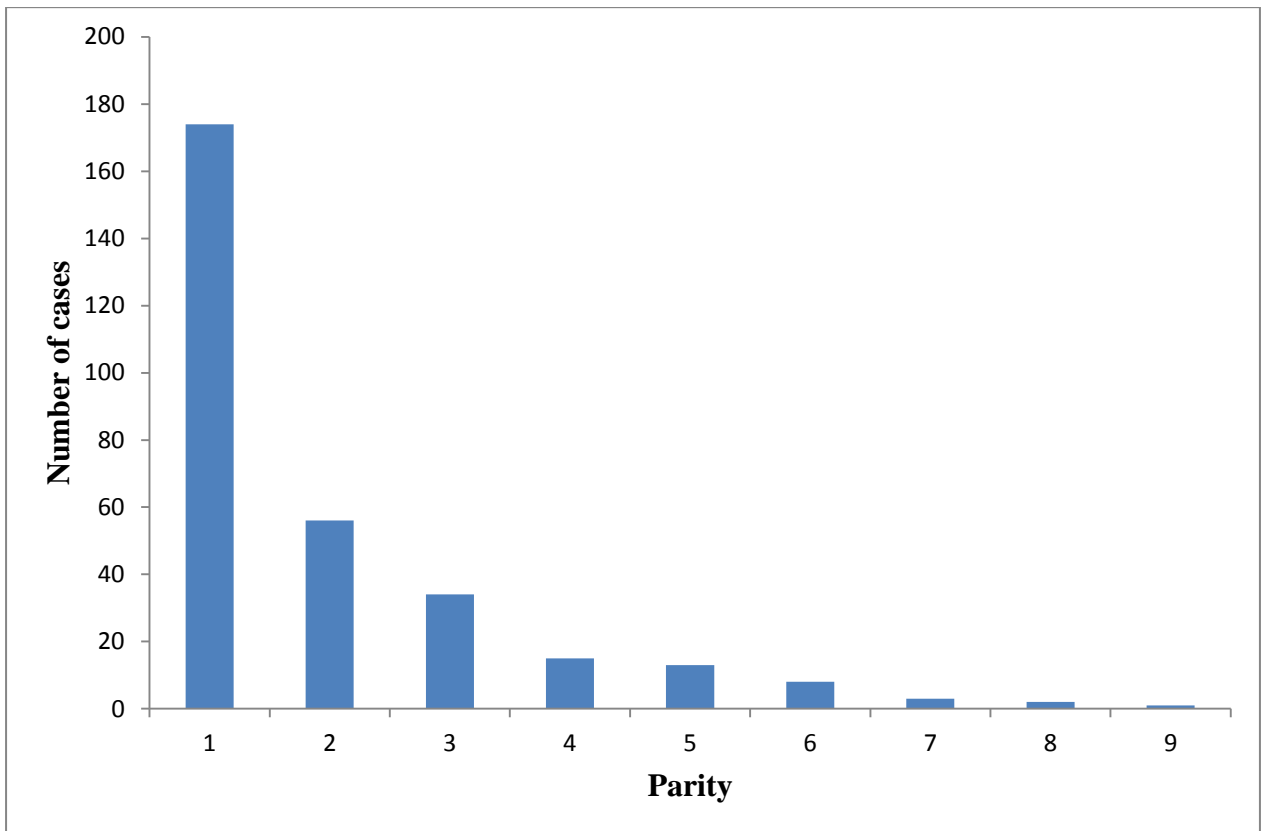


Figure 4.5 Parity of pregnant women who delivered at Intermediate Hospital Oshakati, July – September 2015

Data for weight by gestational age ranging from 26 to 42 weeks are shown. The gestational week of 38 were majority of 96 (31.37%), followed by week 39 of 75 (24.51 %). The week 30 and 42 were reported least of 1 (0.33 %) and 1 (33 %) respectively (Figure: 4.6).

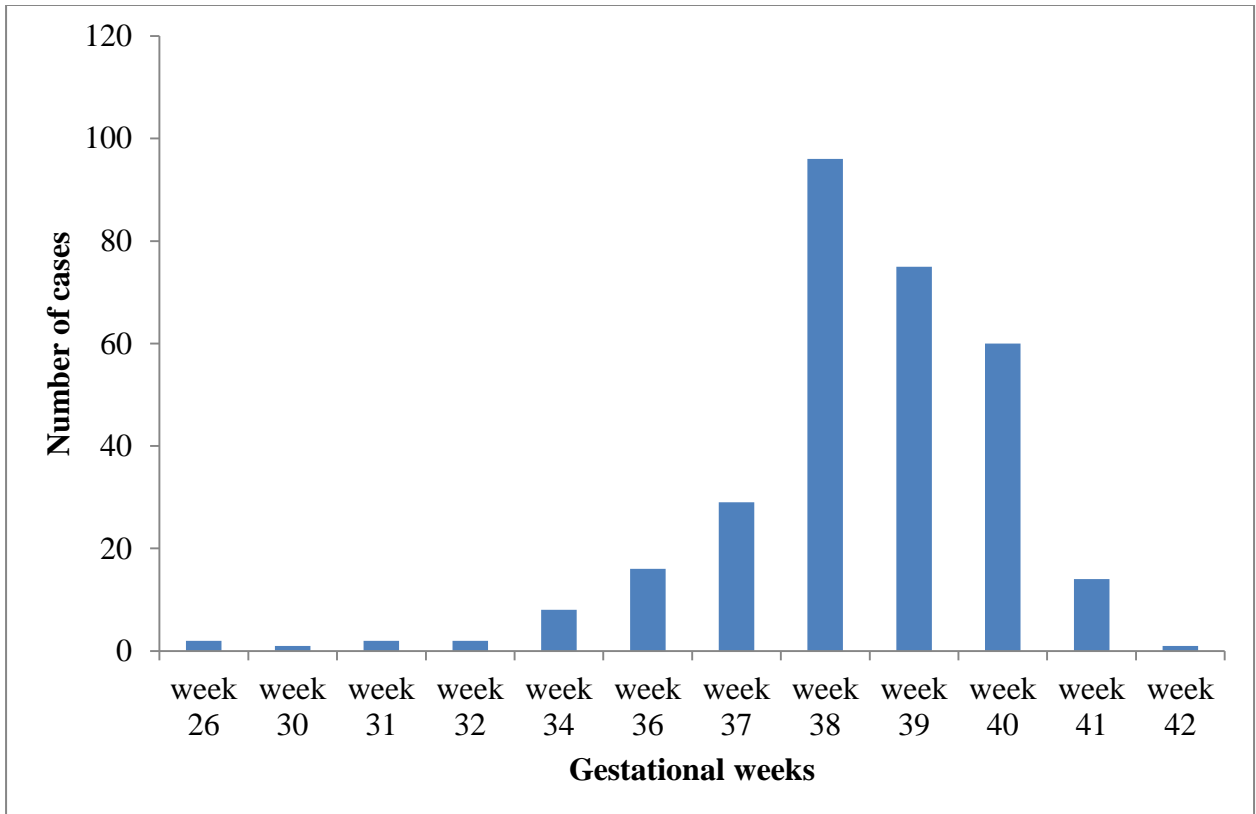


Figure 4.6 Gestation of the women who delivered at Intermediate Hospital Oshakati, Oshana Region, Namibia, July – September 2015

The majority of participants were normal weight of 209 (68.30 %), followed by overweight 65 (21.24 %). The least were underweight of 17 (5.56 %), followed by obese 15 (4.90 %) (Table: 4.4).

Table 4.4 Body Mass Index of the women who delivered at Intermediate Hospital Oshakati, in Oshana Region, Namibia, July – September 2015

Body mass index (BMI)	Frequency (n)	Percent (%)
Normal weight	209	68.30%
Obese	15	4.90%
Over weight	65	21.24%
Underweight	17	5.56%
TOTAL	306	100.00%

The pregnant women who delivered at Intermediate Hospital Oshakati during the study period of July to September 2015 were 306. The study found that 305 (99.67%) were non-smokers, whereas 1 (0.33%) was a smoker.

More than two thirds of the participants 250 (81.70 %), were HIV negative, while 51 (16.67 %) were HIV positive. There were 5 (1.63 %) participants with unknown HIV status. Among the HIV-negative pregnant women who delivered at IHO 112 (44.8%)

were older mothers, while 138 (55.20%) were teenage mothers. Of all the pregnant women who delivered at IHO with HIV -positive status, 41 (80.39%) were older mothers, while 10 (19.61%) were teenage mothers. All the 5 (1.63 %) participants with unknown HIV status were teenage mothers (Figure: 4.7).

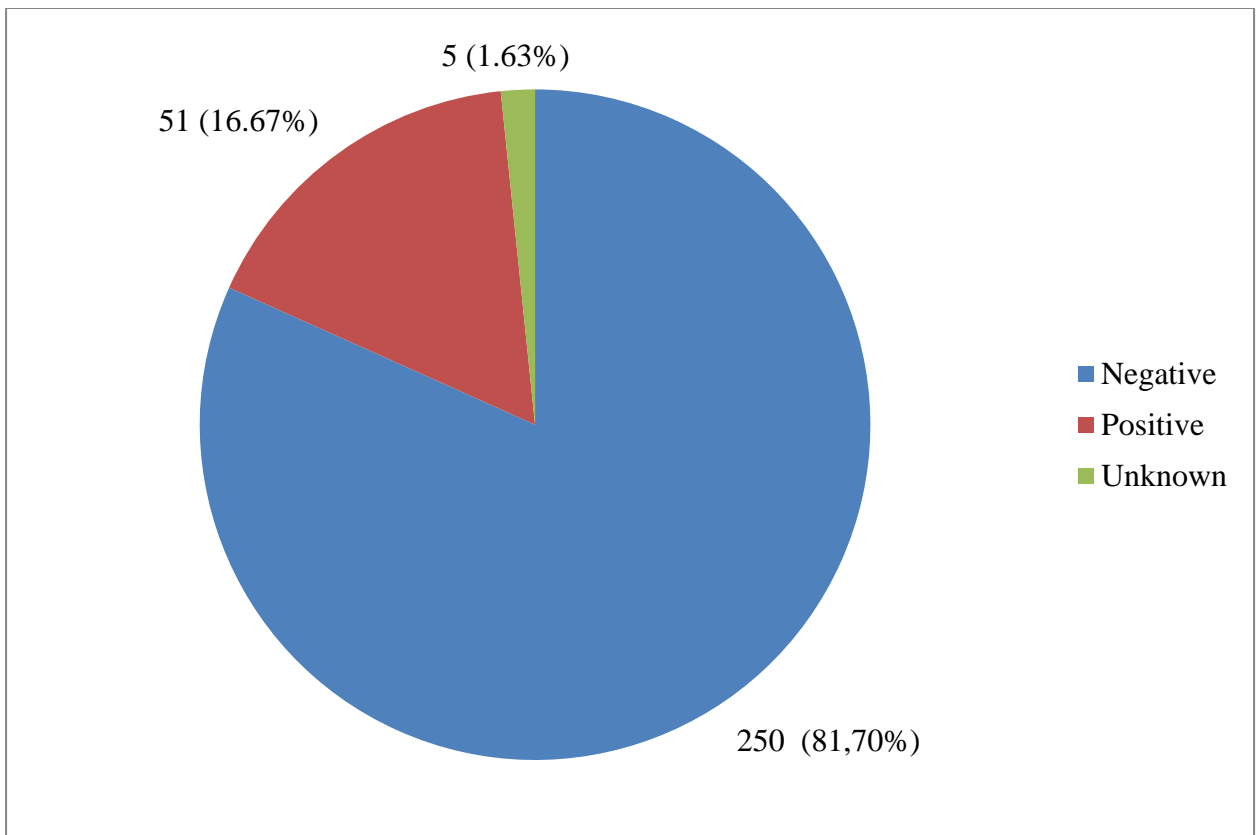


Figure 4.7 HIV Status of pregnant women who delivered at Intermediate Hospital Oshakati, July – September 2015

The majority of participants were 262 (86 %) had less than 10 gm %, while other participants 44 (14%) had less than 10 gm% haemoglobin (Figure: 4.8).

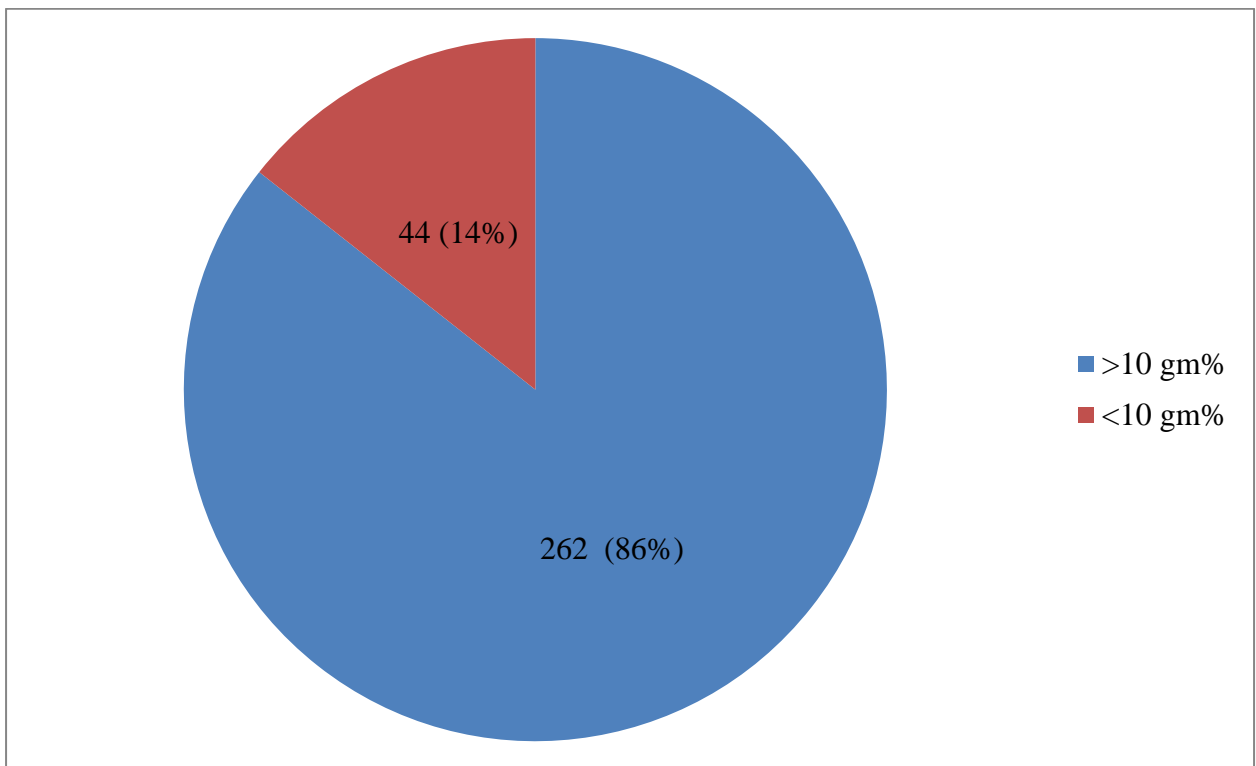


Figure 4.8 Haemoglobin status of the women who delivered at Intermediate Hospital Oshakati, in Oshana Region, Namibia July – September 2015

More than two thirds of the participants 264 (86.27 %), had normal blood pressure, while 18 (5.88 %) had severely high blood pressure. There were 14 (4.58 %)

participants with mildly high blood pressure, while 10 (3.27 %) were moderately high blood pressure (Table: 4.5).

Table 4.5 Blood pressure of the pregnant women who delivered at Intermediate Hospital Oshakati, in Oshana Region, Namibia, July – September 2015

Blood pressure	Frequency (n)	Percent (%)
Mildly High BP 140/90-149/99 MMHG	14	4.58%
Moderately High BP 150/100-159/109 MMHG	10	3.27%
Normal BP <140/90 MMHG	264	86.27%
Severely High BP >160/110	18	5.88%
TOTAL	306	100.00%

4.4 ADVERSE PREGNANCY OUTCOMES OF WOMEN WHO DELIVERED AT INTERMEDIATE HOSPITAL OSHAKATI.

A total of 234 (76.4%) women who delivered at Intermediate Hospital Oshakati, Oshana Region, Namibia, had adverse pregnancy outcomes. The number of pregnant women who underwent caesarean section was 100 (32.67 %), while infants with low birthweight were 66 (21.56 %). The participants with eclampsia were 28 (9.15%). The study had adverse pregnancy outcomes of the postpartum haemorrhage 20 (6.53%)

while maternal death was recorded at 6 (1.96 %) and neonatal death at 4 (1.30 %). In addition, the study had 9 perinatal deaths, 5 (1.63%) of those were fresh and 4 (1.30%) were macerated stillbirths. The puerperal sepsis recorded only 1 (0.32 %) (Table: 4.6).

Table 4.6 Pregnancy outcomes of women who delivered at Intermediate Hospital Oshakati, Oshana Region, Namibia, July – September 2015

Characteristics	Frequency (n)	Percentage (%)
Maternal death	6	1.96
Neonatal death	4	1.30
Postpartum Haemorrhage	20	6.53
Puerperal sepsis	1	0.32
Eclampsia	28	9.15
Caesarean Section	100	32.67
Low birthweight	66	21.56
Fresh still birth	5	1.63
Macerated	4	1.30
None	72	23.52
Total	306	100.00

A majority of the participants presented other adverse pregnancy outcomes 19 (45.25%) of perinatal tears, followed by fetal distress 9 (21.42 %). The participants

with vacuum extraction were (4 or 9.52 %), while participants with syphilis were 2 (4.76%) and one case each was reported on the rest of the characteristics (Table: 4.7).

Table 4.7 Other adverse pregnancy outcomes of women who delivered at Intermediate Hospital Oshakati, Oshana Region, Namibia, July – September 2015

Characteristics	Frequency (n)	Percent (%)
Anemia	1	2.38%
Breech	1	2.38%
Cleft lip	1	2.38%
Fetal distress	9	21.42%
Jaundice	1	2.38%
Meconium aspiration	1	2.38%
Perineal tear	19	45.23%
Retained placenta	1	2.38%
Spinal bifida	1	2.38%
Syphilis	2	4.76%
Transverse lie	1	0.33%
Vacuum extraction	4	9.52%
TOTAL	42	100.00%

4.5 SOCIO-DEMOGRAPHIC FACTORS ASSOCIATED WITH ADVERSE PREGNANCY OUTCOMES.

Table 4.8 presents the socio-demographic factors associated with adverse pregnancy outcomes among women who delivered at IHO. The socio-demographic factors that did not show any statistically significant association with adverse pregnancy outcomes in this study were: age (OR 0.90, 95%CI: 0.57-1.41, $p=0.6465 > 0.05$), employment (OR 1.01, 95%CI: 0.52-1.98, $p=0.9731 > 0.05$), marital status (OR 0.94, 95%CI: 0.38-2.34, $p=0.8965 > 0.05$), and highest educational level attended (OR 0.72, 95%CI: 0.30-1.72, $p=0.4669 > 0.05$).

The socio-demographic factors that are showing a statistically significant association with adverse pregnancy outcomes in this study were region (OR 0.33, 95%CI: 0.12-0.94, $p=0.0314 > 0.05$), and residential area (OR=0.43, 95%CI: 0.25-0.74, $p=0.0021 > 0.05$).

Table 4.8 Logistic regression analysis of adverse pregnancy outcomes and socio-demographic characteristics of among women who delivered at Intermediate Hospital Oshakati, July – September 2015

Characteristics	Adverse Pregnancy Outcomes n (%)	No Adverse Pregnancy Outcomes (%)	Odd Ratio (OR)	95% CI	P-Value
Age			0.90	0.57-1.41	0.6465
Teenagers	84 (54.90)	69 (45.10)			
Older mothers	80 (52.29)	73 (47.71)			
Region			0.33	0.12-0.94	0.0314*
Kunene	4 (66.67)	2 (33.33)			
Non-Namibian (Angola)					
Ohangwena	17 (77.27)	5 (22.73)			
Omusati	27 (58.70)	19 (41.30)			
Oshana	40 (66.67)	20 (33.33)			
Oshikoto	67 (42.95)	89 (57.05)			
	6 (54.55)	5 (45.45)			
Employment			1.01	0.52-1.98	0.9731
Employed	21 (53.85)	18 (46.15)			
Unemployed	143(53.56)	124(46.44)			
Marital status			0.94	0.38-2.34	0.8965
Single	153(53.50)	9 (45.00)			
Married	11 (55.00)	133(46.50)			
Residential Area			0.43	0.25-0.74	0.0021*
Urban	28 (37.84)	46 (62.16)			
Rural	136(58.62)	96 (41.38)			
Highest Educational level attended			0.72	0.30-1.72	0.4669
No formal education	15 (68.18)	7 (31.82)			
Primary education	30 (66.67)	15 (33.33)			
Secondary education	112(49.12)	116(50.88)			
Tertiary education	7 (63.64)	4 (36.36)			

* P-value statistically significant at 0.05

4.6 POTENTIAL RISK FACTORS ASSOCIATED WITH ADVERSE PREGNANCY OUTCOMES

Table 4.9 presents the potential risk factors associated with adverse pregnancy outcomes among women who delivered at IHO. The potential risk factors that did not show any statistically significant association with adverse pregnancy outcomes in this study were: gravidity (OR 0.94, 95% CI: 0.80-1.10, $p=0.44$), parity (OR 0.86, 95% CI: 0.73-1.02, $p=0.093$), and HIV status (OR 1.02, 95% CI: 0.53-1.99, $p=0.9554$).

The potential risk factors that are showing a statistically significant association with adverse pregnancy outcomes in this study were gestational weeks (OR 0.75, 95% CI: 0.65-0.88, $p=0.0004$), BMI (OR 0.56, 95% CI: 0.32-0.98, $p=0.0430$), haemoglobin (OR 0.33, 95% CI: 0.16-0.69, $p=0.0029$), and blood pressure (OR 9.56, 95% CI: 1.19-77.5, $p=0.0334$).

Table 4.9 Logistic regression analyses of adverse pregnancy outcomes and potential risk factors among women who delivered at Intermediate Hospital Oshakati, July – September 2015

Characteristics	Adverse Pregnancy Outcomes	No Adverse Pregnancy Outcomes	Odds Ratio (OR)	95% CI	P-Value
Gravidity			0.94	0.80-1.10	0.44
1-4	154(53.85)	132(46.15)			
5-9	10 (50.00)	10 (50.00)			
Parity			0.86	0.73-1.02	0.093
0-4	154(53.66)	133(46.34)			
5-9	10 (52.63)	9 (47.37)			
Gestational weeks			0.75	0.65-0.88	0.0004*
26-31 weeks	4 (80.00)	1 (20.00)			
32-37 weeks	43 (76.79)	13 (23.21)			
38-42 weeks	117(47.76)	128(52.24)			
BMI			0.56	0.32-0.98	0.0430*
Normal weight	117(55.98)	92 (44.02)			
Obese	11 (73.33)	4 (26.67)			
Overweight	27 (41.54)	38 (58.46)			
Underweight	9 (52.94)	8 (47.06)			
HIV Status			1.02	0.53-1.99	0.9554
Negative	134(53.60)	116(46.40)			
Positive	27 (52.94)	24 (47.06)			
Unknown	3 (60.00)	2 (40.00)			
Haemoglobin			0.33	0.16-0.69	0.0029*
<10gm%	33 (75.00)	11 (25.00)			
>10gm%	131(50.00)	131(50.00)			
Blood pressure			9.56	1.19-77.5	0.0334*
Normal	128(48.48)	136(51.52)			
Mildly high	9 (64.29)	5 (35.71)			
Moderate high	9 (90.00)	1 (10.00)			
Severely high	18 (100)	0 (0.00)			

* P-value statistically significant at 0.0

4.7 MULTIVARIATE ANALYSES ON POTENTIAL RISK FACTORS ASSOCIATED WITH ADVERSE PREGNANCY OUTCOMES.

Table 4.10 presents multivariate analyses on potential risk factors associated with adverse pregnancy outcomes among women who delivered at IHO. This table shows that in multivariate logistic regression analysis, the following risk factors were significantly associated with adverse pregnancy outcome: residential area (OR 0.48, 95% CI: 0.25-0.88, $p=0.00176$), gestational weeks (OR 0.74, 95% CI: 0.62-0.88, $p=0.0007$), haemoglobin (OR 0.28, 95%CI: 0.13-0.63, $p=0.0018$), obese (OR 4.85, 95% CI: 1.35-1.58, $p=0.0157$), and moderate blood pressure (OR 13.87, 95% CI: 1.65-116.76, $p=0.0156$).

The following risk factors did not show any significant association with adverse pregnancy outcomes in this study: overweight (OR 0.81, 95% CI: 0.43--1.52, $p=0.5215$), underweight (OR=0.98, 95% CI: 0.33-2.89, $p=0.9673$) and mildly high blood pressure (OR=2.15, 95% CI: 0.65-7.15, $p=0.2105$).

Table 4.10 Multivariate analyses on potential risk factors of women who delivered at Intermediate Hospital Oshakati, July – September 2015

Characteristics	Odd Ratio (OR)	95 % CI	P-Value
Residential Area	0.48	0.26 to 0.88	0.0176
Gestation	0.74	0.62 to 0.88	0.0007
Haemoglobin	0.28	0.13 to 0.63	0.0018
Body Mass Index (BMI)			
Obese / Normal	4.85	1.35 to 1.58	0.0157
Overweight / Normal	0.81	0.43 to 1.52	0.5215
Underweight / Normal	0.98	0.33 to 2.89	0.9673
Blood Pressure			
Mildly high / Normal	2.15	0.65 to 7.15	0.2105
Moderately high / Normal	13.87	1.65to 116.76	0.0156

* p-value statistically significant at 0.05

4.8 COMPARISON OF ADVERSE PREGNANCY OUTCOMES BETWEEN TEENAGE AND OLDER MOTHERS

Table 4.11 presents the comparison between teenage and older mothers with regards to different adverse pregnancy outcomes among women who delivered at IHO. Maternal deaths were observed only in older mothers 6 in total. The P-Value=0.0392 indicate a statistically significance association between maternal deaths and age category with maternal death occurring only in older mothers. The ($\text{Chi}^2 = 4.2500$, $p=0.0392$), indicates a strong association between maternal death and age categories.

The following adverse pregnancy outcomes did not show any statistically significance: neonatal death ($\text{Chi}^2 = 0.2533$, $p=0.6147$), postpartum haemorrhage ($\text{Chi}^2 = 0.4815$, $p=0.4877$), puerperal sepsis ($\text{Chi}^2 = 0.0000$, $p=1.0000$), eclampsia ($\text{Chi}^2 = 0.0393$, $p=0.8428$), caesarian section ($\text{Chi}^2 = 0.0149$, $p=0.9029$) and low birth weight ($\text{Chi}^2 = 0.01739$, $p=0.6767$).

Table 4.11 Adverse pregnancy outcomes in teenage and older mothers who delivered at Intermediate Hospital Oshakati, July – September 2015

Outcomes	Teenage mothers (n= 153) (%)	Older mothers (n= 153) (%)	X ²	P-value
Maternal death	0 (0.00)	6 (3.92)	4.2500	0.0392*
No maternal death	153(100)	147(96.08)		
Neonatal death	2 (50.00)	2 (50.00)	0.2533	0.6147
No neonatal death	151(50.00)	151(50.00)		
Postpartum haemorrhage	12 (60.00)	8 (40.00)	0.4815	0.4877
No postpartum haemorrhage	141(49.30)	145(50.70)		
Puerperal sepsis	1 (100.00)	0 (0.00)	0.0000	1.0000
No puerperal	152(49.84)	153(50.16)		
Eclampsia	13 (46.43)	15 (53.57)	0.0393	0.8428
No eclampsia	140(50.36)	138(49.64)		
Caesarean Section	49 (49.00)	51 (51.51)	0.0149	0.9029
No caesarean section	104(50.49)	102(49.51)		
Low birth weight	35 (53.03)	31 (49.97)	0.1739	0.6767
None	118(49.17)	122(50.83)		

* p-value statistically significant at 0.05

4.9. SUMMARY

In this chapter, the collected data was analyzed and interpreted in accordance with the objectives of the study. The researcher was able to reach 306 (100%) pregnant women who delivered at Intermediate Hospital Oshakati as was indicated for the study. Descriptive study and statistical analysis were applied using EPI INFO 7. The data was presented as tables, graphs and charts. Bivariate and multivariate analyses were performed in this study. Categorical variables were compared between teenagers and older mothers using a Pearson chi-square test. Odds Ratios, 95% confidence intervals and p-values were used to demonstrate statistical significance for factors associated with adverse pregnancy outcomes. In all analyses, a p-value of less than 0.05 was considered statistically significant.

CHAPTER 5

DISCUSSIONS, CONCLUSIONS AND RECOMMEDATIONS

5.1 INTRODUCTION

This chapter summarizes the main findings of this study and conclusions are drawn on the basis of the study objectives and assumptions made. The findings were discussed in comparison with other previous studies done in other countries as indicated in the literature review. From these conclusions, a number of recommendations are formulated and presented with acknowledged contextual study.

5.2 DISCUSSION OF THE FINDINGS

This study found that the following factors were statistically significant associated with the adverse pregnancy outcomes among women who delivered at the Intermediate Hospital Oshakati: region, residential area, gestational weeks, body mass (overweight), haemoglobin and moderately high blood pressure (Table: 4.8 and 4.9). Whilst the following other factors were not statistically significant associated with the adverse pregnancy outcomes among women who delivered at the Intermediate Oshakati Hospital: age, employment, marital status, highest educational level, gravidity, parity and HIV status (Table: 4.8 and 4.9).

In fact, the region of origin of the participants was statistically significant (OR 0.33, 95% CI: 0.12-0.94, $p=0.0314$). The study found a high proportion of adverse pregnancy outcomes among women from Angola with a proportion of 77.27 %, Omusati 67.80%, Ohangwena 58.70%, Oshikoto 54.55%, Kunene 50% and Oshana 43.83%. The study found that women who delivered at Intermediate Hospital Oshakati were coming from the northern part of Namibia and some from neighbouring country Angola. It showed that Angolan pregnant women were referred from Omusati and Ohangwena regions where the Namibian and Angolan border post is situated. The study showed that the majority (76.19 %,) of adverse pregnancy outcomes were among non-Namibian (Angolans) whilst Namibians were at 51.93%. Intermediate Hospital Oshakati is the only referral hospital in the northern part of Namibia and most of the complicated cases are referred there. There is a long distance between this hospital and other district hospitals especially Ohangwena, Omusati, Oshikoto and Kunene with more than a distance of 100 kilometers.

Most of the studies consulted in the literature review did not consider the region variables where the women live as a factor which might have an impact or influence on adverse pregnancy outcomes, but in this study the researcher included this and the region of origin was found to be statistically significance. This study revealed that the majority of adverse pregnancy outcomes were among Angolans and this could be

attributed to the decaying health system in Angola as well as a lack of adequate information about antenatal care (ANC) among Angolans as seen by their late presentation at ANC clinics. Most of these pregnant mothers present to the Namibian hospitals without ANC health passports.

In this study it was found that residential area was significantly (OR=0.43, 95%CI: 0.25-0.74, p=0.0021) associated with adverse pregnancy outcomes. The study found that a higher proportion {n=136, (58.62 %)} of adverse pregnancy outcomes were among women from rural areas compared to n= 28 (37.84%) who were from urban areas. Most of the pregnant women who delivered at IHO were from rural areas and travelling long distances could possibly be attributed to adverse pregnancy outcomes. This study revealed that the majority of teenage mothers with adverse pregnancy outcomes were from rural areas n=120 (51.72%), compared to teenage mothers from urban areas n=33 (44, 59%). Access to information about pregnancy and effects is readily available in urban areas in the form of internet, library, television and an adolescent friendly clinic, than it is in rural areas. Therefore, teenage mothers from urban areas are likely to avoid an issue that predisposes them to adverse pregnancy outcomes.

This study showed that gestational weeks were significantly (OR=0.75, 95% CI: 0.65-0.88, p=0.0004) associated with adverse pregnancy outcomes among women who delivered at IHO. Furthermore, the study found that the majority {week 26-31 (80%)}, of pregnant women who delivered at Intermediate Hospital Oshakati, followed by week 32-37 (76.79%), and week 38-42 (47.76%). Body Mass Index (BMI) was significantly (OR 0.56, 95% CI: 0.32-0.98, p=0.0430) associated with adverse pregnancy outcomes among women who delivered at IHO. The study found that a high proportion (73.33%) of obese pregnant women had adverse pregnancy outcomes among women who delivered at IHO, followed by 55, 98% of the normal weight, 52.94% of underweight and 41.54% of overweight. Callaway, et al., (2006) in her study about the prevalence and impact of overweight and obesity in an Australian obstetric population found that the prevalence of maternal overweight and obesity was (43%), which is higher than that reported in another study of Australian women giving birth in Queensland between 1998 and 2002, which reported that 34% of women were overweight or obese.

In this study it was found that haemoglobin was significantly (OR 0.33, 95% CI: 0.16-0.69, p=0.0029) associated with adverse pregnancy outcomes. This study further showed that a higher proportion {n=33, (75%)} of adverse pregnancy outcomes occurred among women with haemoglobin less than 10gm% compared with {n=131,

(50%)} haemoglobin less than 10g%. This study revealed that most of the pregnant women who delivered at IHO with less than 10g% were older mothers n=24 (15, 69%), whereas teenage mother had n=20 (13.07%) of adverse pregnancy outcomes. Another study done in Nigeria about obstetric complications, intervention rates and materno-fetal outcome in teenage nullipara in Benin city found that pregnant women with low haemoglobin occurred more commonly in teenagers compared to older mothers and there was also a significant difference in the mean birth weight and gestation at delivery (Ebeigbe, 2007).

In that the IHO study blood pressure was significantly (OR 9.56, 95% CI: 1.19-77.5, p=0.0334) associated with adverse pregnancy outcomes among women who delivered at IHO. All women n=18 (100%), with severe blood pressure had adverse pregnancy outcomes, as well as 90% (n=9) of those with moderately high blood pressure, followed by 64% (n=9) of those with mildly high blood pressure and lastly 48% (n=128) of those with normal blood pressure had adverse pregnancy outcomes.

Furthermore, this study found that maternal death was significantly ($\text{Chi}^2 = 4.2500$, p=0.0392) associated with adverse pregnancy outcomes among women who delivered at IHO. The study did not look at the causes of maternal death at IHO; however, it was found that all maternal deaths occurred in older mothers (>20 years). A study by

(Onakewhor et al., 2011) done in Nigeria highlighted that HIV/AIDS was significantly (24.5%) associated with maternal mortality in Nigeria. In a national survey conducted in 2006 to assess the availability of basic and emergency obstetric care in Namibia, it was found that the country only has four facilities offering all eight signal functions that meet the WHO standards for Comprehensive Emergency Obstetric Care (CEmOC) facilities. There were no basic emergency obstetric care (BEmOC) facilities in Namibia and most obstetric emergency services were performed at CEmOC facilities.

The four health facilities providing all the eight signal functions are in the central and northern regions – two in Windhoek, one in Otjiwarongo and one in Oshakati. The northern regions do not have the BEmoC except the CEmoC facilities at Oshakati (MoHSS, 2006). Two-thirds of the Namibian populations live in the northern regions, and thus it is not surprising that high maternal deaths occur in these areas. The alternative hypothesis was confirmed, that the aforementioned factors are associated with adverse pregnancy outcomes.

5.3 CONCLUSIONS

This study found that adverse pregnancy outcomes are a real public health issue, which needs to be addressed. All the 306 women who met the eligibility criteria and

were approached agreed to participate in the study, thus giving a 100% response rate. This study found that n=164 (53.60%) had adverse pregnancy outcomes, whereas n=142 (46.40%) did not have.

The study concludes that the factors associated with adverse pregnancy outcomes are as follows: most common one was gestational weeks, followed by haemoglobin, moderate high blood pressure, obese and residential area. Most of the pregnant women who delivered at IHO were from rural areas and due to long distances it might possible to develop adverse pregnancy outcomes. In addition, the study found that obesity is one of the adverse pregnancy outcomes among women who delivered at IHO. Antenatal clinics did not educate mothers to take part in regular exercise activities to reduce obesity and high blood pressure.

Women with low haemoglobin occurred more commonly in older mothers compared to teenagers. Teenage mothers are more likely to eat fruits and vegetables (balanced diet) which prevent them to have low haemoglobin compared with older mothers. This study compared the adverse pregnancy outcomes among teenage mothers and older mothers who delivered at IHO during the study period of three months. There were no common adverse pregnancy outcomes in both teenage mothers and older mothers. Maternal death was one of the adverse pregnancy outcomes among older mothers,

whereas zero maternal death reporting in teenage mothers. This could be due to social problems in adult compared to teenage mothers. All the deaths recorded occurred in mothers above the age of 35 and this age group could contribute to these deaths as a risk maternal age.

5.4 LIMITATIONS

Some limitations that were encountered during this study are as follow: Home deliveries and private patients who delivered in this hospital were not included in this study; therefore the findings did not represent the whole population of Oshana region. It was difficult to find the parents or guardians of the teenage mothers (minors) in order for them to sign consent forms for those referred from other regions as well as those who are from within the region. Some patients' documents were not clear and some were incomplete.

5.5 RECOMMENDATIONS

In this study we recommend the following:

- ✓ The Ministry of Health and Social Services in collaboration with relevant stakeholders to build another intermediate hospital in the northern part of Namibia to avoid too many cases being referred and long distances travelling.
- ✓ Namibian and Angolan governments to develop a good referral system among the pregnant women who are coming from Angola.
- ✓ Ensure that district hospitals have specialists in obstetric care and advanced midwifery.
- ✓ To sensitize all pregnant women about the adverse pregnancy outcomes and how to prevent it in order to reduce maternal and child death.
- ✓ The Ministry of Health and Social Services to strengthen awareness campaigns on family planning and sex education among teenagers in rural areas.
- ✓ The parents and guardians should also be educated on the issue of teenage pregnancy prevention as well as adverse pregnancy outcomes.
- ✓ ANC clinic should promote regular exercises and a balanced diet intake to all pregnant women.

5.6. SUMMARY

This chapter presented a discussion of the findings, conclusions, limitations and recommendations of the study. In this chapter, the discussion of the findings, self-interpretation and findings from other studies were done in accordance with the objectives of the study. The researcher was able to reach 306 (100%) of pregnant women who delivered at Intermediate Hospital Oshakati as was indicated for the study.

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ANNEXURE 1: CONSENT FORM

Dear mothers

My name is Teopolina Natangwe Mungoba, a final year Masters of Science (Field Epidemiology) student at the University of Namibia, Faculty of Health Sciences, under the supervision of Dr. H.Mitonga and Dr. S.A David. I am conducting research on the following topic:

Factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati

The study aims to determine factors associated with Adverse Pregnancy Outcomes (APOs) among women delivering at Intermediate Hospital Oshakati (IHO). You are being requested to attend a face to face interview with me (as the researcher) and, respond to questions that you will be asked. Your participation in this research is voluntarily; you may withdraw from the interview at any time without any consequences. As the researcher, I will use the one-on-one interview with your permission, to get valuable information. However, the information may be withdrawn if you are not comfortable with it.

The results of the study may be published but your name will not be revealed and no individual identification or information will be provided. Even though there may be no direct or immediate benefits derived from the study, the results of the study may generate factors associated with APOs among women delivered at IHO.

If you have any questions about the study, please do not hesitate to ask or to call the researcher (Teopolina Natangwe Mungoba) 0812451694 or tmungoban@yahoo.com

I thank you for your participation.

Consent

I have read the above informed consent, the nature, demands and benefits of the study.

I understand that I may withdraw my consent and discontinue participation during the interview without any penalty or loss of benefit to myself.

Signature of the Participant: Date.....

Signature of parent/Guardian (If mother under 18 years):

Date:

I certify that I have explained to the above participant the nature, purpose, and potential benefits and risks associated with participation in this study.

Signature of the researcher Date.....

**ANNEXURE 2:
RESEARCH QUESTIONNAIRE AND CHECKLIST INSTRUMENT**

Title: Factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati

Compiled By: Teopolina Natangwe Mungoba – 0812451694 tmungoban@yahoo.com

Student No: 8932395

Course: Master's degree in Applied Epidemiology and Laboratory Management

Institution: University of Namibia (UNAM)

Qualification: Bachelor Degree of Nursing Science Management

Main Supervisor: Dr. H. Mitonga-UNAM- 0856056256

Co-Supervisor: Dr.S.A.David-UNAM-0816182222

Dear Participant:

The aim of this study is to determine the factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati

The Objectives of the study:

Section A: To determine the factors associated with adverse pregnancy outcomes.

Section B: To describe the factors associated with adverse pregnancy outcomes.

Section C: To compare the adverse pregnancy outcomes between teenage mothers and older mothers.

Instructions:

- (1) This questionnaire completed by researcher.
- (2) Please mark with an" X" in the applicable column.
- (3) Answer all questions in all Sections.
- (4) Please answer each question as truthfully as possible. This interview will take about 10-15 minutes.
- (5) The results of this research will be available towards the end of January 2016.

Your participation in this research study is highly appreciated.

Regards

Teopolina Natangwe Mungoba (0812451694) tmungoban@yahoo.com

Questionnaire Number: _____

Date of Interview

SECTION A: Demographic characteristics of the patient:

QUESTION 1: Please answer the following questions.

1.1 Age		
1.2 Region		
1.3 Employment (please tick the collect answer)	Yes	
	No	
1.4 Marital Status (please tick the collect answer)	Married	
	Single	
	Divorced	
	Widow	
1.5 Residential area (please tick the collect answer)	Rural	
	Urban	
1.6 Highest Educational level attended (please tick the collect answer)	No Formal Education	
	Primary Education	
	Secondary Education	
	Tertiary Education	

SECTION B: Potential risk factors:**Question 2: Please indicate the correct answer.**

2.1 Gravity		
2.2 Parity		
2.3 Gestation		
2.4 Body mass index (BMI)		
2.5 Smoking	Yes	
	No	
2.6 HIV Status (please tick the correct answer)	Negative	
	Positive	
	Unknown	
2.7 Haemoglobin (please tick the correct answer)	>10 gm%	
	<10 gm%	
2.8 Blood pressure (BP) in	Normal BP	

pregnant women (please tick the correct answer)	<140/90	
	Mildly High BP 140/90- 149/99	
	Moderately High BP150/100- 159/109	
	Severely High BP >160/110	

SECTION C: Patients outcomes after birth:**Question 3: Please tick the correct answer.**

3.1 Maternal death	Yes	
	No	
3.2 Neonatal death	Yes	
	No	
3.3 Postpartum haemorrhage	Yes	
	No	
3.4 Puerperal sepsis	Yes	
	No	
3.5 Eclampsia	Yes	
	No	
3.6 Caesarean Section	Yes	
	No	
3.7 Low birth weight (please tick the correct answer)	< 2500 gr	
	>2500 gr	
3.8 Perinatal death	Fresh	

(please tick the correct answer)	Stillbirth	
	Macerated	
3.9 Others (Adverse outcomes)		

ANNEXURE: 3 RESEARCH PERMISSION LETTER FROM UNAM

University of Namibia, Private Bag 13301, Windhoek, Namibia
 340 Mandume Ndemulayo Avenue, Pioneers Park
 ☎ +264 61 206 3111; URL: <http://www.unam.edu.na>



19 February 2015

TO WHOM IT MAY CONCERN**RE: RESEARCH PERMISSION LETTER**

1. This letter serves to inform that student: **TN Mungoba** (Student number: **8932395**) is a registered student in the School of Nursing and Public Health at the University of Namibia. His research proposal was reviewed and successfully met the University of Namibia requirements.
2. The purpose of this letter is to kindly notify you that the student has been granted permission to carry out postgraduate studies research. The School of Postgraduate Studies has approved the research to be carried out by the student for purposes of fulfilling the requirements of the degree being pursued.
3. The proposal adheres to ethical principles.

Thank you so much in advance and many regards.

Yours truly,

Name of Main Supervisor: **Dr H Mifongc**

Signed: _____

Dr. C. N.S. Shaimemanya


Signed: _____

Director: School of Postgraduate Studies

Tel: 2063523

E-mail: cshaimemanya@unam.na

ANNEXURE: 4 ETHICAL CLEARANCE CERTIFICATE FROM UNAM



UNAM

UNIVERSITY OF NAMIBIA

ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: SONPH/3/2015 Date: February, 2015

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 adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati

Nature/Level of Project: Masters

Researcher: T.N.MUNGOBA

Student Number : 8932395


Host Department & Faculty: School of Nursing and Public Health

Supervisor : Dr H Mitonga (Main) Dr S David (Co)

Take note of the following:

- (a) Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the UREC. 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 UREC.
- (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 UREC.
- (d) The UREC 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.

UREC wishes you the best in your research.



Prof. I. Mapaure
UNAM Research Coordinator
ON BEHALF OF UREC

ANNEXURE: 5 PERMISSION LETTER FROM MoHSS



REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198
Windhoek
Namibia

Ministerial Building
Harvey Street
Windhoek

Tel: 061 - 203 2562
Fax: 061 - 222558
E-mail: hnangombe@mhss.gov.na

OFFICE OF THE PERMANENT SECRETARY

Ref: 17/3/3

Enquiries: Mrs. H. Nangombe

Date: 07th July 2015

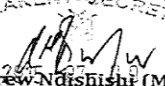
Mrs. Teopolina Natangwe Mungoba
P.O. Box 25726
Windhoek
Namibia

Dear Mrs. Mungoba

Re: Factors associated with adverse pregnancy outcomes among Women who delivered at Intermediate Hospital Oshakati.

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 operational 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;

Yours sincerely

Andrew Ndisiishi (Mr)
Permanent Secretary
REPUBLIC OF NAMIBIA
MINISTRY OF HEALTH AND SOCIAL SERVICES

**ANNEXURE: 6 PERMISSION LETTER FROM OSHANA REGIONAL
DIRECTOR**



**REPUBLIC OF NAMIBIA
MINISTRY OF HEALTH AND SOCIAL SERVICES**

**OFFICE OF THE REGIONAL DIRECTOR
OSHANA REGION**

Private Bag 5538
OSHAKATI

Tel No: (065) 220768 /
(065) 2233118/9
Fax No: (065) 220303

Enquiries: Mr. S. Taapopi

Date: 08 July 2015

TO WHOM IT MAY CONCERNED

Re: Permission to Conduct a Study on factors associated with adverse pregnancy outcomes among women who delivered at Intermediate Hospital Oshakati.

Kindly be informed that Mrs. Teopolina Natangwe Mungoba has been granted permission to conduct the above mentioned study at Intermediate Hospital Oshakati.

Please render her the necessary assistance and support.

Yours Sincerely,


SAKARI TAAPOPI
REGIONAL DIRECTOR

