THE FACTORS CONTRIBUTING TO HIGH NEONATAL MORBIDITY AND MORTALITY IN LIMPOPO PROVINCE

by

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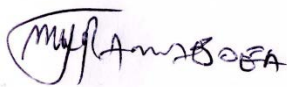
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NOVEMBER 2014

DECLARATION

I declare that **THE FACTORS CONTRIBUTING TO HIGH NEONATAL MORBIDITY AND MORTALITY IN LIMPOPO PROVINCE** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

…………………………………………… 07 December 2014

Full names **DATE**

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THE FACTORS CONTRIBUTING TO HIGH NEONATAL MORBIDITY AND MORTALITY IN LIMPOPO PROVINCE

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ABSTRACT

A quantitative descriptive, retrospective and cross-sectional study was conducted. The purpose of the study was to identify and describe factors that contributed to high sickness and death rate of babies admitted in the Neonatal Unit at a tertiary institution in Limpopo Province. Data were collected from the patient's records by administering an auditing tool. The tool included initial assessment on antenatal care, intra-partum and neonatal care.

Analysis of data was performed by IBM Statistical Package for Social Sciences (SPSS) Statistics 22 computer software version. Frequency tables and pie graphs were used to present the data. The findings revealed that 42% of the mothers whose babies were admitted in the Neonatal Unit were in their childbearing period, 71% of the mothers started antenatal care at the second trimester and 75% babies were admitted within the first six hours of life. Respiratory distress, 77% and prematurity, 43% were the common conditions for admission in the Neonatal Unit. Spontaneous preterm and immaturity were the common causes of death. Recommendations are that education and training on record keeping to be done on continuous basis, to conduct quality improvement programmes and implement maternal and neonatal guidelines in the clinical area throughout.

KEY CONCEPTS

Neonatal death/mortality; neonatal morbidity; stillbirth; perinatal mortality; antenatal; Intra-partum; neonatal care.

ACKNOWLEDGEMENTS

Dedication

I dedicate this thesis to the following special people:

My parents, Mosaupi Kganakga (mother) and the late Nakedi Tsekele (father) Ramaboea, for the support throughout my life.

My daughter Mamphoku, for her encouragement.
My son Mashoene, for always staying with me until late when studying.

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RESEARCH METHODOLOGY

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List of abbreviations

AIDS   Acquired Immune Deficiency Syndrome

ANC   Antenatal care

AZT   Azidothymidine

BANC   Basic Antenatal care

DoH   Department of Health

Cm   Centimeters

G   Grams

g/dl   Grams per decilitre

Hb   Haemoglobin

HIV   Human Immunodeficiency Virus

Kg   Kilograms

KMC   Kangaroo Mother Care

MmHg   Millimetres of mercury

LBW   Low birth weight

MDG   Millennium development goals

MSL   Meconium stained liquor

NICU   Neonatal Intensive Care Unit

PMTCT   Prevention of mother-to-child transmission

PPH   Postpartum haemorrhage

PPIP   Perinatal Problem Identification Programme

PROM   Premature rupture of membranes

MSL   Meconium stained liquor

Rh   Rhesus

RPR   Rapid plasma regain

SPSS   Statistical Package for Social Sciences

VDRL   Venereal disease research laboratory

WHO   World Health Organization

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CHAPTER 1

ORIENTATION TO THE STUDY

1.1   INTRODUCTION AND BACKGROUND

Maternal and child health is regarded as one of the determinants of the country's health status. Globally, in developed countries like America and the European region, the infant mortality and morbidity rate are said to be of the lowest state. According to the World Health Organization (WHO) (2006:19-20), on global estimates of neonatal and perinatal mortality rates, 75% of the infant's deaths worldwide in all countries occurs in the early neonatal period. The Eastern Mediterranean Regions account for 42% of the infant mortality and 54% in the Western Pacific. In developed countries, neonatal mortality account for 5 per 1000 of the births and 42% per 1000 live births in the least developed countries.

This situation is serious worldwide especially in sub-Saharan Africa and South Africa is not an exception. Even though 'new-born' is not a disease, large numbers of children die soon after birth: many of them in the first four weeks of life (neonatal deaths), and most of those during the first week (early neonatal deaths). For every baby who dies in the first week after birth, another is born dead (foetal death or stillbirths) (WHO 2006). Causes and risk factors of neonatal deaths and stillbirths differ from country to country.

According to the Saving Babies Neonatal Morbidity and Mortality Report of 2007 (DoH 2007a), infant mortality rate in South Africa was 43% for the under one year and the neonatal mortality rate account for 19% of the total deaths. The majority of these infant deaths occur in the first 28 days of life. Commonly, the deaths occur in district hospitals and include both the immature and mature infants. Most of them are intra-partum related whereby the infants are admitted with birth complications.

South Africa is among the countries that signed an agreement on the Millennium Developmental Goals to be achieved by 2015. The MDG goal 4 aims at improving child morbidity and mortality by 2015. Currently, the Perinatal Problem Identification

Programme is utilised to monitor infant care standards in the country (UNICEF 2010; WHO 2011).

According to WHO, in the American and European region 25%-45% of neonatal deaths occur within the first 24 hours of their life. These deaths are observed in babies with very low birth weight. Recommendations in these regions were that the deliveries for high risk mothers should be conducted in the level three hospitals in order to improve the perinatal care services. The strategies put in place to improve the perinatal mortality and morbidity included the provision of free health services for pregnant women and induction of labour after 41 weeks of gestation. The maternal and child handbook for the clients was also introduced to encourage awareness of maternal complications and child health in pregnant women (Tanaka, Stock, Yamamoto Mijovic- Kondejewski & Olson 2010:317-322).

In Bangladesh, a study was done by Nahar and Zabeen on neonatal morbidity and mortality rates in the Special Care Baby unit of Birdem. The aim of the study was to identify the main causes of neonatal morbidity and mortality. The neonatal mortality was found to be high at 42 per 1000 live births. The consequences of poor maternal health and nutrition together with lack of care during delivery were found to be contributory factors. The problems affecting the neonates were found to be preventable like asphyxia (Nahar, Zabeen, Akhter, Azad & Nahar 2007:2-3).

In Pakistan, a study was done where by 4 million infants die in the first 28 days of life. The findings of the study were that neonatal deaths accounted for 40% of the total infants deaths. Another study was done to examine the delivery outcomes in pregnant women and the prevalence of neonatal deaths. The neonatal mortality rate was found to be 49 per 1000 live births. The main causes were infection, prematurity and birth asphyxia. The researcher hypothesised that the neonatal mortality rate in this population will be good as the people are urbanised with good obstetrical services (Jehan, Harris, Salat, Zeba, Mobeen, Pasha, McClure, Moore, Wright & Goldenberg 2009:130-138).

In Sri Lanka the neonatal mortality rate is 12,5 per 1000 live births. Some of the contributory factors were inadequate care of the mother and baby during pregnancy, labour and peuperium. Poor quality of new-born care after birth was also observed.

Neonatal sepsis, asphyxia, tetanus and respiratory distress syndrome were identified as the main causes of this high neonatal mortality and morbidity rates in the Eastern countries (Rajindrajith, Mettananda, Adihetti, Goonawardana & Devanarayana 2009:791-796).

1.2 THE SOURCE OF THE RESEARCH PROBLEM

Maternal health has a certain influence on the status of new-born and infant health care in all countries. In South Africa, maternal health services are free and this put a burden on the extent of demand. A pregnant woman is expected to start antenatal clinic immediately she misses her period. Limpopo Province is one of the poorest rural and the fourth largest in South Africa. The province has the total population of 5,5 million. The infant mortality rate is 60 per 1000 live births in the province. The majority of the neonatal deaths occur within the first 28 days of the infant life. This is similar to other countries worldwide. The province has established a programme called The Limpopo Neonatal Care (LINC) in which nurses and doctors are trained on the basic neonatal care and resuscitation. The hospitals are also accredited as a baby friendly after been inspected by experienced Paediatricians. Continuous support is also given by these specialists with the aim of improving the neonatal morbidity and mortality rate in the province (Marinovich & Gutierrez 2011:1-2).

There are five districts in the province, namely, Mopani, Sekhukhune, Waterberg, Vhembe and Capricorn districts. The study was conducted in the Capricorn District where by the researcher has observed a high neonatal morbidity and mortality rate of 30 per 1000 live births. The province has one tertiary institution with a specialised unit caring for critically ill neonates who need assisted ventilation. The babies are admitted in the Neonatal Care Unit with birth complications directly and as referrals from district hospitals within the province. The study will focus on the predictors contributing to the high neonatal morbidity and mortality rates at one tertiary institution in Limpopo Province by evaluating maternity records for mothers and babies born between January 2012 and December 2012 (Limpopo Province Trust for Community Outreach and Education 2011:1).

1.3 RESEARCH PROBLEM

The researcher has observed high neonatal morbidity and mortality whereby neonates are admitted in the Neonatal Care Unit with birth complications. According to the

statistics, the district has a high neonatal morbidity and mortality of 30 per 1000 live births.

Given the above-mentioned problem the following question arises: What are the contributory factors to the high neonatal morbidity and mortality at a tertiary institution in Limpopo Province?

1.4   AIM OF THE STUDY

1.4.1 Research purpose

The purpose of the study was to identify and describe the factors that contributed to the high sick and death rate of babies admitted in the Neonatal Unit at a tertiary institution in Limpopo Province.

1.4.2 Research objectives

The research objectives of this study are to

- assess maternal records of babies who are admitted in the Neonatal Unit with birth complications
- assess records of babies admitted in the Neonatal Care Unit during their first 28 days of life (Burns & Grove 2009:36-37; De Vos, Strydom, Fouché & Delport 2011:107)
- determine the factors that contribute to the high sick and death rate of babies admitted in the neonatal unit

1.5   SIGNIFICANCE OF THE STUDY

The findings of this study might provide some knowledge and insight into the prevalence of neonatal and mortality and this study could form the basis for further research in the province. These findings could have major policy and training implications for midwives. New knowledge will be brought to the institution depending on the results of the research in order to reduce neonatal morbidity and mortality.

1.6   DEFINITIONS OF CONCEPTS

Neonate refers to a baby that has been born alive. The baby is called a neonate during the first four weeks of his life (Pattison 2007:3).

Neonatal morbidity means the presence of disease in a new born baby. This is determined by the general health of the pregnant woman during ante-natal, intra-partum and the immediate postpartum period. The morbid might include both the immediate and long term complications after delivery (Harrison 2012:16).

Neonatal mortality rate is the total number of babies who dies within their first 28 days of life per 1000 live births. This includes the early and late neonatal deaths. Early neonatal mortality rate is the number of deaths that occur within the first 0-7 days of life. Late neonatal mortality rate are the deaths that occur within the first 7-28 days of life per 1000 live births (Pattison 2007:3).

Birth rate is the number of reported live births per 1000 (Fraser, Cooper & Nolte 2010:744).

Stillbirth rate is the birth of a foetus that died in utero and shows no signs of life expressed per 1000 live births (Fraser et al 2010:744).

Perinatal mortality rate is the total number of stillbirths plus the early neonatal deaths per 1000 live births. These include the number of perinatal deaths divided by the number of births (Pattison 2007:3).

1.7   RESEARCH DESIGN AND METHOD

The quantitative non- experimental, descriptive and retrospective research approach was used in this study. According to Burns and Grove (2009:22-24), quantitative research is conducted as an enquiry into human problem based on testing a theory composed of variables, and to describe and examine relationships amongst these variables. With this study approach, the researcher was able to collect data from a large population in order to generalise his findings. (This will be discussed in chapter 3.)

The researcher collected data from the maternity records of mothers and the neonatal records of babies who were admitted in the Neonatal unit during January 2012 to December 2012.

Population

According to Polit and Beck (2008:337), a population is the entire aggregation of cases in a researcher is interested, while Parahoo (2006:256) defines a population as the total number of units from which data can be potentially collected; these maybe be individuals, organisations, events or artefacts.

For this study, the population comprised all records of babies who were admitted in the neonatal unit of this hospital from January-December 2012.

Sample and sampling

The systematic random sampling method was utilised. With this method, each individual case had an equal chance to be selected for the sample. The researcher assigned a single number to each element in the list, not skipping any number in the process.

Numbers were assigned to all the babies admitted to the unit in the admission register book. The sampling interval was every 10th case in the total population under study. The first case was selected randomly in through a table of random numbers and the successive cases according to the determined interval until the required number of the sample is reached (Babbie & Mouton 2010:190-191).

Sample size

According to De Vos et al (2011:230), sample comprises the elements of the population considered for actual inclusion in the study. This is a small portion of the population under study and it is representative with common characteristics. The sample size was 10% of the total admissions over 12 month period. The total admission in the unit is approximately 1300 babies per annum. The sample size will be 130 neonatal records (De Vos et al 2011:230).

Data collection

According to Burns and Grove (2011:52), data collection is the precise, systemic gathering of information relevant to the research purpose or objectives of a study. The researcher used a variety of techniques for measuring the study variables and systemically records the data on each subject.

Ethical clearances was granted by the Research and Ethics Committee from University of South Africa (UNISA) in the Department of Health Studies and University of Limpopo, request letter to the Limpopo Research and Ethics Committee, approval letter from the Department of Health, Hospital Complex Ethics and Research Committee with affiliation to the University of Limpopo and letter seeking permission from the hospital. Permission was also granted by the hospital management in order to access the records department.

Data collection technique

Data were collected at the records department where the files are kept under lock and key. The files were audited in the records department by the researcher herself to maintain confidentiality. Permission was granted to access the files by the clerk supervisor. The researcher entered the information in the designed tool for each file audited in the computer.

Data analysis

According to Polit and Beck (2012:725), data analysis is the systemic organisation and synthesis of research data. Data were organised in a way that will give meaning.

Descriptive statistics analysis in the form of tables and graphs were used to describe and summarise data. The data were analysed by the statistician using the IBM (Statistical Package for Social Sciences) SPSS statistics 21 version.

In this study, data were analysed according to different variables appearing in the tool and a summary of each section done: that is on Antenatal care. Intrapartum care and

Neonatal care. Frequency tables were done to reflect the number of times the variable occurs.

1.8   RELIABILITY AND VALIDITY

According to Burns and Grove (2009:377), reliability is concerned with how consistently an instrument measures the concept of interest. Validity is defined as the extent to which an instrument measures what it is supposed to measure. In this study, the instrument was tested on six records obtained of neonates admitted in the Neonatal Care Unit prior to conducting the study.

With face validity the researcher will ensure that the items included in - the instrument measures what it is supposed to measure (Polit & Beck 2008:331-336).

Content validity is an assessment of how well the instrument represents all the different components of the variable to be measured. Content validity was ensured by referencing in the Maternity and new-born care books. Consultation with the experts in maternal and neonatal care was done to give some inputs (De Vos et al 2011:122-124; Polit & Beck 2012:331-336).

The audit tool had all the variables pertaining to antenatal care, intra-partum care and neonatal care as referencing from the maternity case record and the neonatal case records for Limpopo province.

Face validity only reflects about what the instrument should measure. This includes the organisation of the tool and its readability (Polit et al 2008:336-337).

1.9   SCOPE OF THE STUDY

The study attempts to determine the predictors to high neonatal morbidity and mortality rates in the Capricorn District in Limpopo Province. The generalisation of the findings to other districts in the Limpopo Province is not possible as the study was conducted in the Capricorn District. The study was done in the Special Care Unit for managing sick neonates in the province.

1.10 OUTLINE OF THE STUDY

The outline of this study is organised as follows.

Chapter 1   Orientation to the study

Chapter 2   Literature review

Chapter 3   Research design and methodology

Chapter 4   Analysis presentation of data

Chapter 5   Conclusions and recommendations

1.11 CONCLUSION

Chapter 1 introduced the background of the study on the predictors to high neonatal morbidity and mortality in Limpopo Province. It also provided an overview on the purpose of conducting the study, objectives and the problem statement. The methodology and design was discussed and the structure of the dissertation outlined.

Chapter 2 will discuss literature review.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

According to Brink, Van der Walt and Van Rensburg (2012:70-71), literature review is a way of searching for information on the topic under study. It is a systemic organisation of information about the topic of interest and what is currently known and lacking. In quantitative studies, literature review directs the development and implementation of the study.

Theoretical background and current issues on the status of neonatal morbidity and mortality worldwide will be discussed as they are interrelated. The prevalence of neonatal morbidity and mortality in South Africa will also be discussed. The country profile of Limpopo Province will be discussed and the current neonatal health care indicators outlined. Possible contributing factors to the current neonatal morbidity and mortality rates in the province will be discussed and interventions to improve the neonatal outcomes.

2.2 THEORETICAL BACKGROUND ABOUT NEONATAL MORBIDITY AND MORTALITY

According to Pattison (2007:3), a neonate refers to a baby that has been born alive and the baby is less than 28 days of life. Perinatal deaths are all the deaths that happen during the first week of life and include the stillbirths.

Neonatal morbidity means the presence of disease in a new born baby. This is determined by the general health of the pregnant woman during antenatal, intra-partum and the immediate postpartum period. The morbid might include both the immediate and long-term complications after delivery (Harrison 2012:16).

Neonatal mortality rate is the total number of babies who die within their first 28 days of life per 1000 live births. This includes the early and late neonatal deaths. Early neonatal mortality rate is the number of deaths that occur within the first 0-7days of life. Late neonatal mortality rate these are the deaths that occur within the first 7-28 days of life per 1000 live births (Pattison 2007:3).

Padayachee and Ballot (2013:89) define perinatal asphyxia as any perinatal insult resulting in suffocation with anoxia and increased carbon dioxide.

According to Olds, London, Ladewig and Davidson (2012:1174), perinatal mortality rate means the number of neonatal and foetal deaths per 1000 live births and stillbirth is the birth of a dead infant.

Infant mortality rate means the deaths per 1000 live births in the first year of life (Saugstad 2011:251).

2.3   GLOBAL OVERVIEW

According to the World health organization on Global Health survey, there are over 6.3 million perinatal deaths worldwide of these, 2.64 million are stillbirths and 3.0 million are cases of early neonatal death (WHO 2012:357-367). According to Saugstad (2011:251), new-born mortality and morbidity are still very high with the global neonatal mortality rate of 28 per 1000 live births. Most of these neonatal deaths (99%) occur in low-income and middle income countries of which few have high vital registration system (Lawn, Wilczynska-Ketende & Cousens 2006:707). In addition, slow decline in the mortality rates is also observed whereby it will take another 30 years to reduce mortality rates by two thirds as outlined in the millennium developmental goals (MDG 4). Globally, infants less than one month old account for 40% of deaths of children under the age of 5 years. The neonatal mortality differs from region to region: Africa 40/1000, Eastern Mediterranean 38/1000, South East-Asia 35/1000, the Americas 11/1000 and Europe 10/1000. Saugstad (2011:252) further state that the major causes of neonatal deaths are asphyxia (28%), infections (36%), prematurity (28%) and congenital malformations (7%).

In a study done in Brazil on the factors for perinatal death in two different levels of care, the perinatal deaths occur during the early neonatal period. Prematurity was found to be associated with higher mortality (Moura, Maesta, Rugolo, Angulski, Caldeira, Peracoli & Ruge 2014:2-4).

In Bangladesh a study was done on the risk factors and short-term outcome of birth asphyxiated babies in Dhaka and the neonatal mortality remained high with 1.5 million babies dying in their first 28 days of life. Birth asphyxia was found to be the common contributory factor to this high mortality rate. These birth asphyxiated babies were born by elderly primigravidas and the death rate was found to be 16%. The complications observed in this study were prematurity, low birth weight and hypoxic ischaemic encephalopathy (Shireen, Nahar & Mollah 2009:83-89). Another study was done in Dhaka slums on the causes of neonatal and maternal deaths: implications for service delivery. Birth asphyxia was also found to be the main contributory factor to the deaths. Lack of resuscitation after birth and lack of immediate referral to hospitals contributed to the neonatal outcome post-delivery. Majority of the deaths occurred within seven days after birth (Khatun, Rasheed, Moran, Alam, Shomik, Sultana, Choudhury, Iqbal & Bhuiya 2012:3-5).

Low birth weight is an important cause of perinatal, neonatal and postnatal mortality and morbidity. In a study done in Rajshahi Medical College hospital to evaluate the existing set up of neonatal morbidity and mortality in the paediatric unit, prematurity was the common cause of admissions. The majority of these preterm babies were severely depressed at birth with low Apgar scores at one minute. The commonest cause of early neonatal death was birth asphyxia. The findings of the study were that the mortality and morbidity were inversely associated with birth weight during early natal period (Bari, Ullah & Khatun 2008:2-4).

In their retrospective study on the neonatal morbidity and mortality at the national hospital in Dili, East Timor, Bucens, Reid, Barreto, Dwvedi and Counahan (2013:2-3), the common reason for admission was infection 38% per 100 admissions, followed by respiratory disease, asphyxia and prematurity. Most of the deaths were caused by prematurity, infection and asphyxia and occurred within the first two days of admission. Skin infection was common as the general population experienced difficulties in accessing water with low level hygiene.

In a study done in Cameroon, early neonatal deaths were significant in the elderly primigravidas due to low Apgar scores. The poor Apgar scores were related to poor dilating cervix despite good uterine contractions and to rigid perineum (Nkwabong, Fomulu, Hamida, Onama, Tjek, Kouam & Ngassa 2011:2-4).

A study was done on neonatal mortality rate in the Special Care Baby Unit at Ghanaian Teaching hospital. The aim of the study was to identify the main causes of neonatal syndrome and prematurity. The neonatal mortality was found to be 70.69% for premature new-borns. The consequence of lack of care during delivery was also found to be contributory. The problems affecting the neonates were found to be preventable like birth asphyxia. The study revealed that there was poor training on resuscitation skills and the majority of babies who died were ventilated (Rajab & Ghareba 2013:6-8, 12). In a study done in Northern Tanzania on the factors contributing to transferring of the neonates to the Neonatal Care Unit, majority of factors were related to maternal medical conditions, antenatal and intra-partum related complications (Mmbaga, Lie, Kibiki, Olomi, Kvale & Datveit 2011:2-4).

2.4   NEONATAL MORBIDITY AND MORTALITY IN SOUTH AFRICA

South Africa is regarded as one of the sub-Saharan countries where shortage of health services and poverty are still prevalent. The total population for the country is 54 million people and the child population account for 15.5% of the total population (Statistics South Africa 2014).

The Perinatal Problem Identification Programme has been used as a facility-based audit system for monitoring the quality of care and perinatal mortality. Data are collected from all types of institutions where deliveries take place. According to their findings, the mortality rates have not changed over the last 10 years. Most stillbirths and neonatal deaths occur in district hospitals. The overall early neonatal mortality rate for all infants with birth weight of >500 grams is 12 per 1000 live births and 8.5 per 1000 live births for those weighing >1000 grams. The perinatal mortality rate was high for women less than 18 years of age (64.5/1000 births) followed by women more than 34 years of age (49.4/1000 births). The common obstetric causes associated with perinatal deaths were unexplained intrauterine deaths (22%), spontaneous preterm labour (21%), intra-partum

hypoxia and trauma (16%), maternal hypertension (15%) and antepartum haemorrhage (11%). The district and provincial hospitals reporting on these mortalities identified that most of the deaths (1 in 5) were probably avoidable (Pattinson & Rhoda 2014:5-10).

The Child Health Care Problem Identification Program (Child-PIP) uses the hospital-based mortality review process to assess level of care children receive in the South African health system. Neonates account for 7% of admissions to children's wards. About 10% of neonatal deaths recorded in children's wards arrive in the hospital already dead and another 45% die within 24 hours of admission. About 48% of neonates who die in children's wards weigh below their normal age. Moreover, majority of deaths in neonates were caused by infections, septicaemia was the most common cause, followed by pneumonia, acute diarrhoeal, meningitis and PCP. Major resource allocation problems with regard to both neonatal high and intensive care facilities have been identified as deficient together with the allocation of skilled clinical personnel on neonatal care (Patrick & Stephen 2005:1-14).

From the private sector their deliveries make up about 10% of all births in the country with the Caesarean section rate of 68%.The stillbirth rate was 7.5 per 1000 deliveries and the neonatal mortality rate 4.0 per 1000 live births (Pattinson 2011:86-87).

2.4.1 Neonatal health care services in South Africa

Maternal health care plays a major on the neonatal health and its outcome. According to the millennium developmental goals (MDGs) 4 and 5, South Africa was amongst the countries that committed to improving maternal and child health by the year 2015.

2.4.2 Neonatal health care indicators in Limpopo Province

Limpopo Province is one of the poorest provinces and fourth largest in South Africa with an estimated population of 5,5 million people. The birth rate is at 20.5% of the total population and the infant mortality rate is at 41.7%.

Table 2.1   Health care facilities conducting deliveries

Health care facility	Total number	Neonatal facilities
Clinics and health care centres and MOU	411	-
District hospitals	30	Nursery and KMC
Regional hospitals	5	Nursery and KMC
Tertiary hospitals	2	1 (intensive care unit)
Total	**448**	-

2.5   FACTORS CONTRIBUTING TO NEONATAL MORBIDITY AND MORTALITY

Studies have been done worldwide on the possible contributors to neonatal morbidity and mortality. Maternal health during pregnancy plays a major role on neonatal outcomes. It is the responsibility of the health care policy makers to ensure that programmes are put in place in order to ensure proper monitoring and screening of women when they are pregnant. Prematurity, birth asphyxia and infections were found to be the major contributory factors to high neonatal mortality worldwide.

2.5.1 Neonatal factors

Preterm birth remains a global perinatal health problem and is present in both developed and developing countries. Worldwide, it accounts for 9.6% of all births and in Africa and Asia 85% of deliveries are preterm. The causal factors of preterm are maternal medical conditions during pregnancy, multiple births and greater use of assisted reproduction techniques and Caesarean births in developed countries (Beck, Woljdyla, Say, Betran, Meraldi, Rquejo, Rubens, Menon & Van Look 2010:31-32). In the developing countries, there are a number of risk factors associated with preterm births such as poor socio-economic status, very young maternal age, poor diet, cigarette smoking and infections.

Infections in the later neonatal period also contribute to high neonatal morbidity and mortality. These infections might be from maternal vaginal vaginosis and untreated gonorrhoea acquired from a colonised birth canal. In a study done in Malawi on the effect of prophylactic antibiotics to women with premature rupture of membranes, it was not clear as to whether they do have any impact on preventing the infant from been infected (Saugstad 2011:253). In India, neonatal sepsis was also noted as one of the

predictors to neonatal mortality especially to infants born prematurely (Eichenwald 2013:1088).

Birth asphyxia is amongst the top five causes of under-five mortality rate in Africa. According to Velaphi and Rhoda (2012:68), asphyxia is a preventable condition if the woman is managed properly during delivery. In a study done in China on the effect of second stage of labour on maternal and neonatal outcome, prolonged second stage of labour can decrease the Apgar score at one minute and can increase the incidence of asphyxia at birth (Li, Zhang, Ling & Jin 2011:410).

2.5.2 Maternal factors

Educational status of the mother had an influence of better survival of the infant than to those mothers who are illiterate. In the study done in northwest of Ethiopia, perinatal mortality was observed amongst illiterate mothers (Andargie, Berhane, Worku & Kebede 2013:4).

Maternal age of 25 years and less is a risk factor to increase neonatal mortality rate. History of stillbirth and the rate also increases with advanced maternal age 7.6% for mothers aged and above. Maternal obesity with the body mass index (BMI) of above 30 increases risk of stillbirth and neonatal death. According to Andargie et al (2013:3), birth interval of less than two years was also associated with increased perinatal mortality. Chronic conditions like maternal hypertension and diabetes mellitus increase the risk of stillbirths. Obstetric complications like multiple pregnancy and prolonged labour increase the perinatal mortality if the woman was not managed properly.

2.6   INTERVENTIONS TO IMPROVE NEONATAL HEALTH CARE

2.6.1 Interventions during antenatal period to reduce neonatal morbidity and mortality

Maternal health plays a major role during pregnancy and has effect on the health of the baby. According to the Guidelines for Maternity Care (DoH 2007b:20), the woman needs to start antenatal clinic the time she missed her first menstrual period. This will help in early screening and identifying risk factors. This is supported also by Beauclair,

Petro and Meyer (2014:2) in their study on timing of the first ANC visit as influencing the risk for stillbirth in the full-term and singleton pregnancy.

During the first antenatal visit, physical examination is conducted on the woman and history pertaining to the current pregnancies and previous medical, social, obstetrical and family circumstances is taken. A general examination of the pregnant woman is performed and the weight, height, heart and respiratory rate monitored including the blood pressure. In addition, the pregnancy is measured by calculating the gestational period by dates and by abdominal palpation and measuring the Symphysis-fundal height. The Mid-Upper Arm circumference is measured to determine the nutritional status of the pregnant woman (DoH 2007b:20-23).

The woman is also screened for anaemia by checking the haemoglobin level. Iron and folic acid is given to the pregnant mother as prophylaxis. According to Aranda, Ribot, Garcia, Viten and Arija (2011:1), supplementation with iron improves new born birth weight in those women who start pregnancy with iron deficiency, and makes no significant difference to those women who are not iron deficient.

All women are screened for maternal infections including syphilis and HIV to treat infections that can interfere with foetal growth during pregnancy. Women are given counselling during antenatal visits and initiated with treatment when reactive. The highest prevalence of syphilis sero-positivity found among pregnant women in the sub-Saharan Africa was from 2.5-17% and in western countries sero-prevalence during pregnancy ranges from 0.02 in Europe to 4.5% in some US regions. Stillbirth rate and low Apgar scores were frequently observed in those women who were not treated for syphilis during pregnancy. Preterm births 41.84% and foetal low birth weight 27.55% was observed in those women who were reactive on the VDRL test (Anastasiu, Moga & Dull 2012:151-152).

Tetanus toxoid immunisation is already recommended by World Health Organization (WHO) for pregnant women or women of childbearing age to prevent neonatal tetanus. A survey was done in India on the incidence of neonatal tetanus to pregnant women who were immunised against tetanus. The results showed a reduction of neonatal mortality to above 80% in the total deliveries (Khan, Zahidie & Rabbani 2013:4).

In case of pre-existing medical conditions including epilepsy, hypertension and diabetes mellitus, the woman is managed at a higher level of care institution. Referrals are also done to those diagnosed for the first time accordingly. A cross sectional study was done in Rawalpindi Military Hospital on the impact of Pregnancy Induced Hypertension (PIH) on birth weight of new-born at term. The findings were that there was no evidence that PIH has any effect on weight of new-borns in full term pregnancies (Arshad, Pasha, Khattak & Kiyani 2011:113-114).

2.6.2 Interventions during labour and birth for the prevention of intra-partum-related neonatal deaths

The interventions to reduce neonatal deaths in South Africa include improvements in basic obstetric care. This included:

- providing basic and comprehensive emergency obstetric care
- identifying high risk clients at antenatal care
- administration of antibiotics for preterm labour, oxytocic and steroids in preterm labour, continuous monitoring of women in labour
- early referral of pregnant mothers with medical conditions like pregnancy-induced hypertension (PIH) to tertiary institution with advanced technology for both the mother and baby
- immediate care of the infant at birth, neonatal resuscitation and post-resuscitation management and on-going neonatal care (Velaphi et al 2012:69-70).

2.6.3 Interventions to reduce premature-related deaths

Globally, studies have been done and prematurity was observed to be a challenge and contribute to 40%-80% of neonatal morbidity and mortality. In a study done in northern Tanzania, preterm delivery is estimated to account for 28% of all neonatal deaths (Mmbaga et al 2011:7). Antenatal steroids are given to mothers who are in preterm labour at a gestation of below 34 weeks and this reduces the incidence of respiratory distress. Antibiotics are also administered to mothers in pre-labour rupture of membranes to reduce the incidence of infection. Mothers should be advised to stop smoking during pregnancy to reduce the incidence of intrauterine growth restriction

(Saugstad 2011:255). During the postnatal period, preterm infants are at risk of developing hypothermia as they do not have enough energy stores. To prevent this, delivery room should be kept warm and infants to be dried immediately after birth. To those preterm babies who are haemo-dynamically stable skin-to-skin care Kangaroo Mother Care (KMC) is initiated (Velaphi et al 2012:69-70).

2.6.4 Community-based interventions for reducing neonatal mortality

In India community health workers were trained to recognise and manage suspected infections in newly born babies. According to the WHO Integrated Management of Child Illnesses (IMCI) guidelines, neonatal infections should be treated with injectable antibiotics in order to reduce neonatal mortality and morbidity (Khatun et al 2011:3-5).

In Brazil, primary maternity facilities were established at polyclinic to serve low risk deliveries in the community. Health agent were trained on antenatal care and deliveries at maternity clinics increased significantly (Lee, Cousens, Darmstadt, Blencowe, Pattison, Moran, Hofmeyer, Haws, Bhutta & Lawn 2011:11).

Traditional birth attendants are trained in developing countries on childbirth care and recognition and early referral for obstetric emergencies. In Guatemala, traditional birth attendants were trained and there was a reduction in perinatal deaths among those women referred to hospital for delivery (Lee et al 2011:13).

2.7   RECOMMENDATIONS TO IMPROVE NEONATAL HEALTH CARE SERVICES

- Perinatal audits are recommended in order to identify the reduction in the mortality rates and common parameters should be utilised to define the perinatal mortality rates.
- Regionalisation system should be developed at different levels of care in providing neonatal services worldwide. Networking internationally is recommended in order share ideas on neonatal care.
- Conducting research on a continuous basis on neonatal care is also recommended.
- Free health services and access to pre- and postnatal care to be practiced globally.

- Encourage hospital deliveries whereby pregnant women are managed by qualified midwives and promote breastfeeding.
- Invest in equipment (monitors, incubators) and staff in the intensive care unit and the maternity unit.
- To have evidence-based treatment and guidelines.
- Free essential drugs for all pregnant women and children irrespective of social background (Saugstad 2011:255-256).

2.8   CONCLUSION

Theoretical background about neonatal mortality and morbidity has been discussed. Global overview about the neonatal mortality and morbidity and current interventions to reduce neonatal deaths were outlined. The factors that are contributory to these neonatal deaths were discussed and some recommendations outlined.

Chapter 3 will address the research methodology applied in this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1   INTRODUCTION

In this chapter the research design is discussed in terms of the methods, population, sampling, instruments, data collection and analysis procedures pertaining to the present study. The research design was used to determine the aims and objectives of the study.

The objectives of the study were to

- assess the maternal records of babies admitted in the Neonatal Care Unit with birth complications
- assess the records of babies admitted in the Neonatal Care Unit during their first 28 days of life
- determine the factors that contributed to neonatal morbidity and mortality in the Capricorn district

3.2   RESEARCH DESIGN

The research design involves a set of decisions regarding what topic is to be studied among what population with what research methods for what purpose. It focuses on the end product and all the steps in the process to achieve the outcome anticipated. It is an overall plan for obtaining answers to the research questions. A specific design was selected and strategies identified to minimise bias. The design also outline how often data will be collected and where will the study be conducted. The quantitative, non-experimental, cross-sectional, descriptive and retrospective design was utilised in this study (De Vos et al 2011:156-158; Polit & Beck 2012:58).

3.2.1 Non-experimental approach

The non-experimental design is used in describing the phenomenon under study whereby the selected variables are measured at a specific time and there is no manipulation of variables. The approach is also applicable where other variables that could be technically manipulated but are ethically non-manipulative (Polit & Beck 2012:223). The causal relationships, differences and predictors are determined when experimental work is not possible depending on the purpose of the study (LoBiondo-Wood & Haber 2010:205).

In this study, the researcher has determined the predictors to the high neonatal morbidity and mortality rate at the specific hospital in Limpopo Province.

3.2.2 Quantitative approach

Quantitative research is a formal, objective, systematic process in which numerical data is used to obtain information about a phenomenon under study. This approach is used to describe variables, examine the relationships among variables and determine the cause and effect among the variables. Reductionism is used whereby the main variables are broken into parts in order to understand the phenomenon well. The researcher remains detached from the study and try not to influence the study with his values (Burns & Grove 2009:22-24).

Quantitative approach use structured procedures and formal instruments to collect information. Deductive reasoning is incorporated in the study as the researcher examines particulars to make generalisations about the phenomenon under study.

In this study, data were collected with a structured formal instrument that includes the various variables pertaining to neonatal morbidity and mortality rates. Data were collected at various stages of maternal care during pregnancy, labour, delivery and on neonatal care.

3.2.3 Descriptive design

The descriptive design approach is used when little is known about a phenomenon. The

design is used to gain more information about the phenomenon under study. No manipulation of variables is involved and dependent and independent variables are not used. In the descriptive design, there is no treatment or intervention, the researcher measures only the variables (Burns & Grove 2009:237-239). With this approach, the researcher will describe and document aspects of a situation as it naturally occurs.

The purpose of descriptive designs is to identify problems with the current practice, justifying current practice and determining what others are doing within the similar situation. In this design the relationship amongst variables are identified to obtain an overall view of the study (Burns & Grove 2009:239).

In this study the researcher assessed the maternal and neonatal records of babies admitted in the Neonatal Care Unit with neonatal problems. The researcher justified the current practice on neonatal care by describing the areas of concern pertaining to neonatal care in Limpopo Province. The current practice on initial antenatal care, subsequent antenatal visits, intra-partum care, immediate care of the new-born baby after delivery and care in the neonatal unit was justified. With the use of an audit tool, the researcher assessed the maternal and neonatal records of babies admitted in the neonatal unit (Polit & Beck 2012:226).

3.2.4 Retrospective design

Retrospective design is addressing the past events that have occurred. A phenomenon existing in the present is linked to a phenomenon that occurred in the past (Burns & Grove 2009:241). The researcher is determining the risk factors and characteristics of a phenomenon and the extent of the problem (Polit & Beck 2012:224; LoBiondo-Wood & Haber 2010:246).

In this study, the researcher assessed the records of mothers and babies who were admitted in the Neonatal Care Unit to determine the contributory factors to high neonatal morbidity and mortality in Limpopo Province.

3.2.5 Cross-sectional design

A cross-sectional design entails the collection of data from more than one case

occurring in the same situation in order to collect a body of quantitative data with two or more variables. These data are then examined to detect patterns of association (Brink et al 2012:101).

In a cross-sectional approach, data are collected at one point in time and one group is observed in their various stages of development, trends and patterns. The intention is to describe changes in the phenomenon across stages (Burns & Grove 2009:241). This will also help in determining extend of the problem in the study group. The researcher in this study collected data at one point where by patients files were analysed to determine the contributory predictors to high neonatal morbidity and mortality.

The advantage of the cross-sectional design is that it is very economic as data are collected at one point and not time consuming. The researcher will also be able to manage his data easily (Polit & Beck 2012:184-186).

3.3   POPULATION AND SAMPLING METHODS

3.3.1 The study population

In order to meet the research objectives of the phenomenon under study, the subjects need to be identified. According to Polit and Beck (2012:273), population is described as the entire aggregation of the cases of interest to the researcher. Population may be broadly defined to thousands of individuals. However, population is not restricted to humans only, as it might include all hospital records, blood samples and files in a particular hospital.

3.3.2 Target population

Target population is also called the target population as the group about which we want to gather information and draw conclusions (Polit & Beck 2012:274). This target population needs to be clearly defined in respect of person, place and time. It includes the eligibility criteria of the study population with the common characteristics of interest to the researcher (Joubert & Ehrlich 2010:94).

3.3.3 Accessible population

Within the target population is the accessible population which the researcher will access in collecting information. This is the population available for that particular study and is the sub-set of the target population and meets the target population criteria. The researcher usually sample from the accessible population (Polit & Beck 2012:274, 719).

The population under study is all the babies admitted in the Neonatal Care Unit in the level 3 hospital in Limpopo Province and are 0-28 days of life. These are the babies who were admitted in the unit from January 2012 to December 2012. The babies were either referred from other institutions within the province or delivered locally. The average number of admissions in the Neonatal Care Unit is 1200 babies per year.

The target population was all babies admitted in the unit with birth complications within their first 28 days of life.

The population was accessed through the admission register book in the unit. The admission register book of babies in the Neonatal Care Unit was available for determining the population under study (Mouton 2006:135-138).

3.3.4 Inclusion criteria of the target population

Inclusion criteria describe the participants who are eligible to participate in the study. Essential characteristics that the participant must have in order to be included for sampling are stated.

In this study, only the new-born infants who were admitted in the Neonatal Care Unit with birth complications during January 2012 to December 2012 and are 28 days of life or less were eligible for the study (Polit & Beck 2012:274).

3.3.5 Sampling method and sampling technique

According to Polit and Beck (2012:275), a sample is a subset of a population so that generalisation can be made about information gathered. The sample should be representative whereby the key characteristics are closely approximate to those of the

study population (Joubert & Ehrlich 2010:94).

Sampling method

According to De Vos et al (2011:224-226), sampling involves taking a smaller number of units of a population as a representative of that particular population under study. This study population has the same characteristics as the group of interest. A representative sample will allow the researcher to generalise the findings to the population determined for the study. Probability sampling was utilised as each individual case has an equal chance to be selected for the sample and subjects are selected randomly. In random sampling, all subjects with the equal number has a chance to be selected for the study.

In this study, sampling was done from the admission book in which all the babies are recorded in the Neonatal Unit.

Sampling technique

Probability or random sampling will be used in this study. In probability sampling the sample is more likely to be representative of the study population. With this sampling approach, the researcher has a chance to estimate the sampling error and reduce bias as all the elements in the study has equal chance of been selected (Brink et al 2012:134).

3.3.5.1 Systematic random sampling

The systematic random sampling method will be utilised. With this method, each individual case has an equal chance to be selected for the sample. The sample is representative of the study population. The random procedure is rigorous enabling the researcher to generalise his findings. The list of the population under study is determined (sampling frame) and it must be randomly arranged. From the sampling frame the elements for study are determined whereby selection is done at the same intervals until the sample is reached. The advantage of the technique is that it is easy and convenient to use (Polit & Beck 2012:282).

3.3.5.2   Determining the sample size

In a quantitative study, it is up to the advantage of researcher's decision to have a larger population to do sampling. With the larger sample representativeness, the generalisation of the findings will be achieved as the findings are more accurate (De Vos et al 2011:224). Larger samples permit the principles of randomisation to work effectively (LoBiondo-Wood & Haber 2010:237).

In this study, the sample size was 120 cases in a total population of 1200 in a year. This was 10% of the total population .The admission register in the neonatal ward was utilised to determine the sample. The names of babies admitted in the neonatal ward were assigned numbers and the first case was selected randomly. The other cases were selected at an interval of ten in the total population under study until the required number of the sample was reached (De Vos et al 2011:22; Mouton 2006:135-138).

3.4   DATA COLLECTION

According to Burns and Grove (2009:430), data collection is a process of selecting study subjects and gathering information from them. The actual steps of collecting the data is specific to each study and depends on the selected research design and measuring methods utilised. Data may be collected by observing, testing, recording or any combination of these methods. The researcher can participate actively in the data collection process or he might supervise the data collectors.

3.4.1 Characteristics of a structured data collection tool

A structured data collection tool is a formal document used to collect and record information (Polit & Beck 2012). A self-designed structured data collection tool will be used to collect data. This will be in a form of an audit tool. Data collection process employed by the researcher needs to be objective, systemic and consistent. The process is elaborated as follows:

- Objective – the data collected must not be influenced by any person who is gathering the information.
- Systemic – the data are collected in the same way by everyone who is involved gathering the information.
- Consistent – the data will be collected in the same way as possible or nearer in order to minimise bias even if data is collected by different individuals.

3.4.2 Development of the audit tool

In this study, the researcher used the audit tool to collect existing data from the records of patients.

The following section explains how the tool was developed to make it more objective and systematic.

The data collection tool was developed on the basis of literature search on the relevant topic. Reference was done on the WHO guidelines on maternal and neonatal care and the maternity guidelines in South Africa.

Experts on maternal and neonatal care were consulted on the structure and content of the tool including paediatricians, obstetricians, advanced midwives and experienced midwives. The tool was also evaluated for internal validity, external validity, content and face validity by colleagues (LoBiondo-Wood et al 2010:280).

The researcher used the audit tool to collect data from the patient's records in that specific hospital (Annexure G).

The tool included the following sections:

Section A: Assessment of first antenatal visit

Section B: Assessment of subsequent antenatal visits

Section C: Assessment on admission during labour

Section D: Assessment during intra-partum care

Section E: Management during second stage of labour

Section F: Neonatal care

3.4.3 Advantages of using an audit tool

- The data are available and accessible to the researcher.

- The researcher will save time and money when conducting the study.

- This method reduces problems with subject recruitment, access and ethical concerns (LoBiondo-Wood & Haber 2010:284).

3.4.4 Disadvantages of using an audit tool

The records available are subject to problems of authenticity and accuracy (LoBiondo-Wood & Haber 2010:284).

3.4.5 Data collection process

Permission to collect data was granted by the Research and Ethics Committee from UNISIA in the Department of Health Studies (Annexure A), Limpopo Research and Ethics Committee (Annexure C), Polokwane Mankweng Hospital Complex Ethics and Research Committee which is affiliated to the University of Limpopo (Annexure D). Permission was also granted by the hospital management in order to access the Records Department (Annexure F).

Data were collected at the Records Department where the files are kept under lock and key. The files were audited in the Records Department to maintain confidentiality. Permission to access the files was granted by the Clerk Supervisor. The researcher entered the information in the designed tool for each file audited in the computer.

3.4.6 Administration of the data collection tool

The data were collected by the researcher only to ensure consistency. The records were retrieved from the clerk's record room. Confidentiality was maintained by keeping the files anonymous. The files had numbers and patients remained anonymous to the researcher.

3.4.7 Pre-testing the data collection tool

Pre-testing the new instrument for data collection helps in identifying errors and rectifying them immediately. The purpose of pilot testing the tool is to determine its quality and relevancy of the items included in the tool. This also helps in assessing the appropriateness of the tool for the target population (LoBiondo-Wood & Haber 2010:280).

The audit tool was pre-tested on five neonatal records which did not form part of the study, prior to the actual collection of data.

3.5   DATA ANALYSIS

Analysis of data is a systemic organisation of information in the present study whereby data are captured in the numeric form (Polit & Beck 2012:751).

3.5.1 Descriptive statistics

The researcher used the descriptive statistics to provide answers to the research questions, describe and summarise data. Descriptive statistics allows the researcher to organise data in a meaningful way and facilitated understanding of the data from various ways (Burns & Grove 2009:461).

Descriptive statistics were used to describe and summarise data whereby the findings were in the form of distribution tables and graphs.

In this study, the researcher was assisted by a professional statistician to analyse and summarise data.

3.5.2 Presentation of descriptive statistics

Information was grouped according to the variables on the tool and described in words. Frequency distribution tables and graphs were also used to describe the findings of the study (LoBiondo-Wood & Haber 2010:310-319).

3.6   RELIABILITY AND VALIDITY OF THE DATA COLLECTION TOOL

3.6.1 Reliability

Reliability is the stability or consistency of the measurement. Stability of an instrument is the extent to which scores are obtained on separate occasions (De Vos et al 2011:162). According to Polit and Beck (2012:331), reliability of the measuring instrument is the consistency with which it measures the target attribute. Reliability is also concerned about accuracy of the measuring instrument. Both authors agree that reliability is concerned with stability and consistency of the measuring instrument.

The reliability of the tool was assessed by conducting a pre-test prior to collecting data with the tool, to ensure that it was stable and consistent.

3.6.2 Validity

Polit and Beck (2012:336) define validity as the degree to which a tool measures what it is supposed to measure.

Validity of an instrument is a determination of the extent to which the instrument actually reflects the construct being examined

3.6.2.1 Construct validity

Construct validity is defined as what the instrument is really measuring (Burns & Grove 2009:221).

LoBiondo-Wood and Haber (2010:290) states that construct validity is based upon the extent to which the test measures a theoretical construct or attribute.

3.6.2.2   Content validity

According to LoBiondo-Wood and Haber (2010:288), content validity represents the universe of content, or the domain of a given construct. This will be looked in when developing the measuring tool whether it has all the items that really measure what it is intended to measure. In addition, Polit and Beck (2012:337) state that content validity concerns the degree to which an instrument has an appropriate sample of items for the construct being measured and adequately covers the construct domain.

The audit tool was validated by consulting experts in the field of maternity and neonatal care within the institution. The Obstetricians, Paediatricians, Advanced Midwives and Experienced Midwives were asked to give their views on the tool. Literature was also reviewed to ensure that relevant terms were used in the audit tool.

3.6.2.3   Face validity

Face validity basically verifies that the instrument gives the appearance of measuring the concept.

Experts in maternity and neonatal care were given the audit tool to check if it really measures what it is supposed to measure. Staff experienced with research skills was also consulted to check on the audit tool and give their views.

3.7   ETHICAL CONSIDERATIONS

Ethics is defined as the field of study that deals with the dynamics of deciding what is right and what is wrong. It is the study of human behaviour in respect of what is considered to be right or wrong in terms of moral judgements (Muller 2009:67).

Reference was done to the following ethical principles throughout the study.

3.7.1 Respect for human dignity

Human rights are claims and demands that have been justified in the eyes of an individual or by a consensus of a group of individuals. People have the right to self-determination, right to privacy and dignity.

People should be treated with respect and be treated as autonomous agents. Participants have the right to make informed and voluntary decisions about study participation.

Privacy is the right an individual has to determine the time, extent and general circumstances under which information will be shared with or withheld from others. The information can consist of one's beliefs, attitudes or his records (Burns & Grove 2009:190).

In this study, the researcher only used the records of patients admitted in the Neonatal Unit. Privacy was maintained by allocating numbers to the patient's files. Addresses, hospital numbers and names of the participants remained anonymous during the study. There was no direct contact with the participants at all.

3.7.2 Beneficence

Beneficence is concerned with preventing harm and discomfort and promoting good. Discomfort and harm can be physical, psychological, social or economic in nature. However, participants should not be put at a disadvantage or exposed to situations for which they have not been prepared (LoBiondo-Wood & Haber 2010:252).

The researcher used no-experimental design and people were not used as participants in the study. Information was only collected from the records of patients and thus no discomfort affected them during the study.

3.7.3 Justice

People should be treated fairly and should receive what they are due or owed. There must also be fair distribution in their selection and participation (Burns & Grove

2009:199).

Privacy to all participants was maintained throughout the study by keeping all the information in the safe place and only known to the researcher. The participants were selected in a fair manner whereby random sampling method was utilised.

3.7.4 Confidentiality and anonymity

On the basis to the right to privacy whereby the individual has the right to decide when and to what extent information need to be disclosed, he also has the right to assume that the data collected will be kept confidential. Complete anonymity is maintained if the participant's identity cannot be linked to the individual responses (Burns & Grove 2009:194). In this study, the researcher allocated numbers to the patient's records for the study and a master list of the original patient's information was kept under lock and key. The researcher collected data in the records room and no file was removed.

3.8   CONCLUSION

This chapter described the research design and methodology of the study in detail. Ethical principles were considered throughout as the records of patients remained anonymous throughout the study.

Analysis and presentation of data will be done in Chapter 4.

CHAPTER 4

ANALYSIS AND PRESENTATION OF DATA

4.1   INTRODUCTION

Data analysis involves the resolution of complex whole into its parts. In quantitative data analysis, the researcher applies different statistical methods to the research variables. This will enable the researcher to give meaning to variables of the study. This chapter deals with the analysis, presentation and description of data collected as described in Chapter 3 of this dissertation.   The purpose of this study was to determine the predictors to the high neonatal morbidity and mortality in Limpopo Province. The objectives of this study were to

- assess the maternal records of babies who were admitted in the Neonatal Care Unit during January 2012 to December 2012
- assess records of babies admitted in the Neonatal Care Unit during their first 28 days of life
- determine the factors that contributed to high neonatal morbidity and mortality in Limpopo Province

An audit tool was utilised by the researcher to collect data from the mothers and new-borns inpatient record that were admitted in the Neonatal Unit from January 2012 to December 2012. The analysis will be done according to the following sections of the data collection tool.

Sections: A, B, C, D, E and F. Data collected from the patients were recorded in the tool and the response was in numbers for each variable.

Section A: First antenatal visit, Section B: Subsequent antenatal visit, Section C: Admission in labour Section E: Management of second stage of labour, Section D: Intra-partum care and Section F: Neonatal care.

4.2   DATA ANALYSIS AND FINDINGS

4.2.1   Section A: First antenatal visit

Section A: The first antenatal visit included the previous obstetric data of the mother, medical, family history, present obstetric history, physical examination, urine and blood investigations done to the mother on her first antenatal visit. This will enable the health care worker to identify the risk factors in the present pregnancy and manage the woman appropriately (Pattinson 2007:5).

4.2.1.1   Age distribution (n=120)

The majority of the mothers 51 (42%) whose babies were admitted in the Neonatal Unit were between 25 and 35 years of age. Twenty-five (21%) mothers were between the ages 22 and 24 years. In addition, 34 (28%) mothers were between 16 and 21 years of age. Two (2%) mothers were below 15 years and 8 (7%) mothers above the age of 35.

The relationship of maternal age and the neonatal outcome in this study was that there were high preterm deliveries in women with advanced maternal age. The results relate to the study done on pregnancy outcome at advanced maternal age in a group of African women in Cameroon. Their findings were that multiparous women of advanced maternal age were at increased risk for preterm, low birth weight infants with low Apgar scores. In the same study, there was no difference in the perinatal outcome between the primiparous of advanced maternal age and their younger counterparts (Ngowa, Ngassam, Dohbit, Nzedjom & Kasia 2013:4).
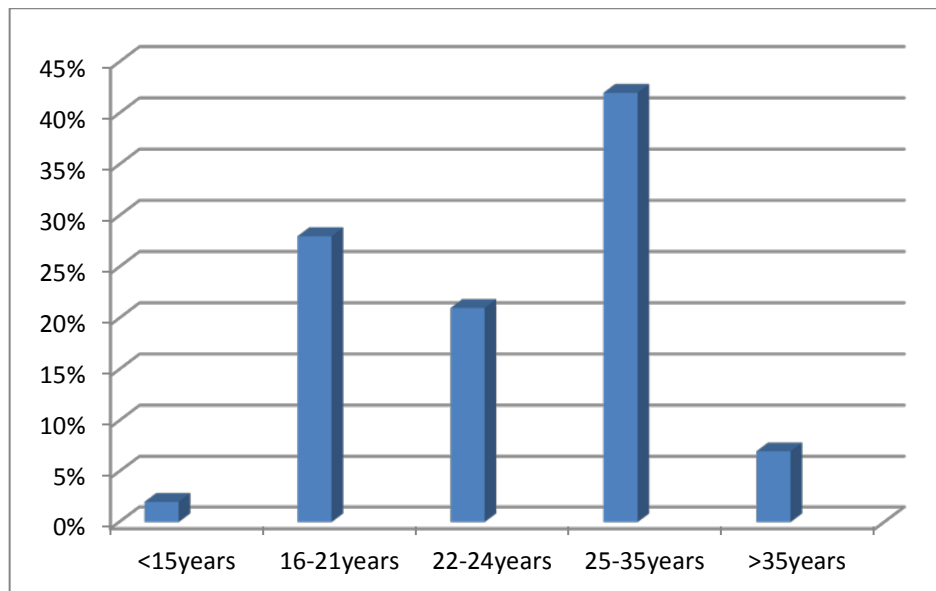
Figure 4.1   Age distribution at first antenatal visit (n=120)

4.2.1.2   Antenatal booking status (n=120)

Majority of mothers 116 (97%) were booked for antenatal care. Four (3%) of the mothers were not booked for antenatal care. From the study done on the factors influencing utilisation of antenatal care services among pregnant women in Osun State Nigeria majority of the women (79.4%) agreed that ANC helps to reduce maternal and neonatal morbidity and mortality (Olayinka & Bukola 2012:1312).

According to the study done in Nigeria by Adenian, Fawole, Fakaye, Ijaiya and Adesina (2014:3) on grand-multiparous women the majority of them started antenatal care late and their babies had a low Apgar score at one minute after birth.
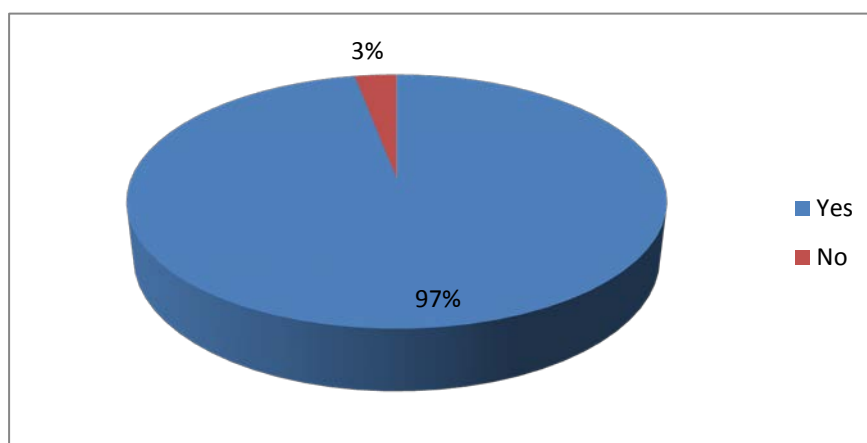
Figure 4.2   Antenatal booking status (n=120)

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4.2.1.3 Antenatal clinic attendance (n=120)

Almost 90 (75%) mothers attended clinic locally. In addition, 18 (15%) mothers attended antenatal clinic at the hospital. Three mothers (2%) attended antenatal care at the private doctors. There was no response for 8 (7%) and 1 (1%) mother had no record of antenatal care.

Early attendance of antenatal clinic is recommended to as soon as the woman has realised that she is pregnant and definitely before 20 weeks of gestation. When a woman attends antenatal clinic early this will help in identification of high risk pregnancies and other potential maternal and foetal problems (Solarin & Black 2013:4).
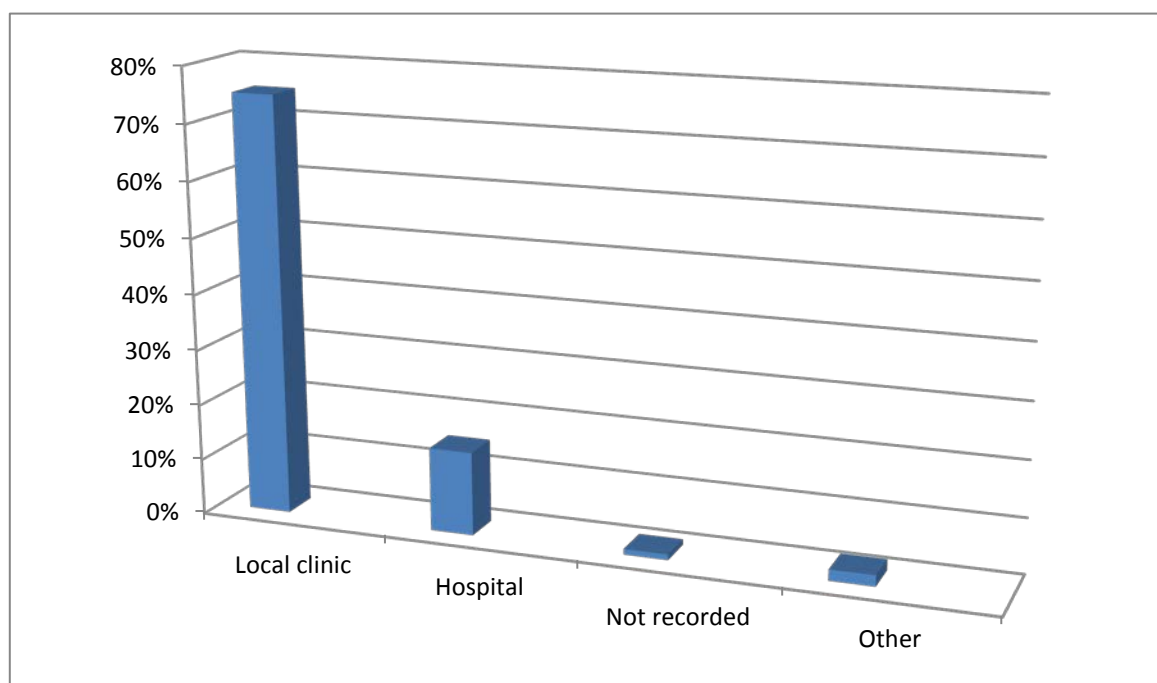
Figure 4.3   Antenatal clinic attendance (n=120)

4.2.1.4 Parity (n=120)

Majority of mothers 56 (47%) were primigravidas, 46 (38%) had two to three pregnancies and 15 (13%) mothers had four to five pregnancies. Three (2%) mothers had more than five pregnancies (multiparas).

Table 4.1   Parity (n=120)

Parity	Frequency	Percentage
0	56	47
2-3	46	38
4-5	15	13
>5	3	2
Total	**120**	**100**

The correlation between parity and neonatal outcome was that the high admission rate of babies16 (13%) in the Neonatal Unit was for primigravidas between the ages 22 and 24 years. Half 8 (50%) of the babies were asphyxiated at birth. There was a significance of birth asphyxia and prematurity 12 (75%) for primigravidas found in this study (Nkwabong et al 2011:1-4).

4.2.1.5   Gravidity (n=120)

Amongst the mothers who attended antenatal clinic, 56 (47%) were pregnant for the first time. A total of 43 (36%) mothers were pregnant for the second and third time while 15 (12%) had their fourth and fifth pregnancy. Interestingly, 6 (5%) mothers were pregnant more than five times.

4.2.1.6   Abortion according to weeks of gestation (n=120)

Abortion was noted in 10 (8%) of the women who were pregnant during the period of January 2012 to December 2012. Almost 110 (92%) mothers never had abortion according to their previous obstetrical history.

Most of the mothers 4 (3%) had their abortion at the gestational age of 24 weeks while 3 (3%) of the mothers were at 12 weeks of gestation. One (1%) mother had abortion at 20 weeks and 1 (1%) had an ectopic pregnancy.

4.2.1.7   Stillbirth and neonatal death (n=120)

Two mothers (2%) had a stillbirth in their previous pregnancies. Majority of the mothers 118 (98%) had no history of stillbirth in their previous pregnancies.

Neonatal deaths were experienced by 7 (6%) mothers in their previous pregnancies and 113 (94%) mothers did not have neonatal deaths.

4.2.1.8   Period of neonatal death (n=120)

Table 4.2 reflects the period when the neonatal death occurred in previous pregnancies for the mothers whose babies were admitted in the Neonatal Unit from January 2012 to December 2012. According to Moura, Maesta, Rugolo, Angulski, Caddeira, Peracoli and Rudge (2014:3), in their study on risk factors for perianal death in two different levels of care the majority 130 (46.9%) of neonatal deaths occur in the first week with the highest risk of death on the first day of life.

Table 4.2   Period of neonatal death (n=120)

Period of neonatal death	Frequency	Percentage
Within 24 hours	2	2
Within 7 days	2	2
Within a month	3	2
Not applicable	113	94
Total	**120**	**100**

4.2.1.9   Complications in the previous pregnancies, labour and peurperium (n=120)

In table 4.3 below 20 (17%) of mothers had complications in their previous pregnancies, 98 (82%) had no complications and 2 (1%) of the women had no response. In a study done on transfer of neonates to Neonatal Care Unit in Northern Nigeria, placenta abruption (65.5%) and premature rupture of membranes were common complications that lead to the neonates been transferred to the neonatal intensive care unit (Mmbaga, Lie, Kibiki, Olomi, Kvale & Datveit 2011:7).

Table 4.3   Complications in the previous pregnancies (n=120)

Complications in the previous pregnancies	Frequency	Percentage
Yes	20	17
No	98	82
No response	2	1
Total	**120**	**100**

4.2.1.10   Type of complications (n=120)

Hypertensive disorders was present in 5 (4%) mothers, 1 (1%) mother had history of gestational diabetes and 1 (1%) had premature rupture of membranes in the previous pregnancy. Obstetric haemorrhage was present in 1 (1%) mother, 1 (1%) with preterm labour, assisted delivery for 3 (2%) mothers and infections for 2 (2%) mothers. Nevertheless, 106 (88%) mothers did not have any history of complications with their previous pregnancies. The findings of the study done in England revealed that the presence of chronic conditions in pregnancy (hypertension and diabetes mellitus) is a risk factor for increased stillbirths (England National Statistics 2012:4-5).
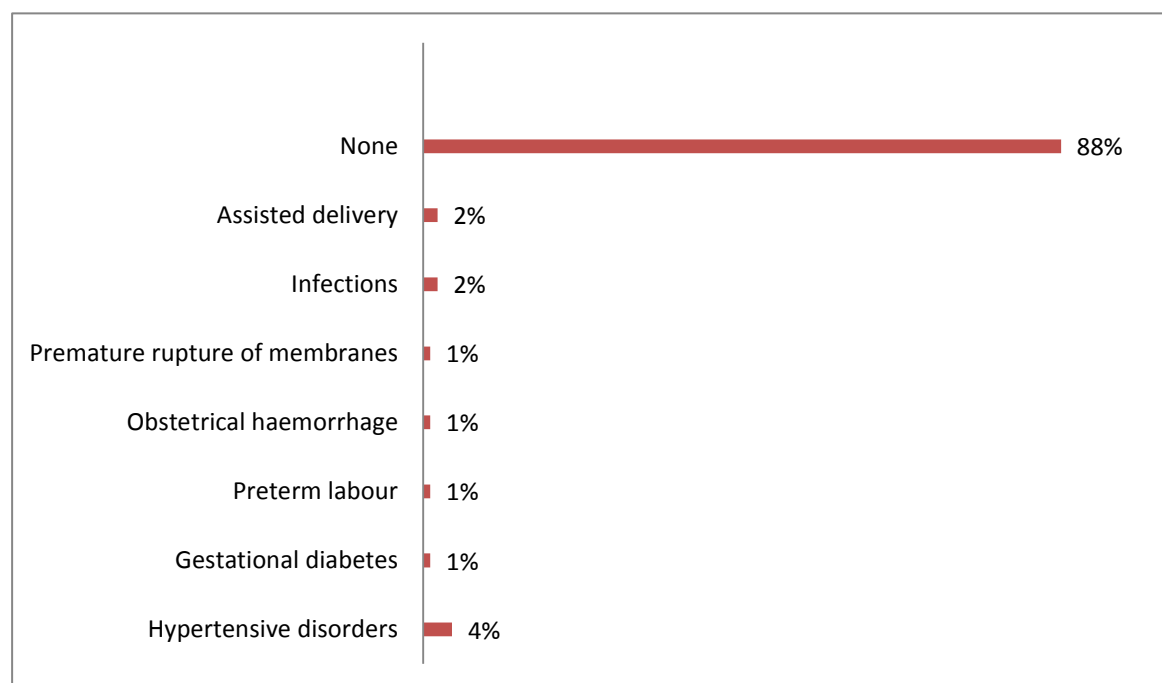
Figure 4.4   Complications in the previous pregnancies (n=120)

4.2.2 Medical history

4.2.2.1 *History of medical conditions (n=120)*

Table 4.4 shows the history of medical conditions of the mothers whose babies were admitted in the Neonatal Unit during January 2012 and December 2012.

Majority of the mothers had a history of diabetes mellitus 7 (6%) and hypertensive diseases 7 (6%). Two (1%) mothers had cardiac disease and one had tuberculosis (1%). History of allergy was present in 1 (1%) mother. Other conditions were accounted in 5 (4%) mothers. Ninety-seven (81%) mothers had no history of medical conditions. According to the study done by   Mmbaga, Lie, Kibiki, Olomi, Kvale & Datveit (2011:7), maternal risk factors for transfer of neonates to the NICU were diabetes mellitus (69.4%) and hypertension (21%).

Table 4.4   History of medical conditions (n=120)

Medical condition	Frequency	Percentage
Cardiac	2	1
Diabetes mellitus	7	6
Hypertension	7	6
Tuberculosis	1	1
Allergies	1	1
Other	5	4
None	97	81
Total	**120**	**100**

4.2.2.2 *Type of allergy (n=120)*

Majority of the mothers 91 (76%) did not have allergy and 1 (1%) mother reported allergy. There was no record of allergy for 28 (23%) mothers whose babies were admitted in the Neonatal Unit during January 2012-December 2012.

4.2.2.3 *Surgical history (n=120)*

Almost 9 (7%) mothers had obstetrical surgery, while 2 (2%) had general surgery. One mother (1%) had a gynaecological surgery. A total of 108 (90%) mothers did not have

any operation done to them. According to Darmstadt, Yakoob, Haws, Menezes, Soomro and Bhutta (2009:56), on their study on the interventions during labour to reduce stillbirths, women with previous Caesarean birth were at risk of giving birth again through surgery.

4.2.2.4   Family history of medical condition (n=120)

Figure 4.5 shows the family history on medical conditions to the mothers whose babies were admitted in the Neonatal Unit during January 2012 to December 2012. Hypertension 11 (9%) and gestational diabetes mellitus 7 (6%) took the lead.
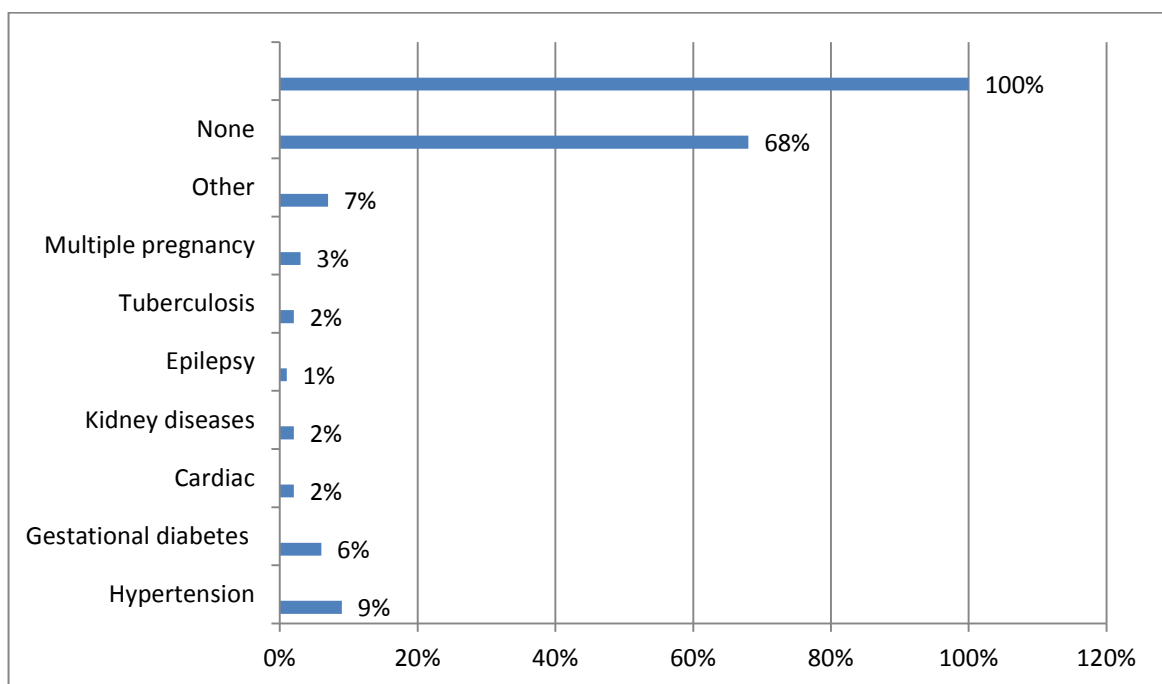
Figure 4.5   Family history of medical conditions (n=120)

4.2.3 Present obstetric history

4.2.3.1   Gestational age at initial visit (n=120)

The findings in this study was that 85 (71%) of the mothers at initial antenatal visit were at 20 to 24 weeks of gestational age. In addition, 25 (21%) mothers booked above 24 weeks of gestation while 6 (5%) mothers booked early between 16 and 19 weeks of their pregnancy. No record was found for 4 (3%).

The study done in Kenya on utilisation of maternal health services confirmed that large percentage of young pregnant women do not seek antenatal care at their first trimester. The findings in this study are that only 5% of the mothers booked at their first trimester (Ochako, Fotso, Ikamari & Khasakhala 2011:4-5). In their study on the association between timing of initiation of antenatal care and stillbirths, Beauclair et al (2014:5) found that only 7.3% of births had a first ANC in the first trimester while 60.1% occurred in the second trimester. In the study done in Cape Town on timing of initiation of antenatal care and stillbirths, there was no association in the occurrence of stillbirths and booking at first, second or third trimester (Beauclair et al 2014:6-7).
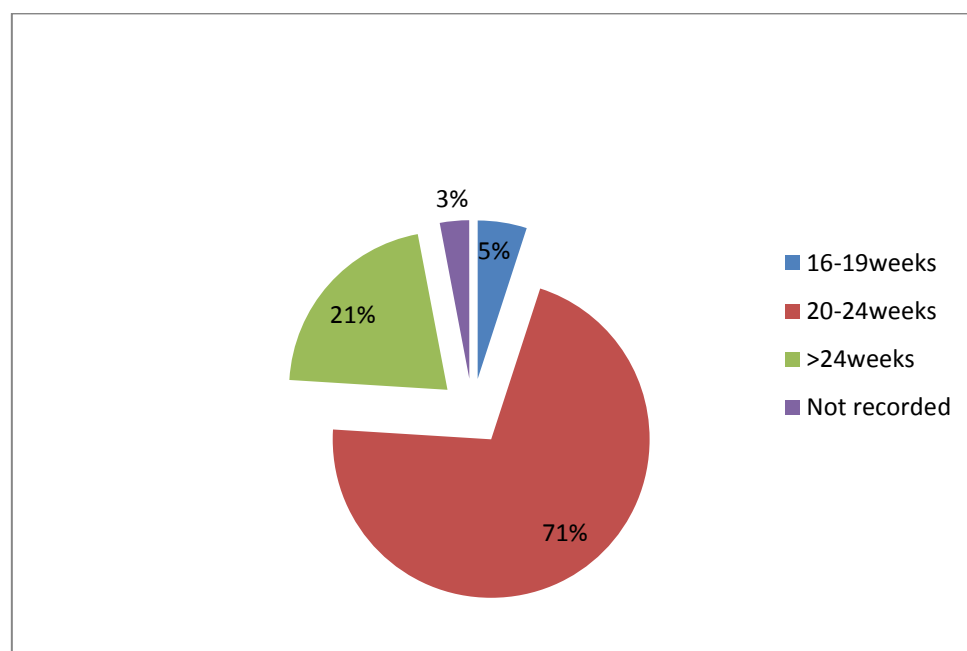
Figure 4.6   Gestational age at first visit (n=120)

4.2.3.2   Gestational age of period when foetal movements felt (n=120)

Foetal movements are one of the determinants of pregnancy confirmation. The foetal movements can be felt on abdominal palpation by 22 weeks after the last menstrual period (Dippenaar & da Serra 2012:170). The foetal movements as experienced by the mother assist the midwife in assessing foetal wellbeing in utero. Diminished foetal movements have been associated with a poor perinatal outcome as most mothers who had a stillbirth describing reduced foetal movements prior to the diagnosis of stillbirth (Paull & Robson 2013:57-58). According to a survey done in England on Childhood, infant and perinatal mortality decreased foetal movements was confirmed to be one of the sign of stillbirths (England National Statistics 2012:5).

Table 4.5 shows that the majority of mothers 88 (73%) experienced foetal movements between 20 and 24 weeks of gestation. In addition, 21 (18%) mothers felt foetal movements above 24 weeks of gestation while six mothers felt foetal movements between 16 to 19 weeks of gestation. For 5 (4%) mothers, there was no record of when foetal movements were felt.

Table 4.5   Period of first foetal movements (n=120)

Period when foetal movements felt	Frequency	Percentage
16-19weeks	6	5
20-24weeks	88	73
>24weeks	21	18
Not recorded	5	4
Total	**120**	**100**

4.2.3.3   *Sonar done for baseline data (n=120)*

Sonar was done for 24 (20%) mothers during antenatal care. In contrast, sonar was not done for 96 (80%) mothers. The results of this study tally with the guidelines on maternal health whereby sonar is only done to those mothers who are not sure of their dates or are at high risk with pregnancy complications, for example, pre-eclampsia (Pattinson 2007:23).

4.2.3.4   *Physical examination of the mothers at the first antenatal visit (n=120)*

Physical examination is important as it gives the health care practitioner baseline data on the woman's wellbeing. This also assists in identifying woman at risk and managing them appropriately (Pattinson 2007:20).

4.2.3.5   *Height of the mothers (n=120)*

Table 4.6 shows that the height of the mothers was measured for 60 (50%) mothers. 16 (13%) measured below 150 cm and 44 (37%) mothers measured above 150 cm. According to the study done in Northern Tanzania on babies transferred to the Neonatal

Care Unit, majority of babies were born to mothers with a height of less than 150 cm (Mmbaga, Lie, Kibiki, Olomi, Kvale & Daltveit 2011:12). On the contrary, in this study, majority of babies transferred to neonatal unit were born to mothers with a height of above 150 cm.

Table 4.6   Height of the mothers (n=120)

Height	Frequency	Percentage
<150cm	16	13
>150cm	44	37
Not recorded	60	50
Total	**120**	**100**

4.2.3.6   *Weight of the mothers at the first antenatal visit (n=120)*

Almost 61 (51%) mothers were weighing between 51 and 70 kg while 18 (15%) mothers weigh above 71 kg. In addition, 12 (10%) mothers weight below 50 kg on the first antenatal visit. Almost 29 (24%) of the mothers had no record of their weight on the first antenatal visit.
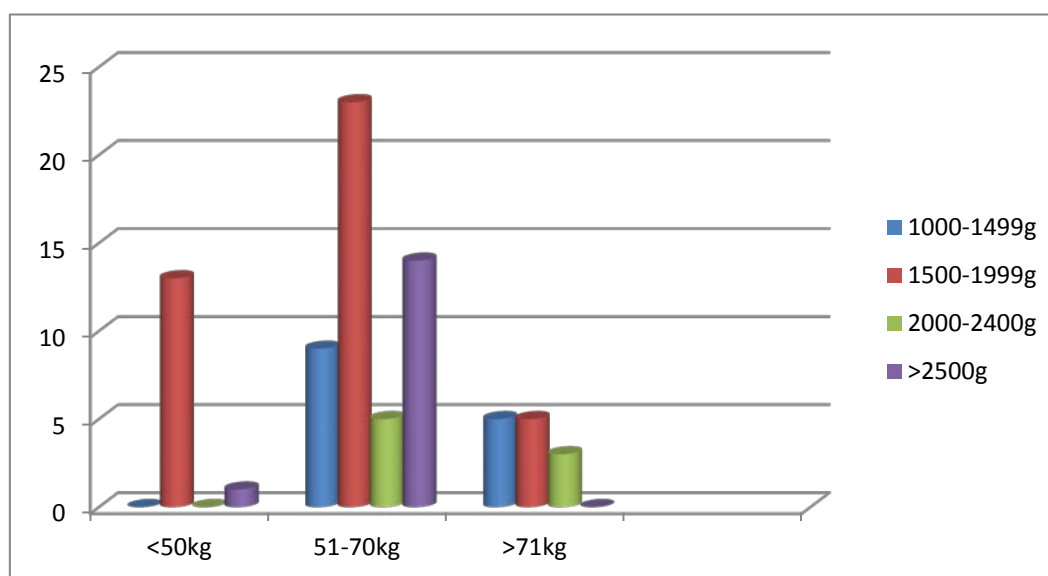
Figure 4.7 Association of mother's weight and weight of the baby (n=120)

The association of the mother's weight on initial visit and the birth weight of the baby was found in the mothers who weighed between 51 and 70 kg. Majority of the babies 23 (28%) weighed 1500 to 1999 kg. Moreover, 13 (11%) babies whom their mothers weigh below 50 kg had a weight of 1500 to 1999 kg. In a study done in Tanzania women with

a body mass index of above 30 were said to be obese and at risk of giving birth to large babies (weight above 4 kg).This babies tend to be asphyxiated at birth and increases the morbidity and mortality rates (Mmbaga et al 2011:7).

4.2.3.7 Blood pressure measurements at first antenatal visit (n=120)

Blood pressure measurement for 60 (50%) mothers ranged within normal limits between 100/60-120/80 mmHg. For 11 (9%) mothers, the blood pressure was between 121/80-130/90 mmHg. In addition, 16 (13%) mothers had a slightly elevated blood pressure of above 140/90 mmHg. However, blood pressure was not recorded for 33 (28%) mothers during their first antenatal visit.
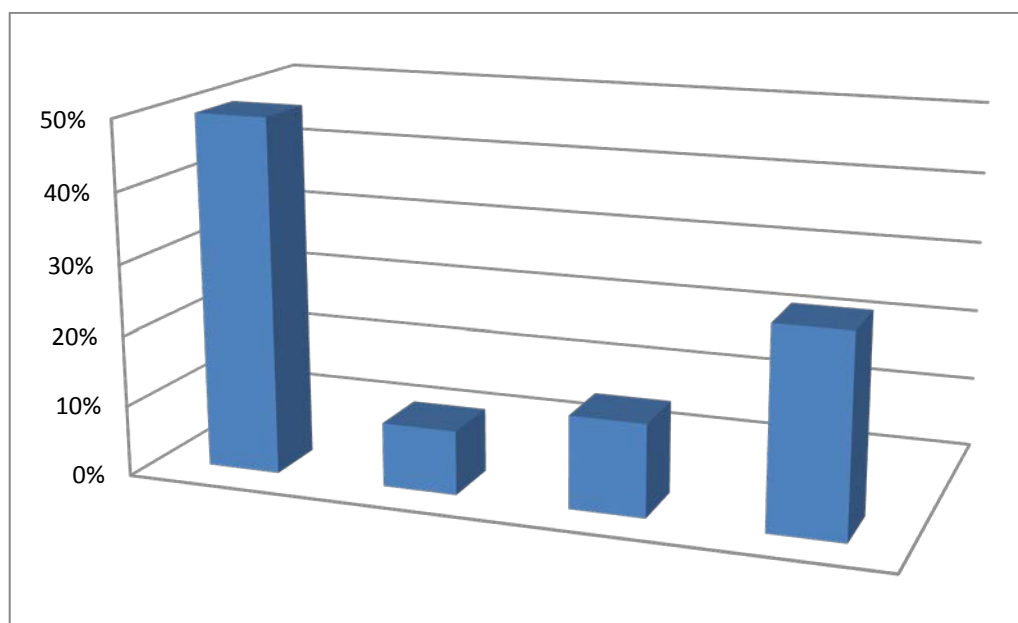
Figure 4.8   Blood pressure measurements at first antenatal visit (n=120)

Neonatal birth weight in relation to the maternal blood pressure above 140/90 mmHg was that for the 16 babies, 7 (44%) of them weigh between 1000 grams and 1499 grams. Four (25%) of the babies had a weight between 1500 grams and 1999 grams. Similarly, 4 (25%) weigh between 2000 grams and 2499 grams respectively. One (6%) baby weighed above 2500 grams at birth.

The findings of the study showed that there was a relation between a slightly elevated blood pressure and delivery of infants with low birth weight. The findings of this study resonate with those of the study done in Kualar Lumpur on the relation between

pregnancy induced hypertension and low birth weight. It was found that the mothers who delivered low birth weight babies were 6 times more to have pregnancy-induced hypertension compared to the controls (Rahman, Hairi & Salleh 2008:154).

4.2.3.8 Urine analysis (n=120)

Proteinuria was detected in the urine specimen of 10 (8%) mothers and glucosuria was detected in 2 (2%) mothers. Ketones were detected in 8 (7%) specimens and leucocytes in 10 (8%) specimens. Furthermore, 53 (44%) specimens were normal and for 37 (31%) mothers urine analysis was not recorded. Proteinuria is considered to be one of the markers for poor pregnancy outcome and in turn risk for neonatal morbidity and mortality. In the study on neonatal outcome in hypertensive disorders of pregnancy, neonates who were born to women with pre-eclampsia a high rate of small for gestational infants was common (Ferrazzani, Luciano, Garofalo, D'Andrea, De Carolis, De Carolis, Paolucci, Romagnoli & Caruso 2011:447).
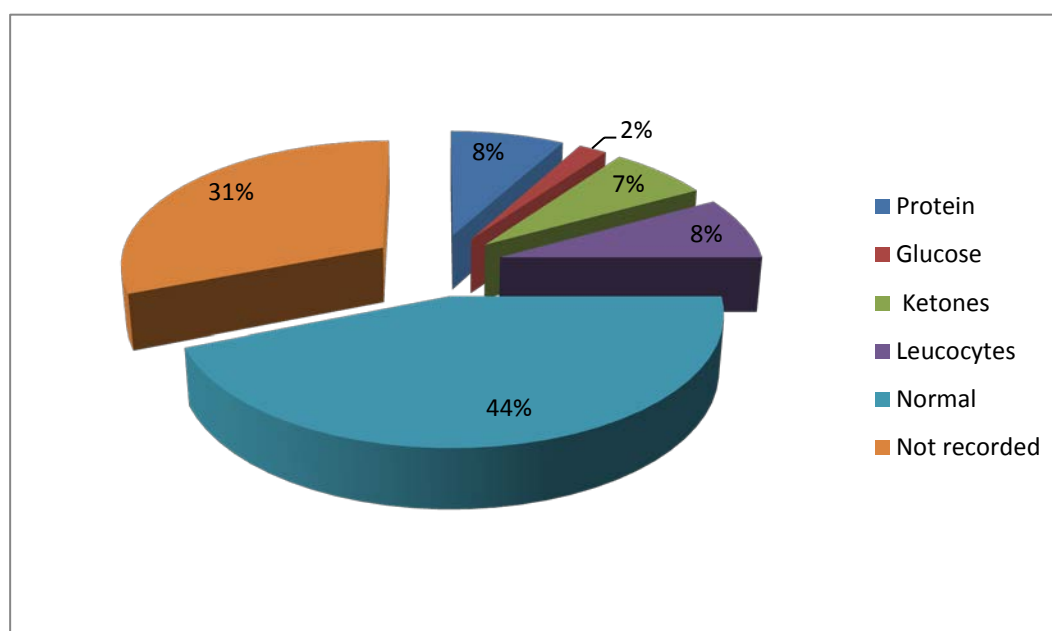
Figure 4.9   Urinalysis of mothers at first antenatal visit (n=120)

4.2.3.9 Colour of mucous membranes (n=120)

Majority of mothers 101 (84%) had normal pink mucous membranes. Pallor was noted in 15 (13%) mothers. Four (3%) mothers had no record of the colour of mucous membranes.

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Table 4.7   Colour of mucous membranes (n=120)

Pallor	Frequency	Percentage
Pink	101	84
Pale	15	13
Not recorded	4	3
Total	**120**	**100**

4.2.3.10 Presence of oedema (n=120)

Oedema was observed in 8 (7%) mothers at first antenatal visit. Majority of the mothers 98 (81%) were not having oedema. Fourteen (12%) mothers had no record of presence of oedema.

Table 4.8   Presence of oedema (n=120)

Presence of oedema	Frequency	Percentage
Yes	8	7
No	98	81
Not recorded	14	12
Total	**120**	**100**

4.2.3.11 Site of oedema (n=120)

The common site of oedema was noted on the face in 1 (1%) mother and on the legs in 8 (7%) mothers. No record was found for 5 (4%) of the mothers.
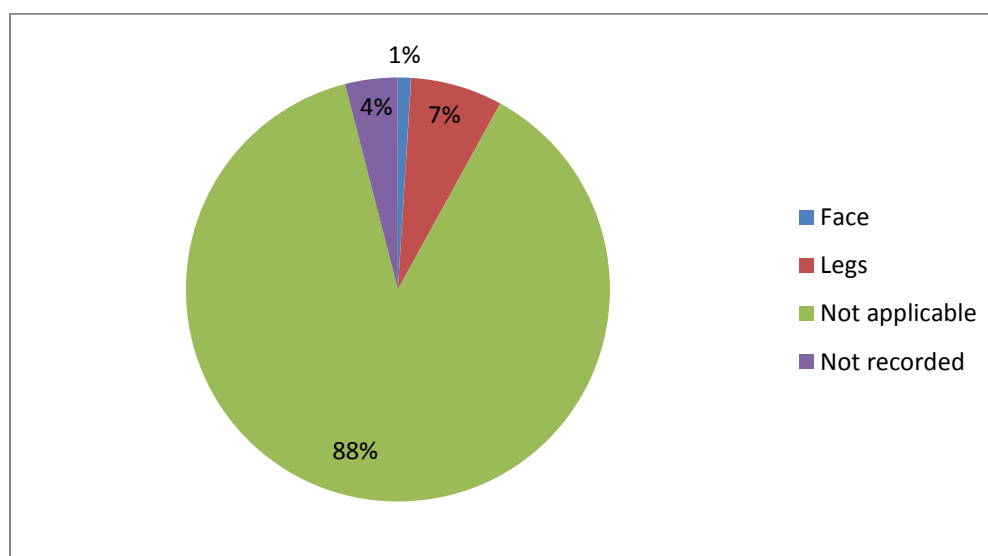
Figure 4.10   Site of oedema at first antenatal visit (n=120)

4.2.3.12 Examination of the abdomen (n=120)

Majority of the mothers 104 (86%) had a normal abdomen. Tenderness was noted in 1 (1%) mother and mass found in 8 (7%) mothers. Seven (6%) mothers had no record of abdominal examination on their first antenatal visit. Abdominal palpation is done to determine the duration of the pregnancy and this is correlated with the symphysis fundal height after 12 weeks of gestation. The examination will assist the midwife in determining the size of the uterus, presence of multiple pregnancy and anticipation for a complicated delivery. The midwife will also be able to refer the woman to an institution with facilities for high risk clients (Dippenaar & Da Serra 2012:181).

4.2.3.13 Respiratory rate (n=120)

Most of the mothers 117 (97%) whose babies were admitted in the Neonatal Unit had a normal respiratory rate. Tachypnoea was detected in 1 (1%) mother and 2 (2%) of them had no record of their respiratory rate.

4.2.3.14 Pulse rate (n=120)

Majority of the mothers who were booked 108 (90%), their pulse rate was between 60-100 beats per minute while 4 (3%) of the mothers had a pulse above 100 and 1 (1%) had pulse rate of below 7 (6%) of the mothers had their pulse rate not recorded on first antenatal visit.

4.2.3.15 Symphysis fundal height measurements (n=120)

For majority of the mothers 95 (79%) symphysis fundal height measurement (SFH) ranged between the 10th and 90th percentile. In contrast, 11 (9%) of the mothers had their symphysis fundal measurements ranging above the 90th percentile and 3 (3%) had the range below the 10th percentile and 11 (9%) of the mothers had no recordings of the symphysis fundal measurement at their first antenatal visit. Symphysis fundal height is used between 20-35 weeks of gestation to determine the expected foetal growth. The SFH should correlate with the duration of pregnancy and is measured in centimeters. Excessive foetal growth above the 90th percentile is a risk for large for gestation and

obstructed labour can be anticipated as the infant might be born with respiratory problems (Dippenaar & Da Serra 2012:80-81).
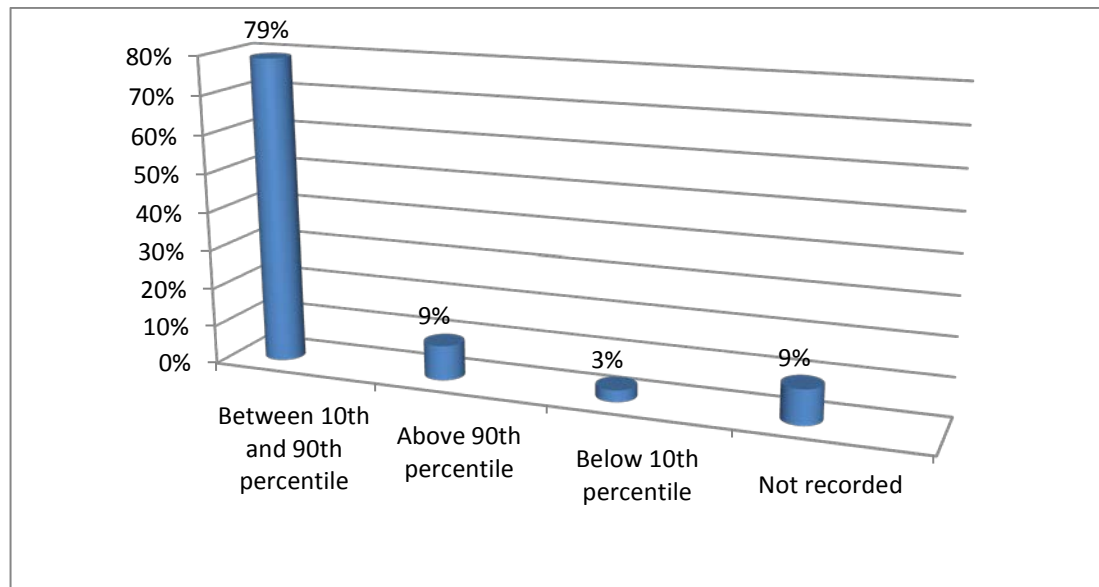
Figure 4.11   Symphysis fundal height measurements (n=120)

4.2.4   Investigations done

4.2.4.1   RPR (Rapid plasma regain) or venereal disease research laboratory results (VDRL) (n=120)

Majority of mothers 101 (84%) in this study tested negative for rapid plasma regain. However, 6 (5%) of the mothers tested positive for rapid plasma regain and 13 (11%) of the mothers didn't have record of the VDRL results.

Almost all of the mothers who tested positive for rapid plasma regain were treated fully. The prevalence of sexually transmitted diseases like gonorrhoea in pregnant mothers to the neonatal outcomes is that they are likely to experience preterm birth. On the contrary, the findings in this study were that there was no evidence of preterm birth for these mothers whose babies were admitted in the Neonatal Unit during January 2012 to December 2012. In a study done in Romania on Maternal untreated symphysis infection and pregnancy outcome, there was no significant association between VDRL titer and birth weight of the new-born babies (Anastasiu et al 2012:150-151).
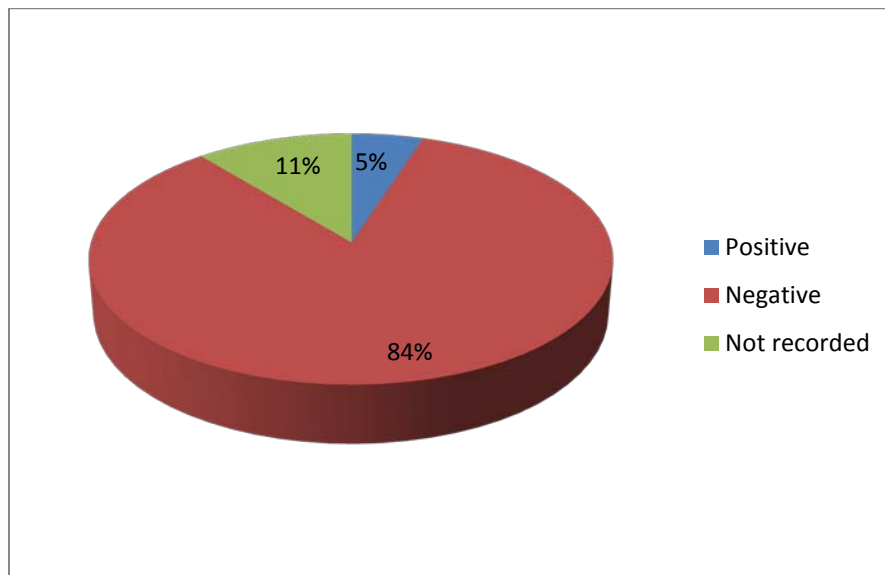
Figure 4.12   VDRL results at first antenatal visit (n=120)

4.2.4.2   Rhesus factor results (n=120)

The Rhesus factor results were positive for 103 (86%) mothers. Four (3%) mothers were rhesus negative and 13 (11%) of them had no record of the Rhesus factor.
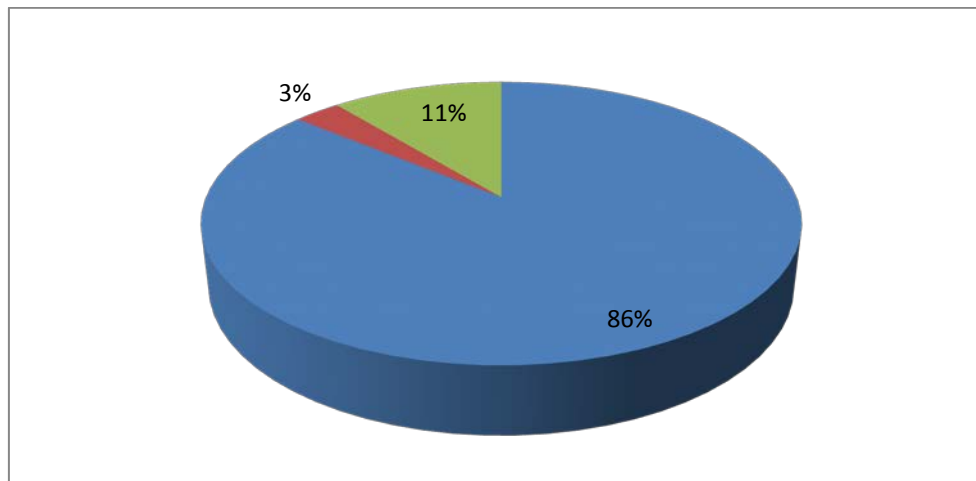
Figure 4.13   Rhesus factor results (n=120)

4.2.4.3   Haemoglobin level at first antenatal visit (n=120)

Majority of the mothers 44 (37%) had a haemoglobin level of 12 g/dl to 18 g/dl at their first antenatal visit. Furthermore, 40 (33%) of the mothers had   haemoglobin of 12-10 g/dl and 14 (12%) had haemoglobin level of below 10 g/dl. However, 22 (18%) mothers had no record of their haemoglobin level at their first antenatal visit.

Almost 14 (12%) of the women who were anaemic (haemoglobin level below 10 g/dl) at their first antenatal visit delivered infants with low birth weight 9 (64%).The prevalence of anaemia in pregnancy had an adverse effect on the neonatal outcome. The findings tally with the study that was done in India whereby prematurity and low birth weight was common to women who were anaemic during pregnancy (Bora, Sable, Wolfson, Boro & Rao 2013:3).
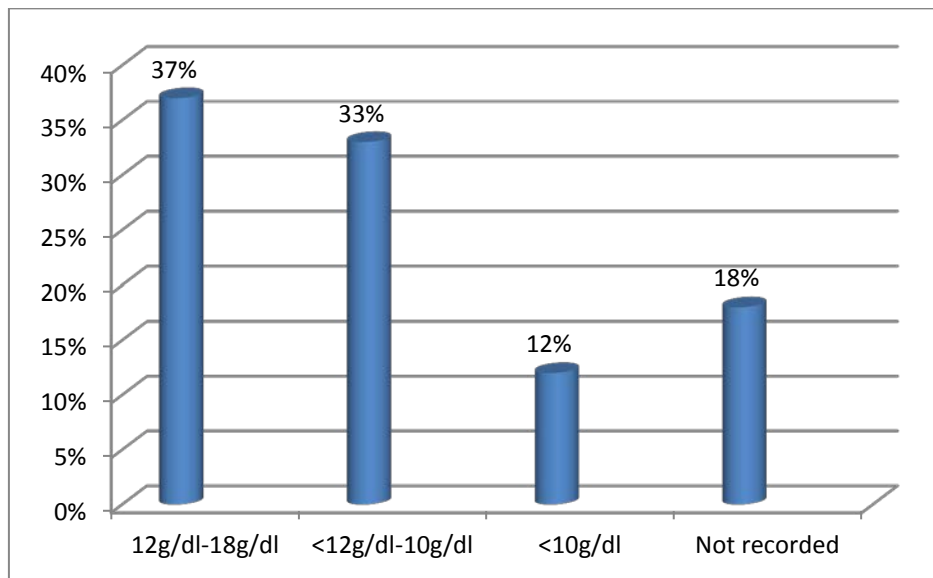
Figure 4.14   Haemoglobin levels of mothers at first antenatal visit (n=120)

4.2.4.4   HIV results (n=120)

Almost 36 (30%) mothers were coded positive on their antenatal cards and 79 (66%) mothers were coded negative to HIV, but 5 (4%) mothers did not have record of their HIV status during their first antenatal visit.
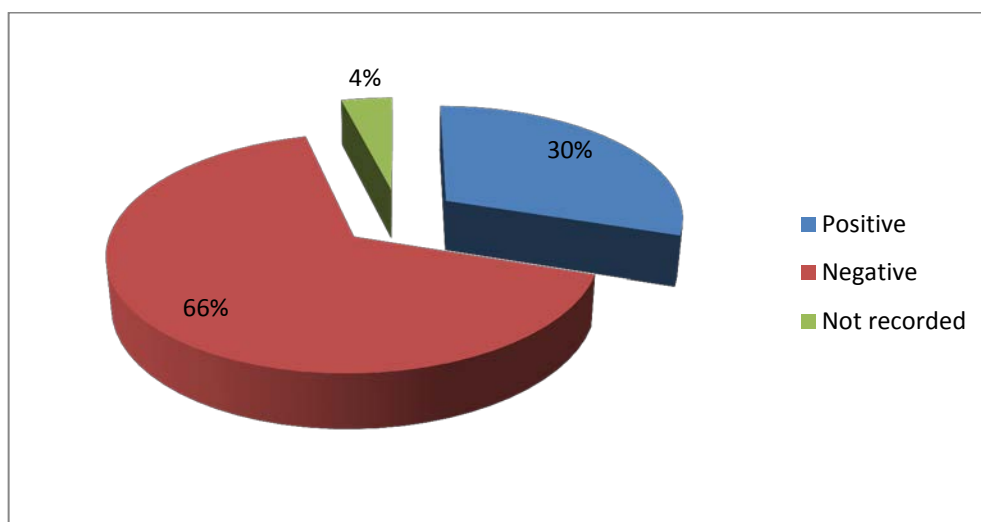
Figure 4.15   HIV results of mothers at first antenatal visit (n=120)

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The correlation between HIV infected mothers on highly active antiretroviral therapy (HAART) and the neonatal outcome was that of the mothers 36 (30%) who tested positive at first antenatal visit 7 (19%) of the babies weight below 2500 grams at birth. In this study low birth weight 24 (20%) was noted in those mothers who were on highly active antiretroviral treatment. These findings correlates with the study done on the prevalence of human immunodeficiency virus infected pregnant women who received highly active antiretroviral therapy as prematurity was noted in 13,6% of the babies (Chama, Bello, Ajayi, Zarma & Gashau 2010:364).

4.2.4.5   PMTCT, if positive (n=120)

Table 4.9 shows that out of 36 (30%) mothers who tested HIV positive during antenatal visit, 32 (26%) were on anti-retroviral treatment (ART). Three (3%) were on mono therapy and 1 (1%) was treated with dual therapy. According to the maternity guidelines all women attending antenatal care should be given routine information about HIV testing and the PMTCT programme. Women who tested HIV positive should be initiated on antiretroviral treatment full drug combination (FDC) at once if their CD4 count is 350 or less to enhance maternal and foetal survival. At onset of labour the woman continues with FCD until delivery. For those women who tested negative at initial visit, repeat testing should be offered every 12 weeks until delivery. Infants that are born to HIV positive mothers are given Nevirapine at birth and daily irrespective of infant feeding choice. For those mothers who are breastfeeding nevirapine is given to the infant until the mother stops breastfeeding (Dippenaar & Da Serra 2012:688-689; DoH 2007b:134-137).

In a study done in rural Uganda on neonatal mortality in HIV exposed infants born to women receiving combination antiretroviral therapy the neonatal mortality rate remained high irrespective of the prophylaxis during pregnancy. Prematurity and infections were found to be the leading causes of neonatal deaths (Ades, Mwesingwa, Natureeba, Clark, Plenty, Charlebois, Achan, Kamya, Havlir, Cohan & Ruel 2013:53-54).

Table 4.9   Mothers treated on PMTCT (n=120)

Mothers treated on PMTCT	Frequency	Percentage
Mono therapy	3	3
Dual	1	1
ART	32	26
Not applicable	78	65
Not recorded	6	5
Total	**120**	**100**

4.2.5 Supplements and vaccines given (n=120)

Figure 4.16 shows that supplements were given to 107 (89%) mothers while 5 (4%) mothers were not given supplements. No record was found of supplements for 8 (7%) mothers. Almost 89 (74%) mothers were given vaccines and 11 (9%) were not vaccinated during antenatal visits. No record was found on vaccination for 20 (17%) mothers.
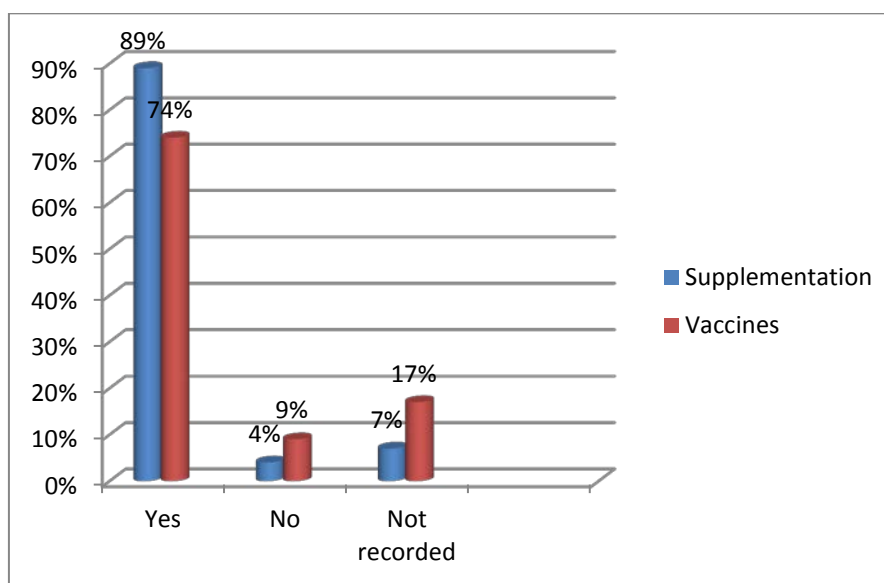
Figure 4.16   Supplements and vaccines given (n=120)

Prenatal supplementation with daily iron is effective to reduce the risk of low birth weight and maternal anaemia (Pena-Rosas, De-Regil, Dowswell & Viteri 2012:2). According to Arand, Ribot, Garcia, Viteri and Arija (2011:791-792), iron supplementation during pregnancy made no significant difference on the infant's birth weight at birth.

4.2.6 Risk grading done on first antenatal visit (n=120)

Almost 28 (23%) mothers were graded as high risk, 64 (54%) as medium risk, 22 (18%) as low risk and 6 (5%) not recorded. According to the maternity guidelines the pregnant

woman is screened during history taking for any risk factors throughout the pregnancy. The checklist includes the previous obstetric history, current pregnancy and general medical conditions. The high risk pregnant women are then referred for hospital delivery in order to prevent any complications for the mother and baby. Antenatal follow up visits of these mothers is done at the hospital until delivery (DoH2007b:29-31).

Table 4.10   Risk grading on first antenatal visit (n=120)

Risk grading on first antenatal visit	Frequency	Percentage
High risk	28	23
Medium	64	54
Low	22	18
Not recorded	6	5
Total	**120**	**100**

4.2.7   Antenatal follow-up (n=120)

Most of the booked mothers 82 (69%) attended antenatal follow-up at the local clinic. In addition, 28 (23%) mothers attended antenatal care at the district hospital while 6 (5%) mothers attended antenatal care at the regional hospital. However, there was no record for 4 (3%) mothers.
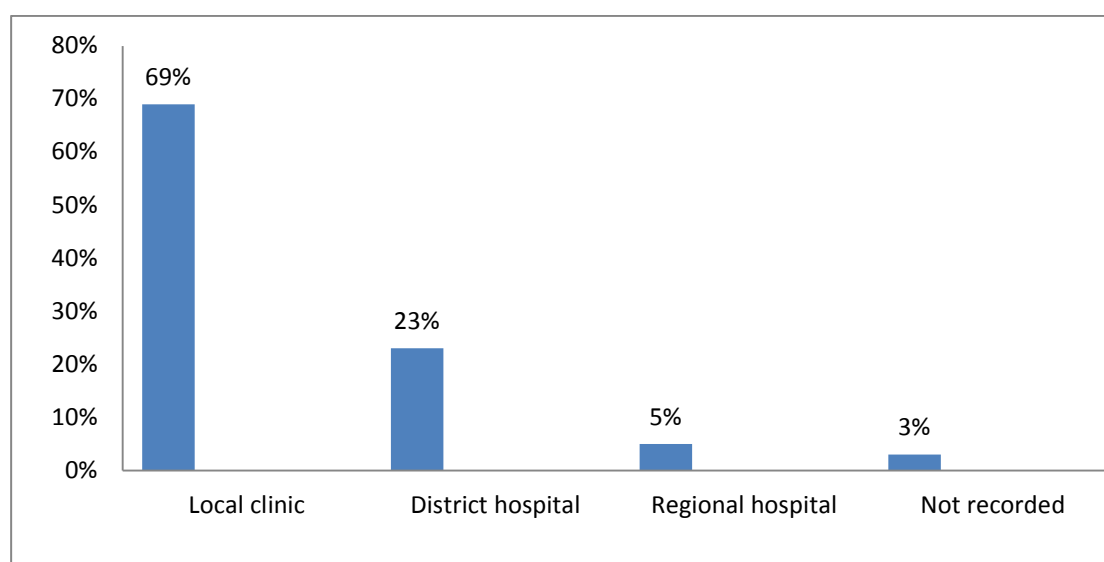
Figure 4.17   Antenatal follow-up (n=120)

4.2.8 Delivery plan (n=120)

Majority of the mothers 92 (77%) had a plan to deliver at the district hospital and 13 (11%) at the local clinic. In addition, 11 (9%) mothers had a plan to deliver at the regional hospital. However, 4 (3%) mothers had no record of delivery plan in their antenatal cards. In a study done in rural Tanzania on impact of place of delivery on Neonatal mortality, mothers who delivered outside a health facility experienced 1.63 times odds of experiencing neonatal deaths (Ajaari, Masanja, Weiner, Abokyi & Owusu-Agyeic 2012:52).

4.3 SECTION B: SUBSEQUENT ANTENATAL VISITS

Section B consisted of the following variables − number of antenatal visits, foetal movements recorded, blood pressure checked, pulse checked, pallor, measurement of symphisis fundal height, urine analysis, Haemoglobin levels and HIV tests done.

4.3.1 Number of antenatal visits (n=120)

Majority 48 (40%) of mothers visited the clinic thrice during their pregnancy. Furthermore, 43 (36%) of the mothers had three and more visits while 13 (11%) mothers attended antenatal clinic once and 16 (13%) attended twice. In this study prematurity (4%) and birth asphyxia (6%) was noted in women who had more than three visits. Neonatal infection (4%) was observed in those women who had two to three visits.
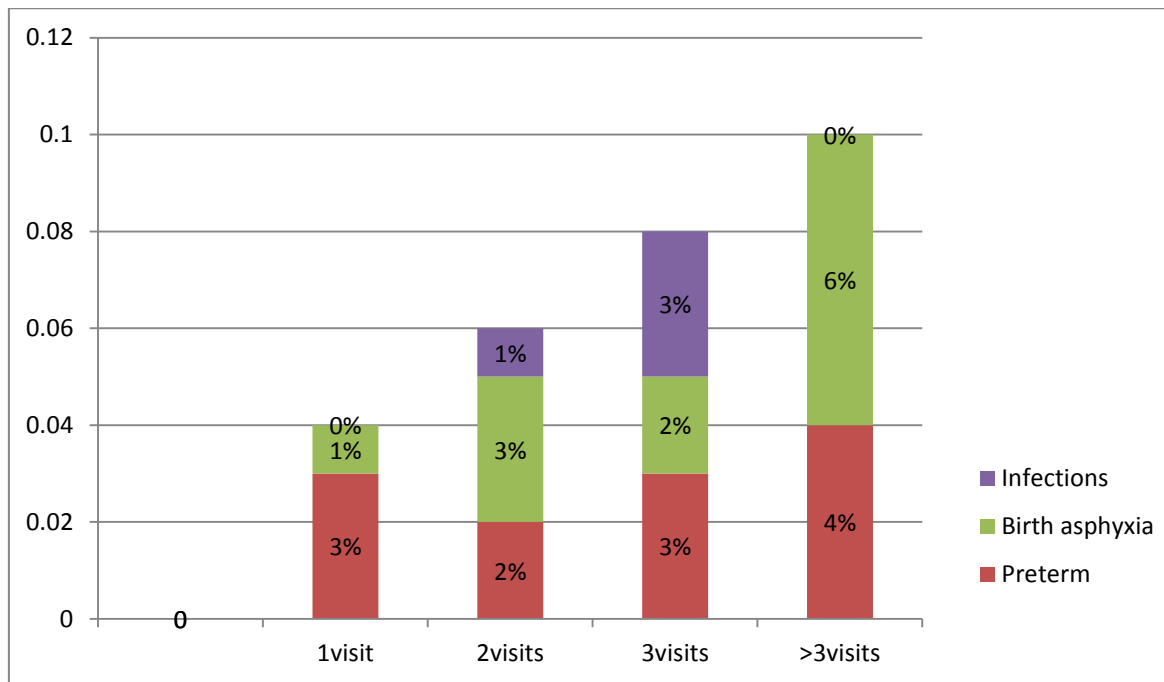
Figure 4.18   Number of visits and neonatal outcomes (n=120)

4.3.2   Foetal movements recorded (n=120)

Majority of the mothers 108 (90%) experienced normal foetal movements. Six mothers (5%) experienced abnormal movements. However, foetal movements were not recorded for 6 (5%) mothers.

4.3.3   Blood pressure measurement on subsequent follow-ups (n=120)

Majority of the mothers 63 (53%) had a blood pressure of 100/60-120/80mmHg, while 29 (24%) mothers had a blood pressure of 121/80-130/90 mmHg on subsequent antenatal visits and only 19 (16%) mothers had a blood pressure of above 140/90 mmHg. Nine (7%) of the mothers had no record of blood pressure measurement on subsequent antenatal visits. According to Ferrazzani et al (2011:446), maternal hypertension was strongly associated with poor neonatal outcomes.

Table 4.11   Blood pressure measurements (n=120)

Blood pressure checked	Frequency	Percentage
100/60-120/80 mmHg	63	53
121/80-130/90 mmHg	29	24
140/90 mmHg	19	16
Not recorded	9	7
Total	**120**	**100**

4.3.4 Pallor (n=120)

Majority of the mothers 106 (88%) had normal mucous membranes. Pallor was noted in 5 (4%) mothers and 1 (1%) mother had jaundice. Nevertheless, 8 (7%) of the mothers did not have any record of condition of their mucous membranes.

4.3.5 Symphysis fundal height measurements (n=120)

For majority of the mothers, 84 (70%) symphysis fundal height measurement ranged between the 10th and 90th percentile. Fifteen (12%) mothers had their symphysis fundal measurements ranging above the 90th percentile and 2 (2%) had the range below the 10th percentile. However, 19 (16%) mothers had no recordings of the symphysis fundal measurement at their subsequent antenatal visit.

4.3.6 Measurement of fundal height by palpation (n=120)

The majority 89 (74%) mothers ranged 28-38 weeks, 21 (18%) ranged <28 weeks, 4 (3%) >37weeks and no record for 6 (5%) mothers.

Table 4.12   Measurement of fundal height by palpation (n=120)

Measurement of fundal height by palpation	Frequency	Percentage
<28 weeks	21	18
28-38 weeks	89	74
>37 weeks	4	3
Not recorded	6	5
Total	**120**	**100**
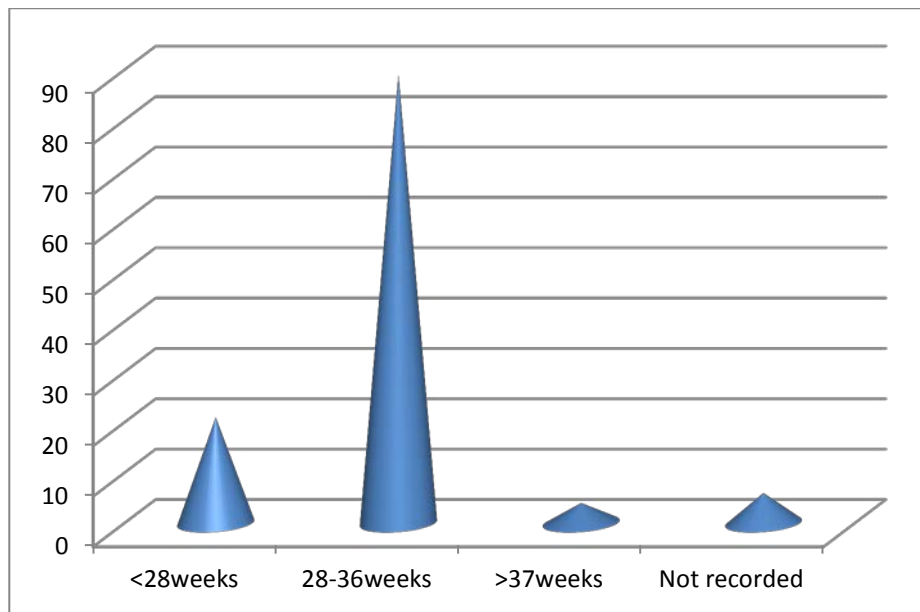
Figure 4.19 Fundal height measurements at subsequent antenatal visit (n=120)

4.3.7 Pelvic assessment (n=120)

Pelvic assessment was done to 5 (4%) mothers at subsequent antenatal visit. However, an overwhelming majority of the mothers 115 (96%) were not done pelvic assessment during their subsequent antenatal visits.

4.3.8 Urine analysis (n=120)

Proteinuria was detected in the urine specimen of 6 (5%) mothers and glucosuria was detected in 6 (5%) mothers. Leucocytes in 1 (1%), furthermore, 40 (33%) specimens were normal and for 67 (56%) mothers urine analysis was not recorded. Proteinuria is considered to be one of the markers for poor pregnancy outcome and in turn risk for neonatal morbidity and mortality. In the study on neonatal outcome in hypertensive disorders of pregnancy, neonates who were born to women with pre-eclampsia a high rate of small for gestational infants was common (Ferrazzani et al 2011:447).

Table 4.13   Urine analysis findings (n=120)

Urine analysis	Frequency	Percentage
Proteins	6	5
Glucose	6	5
Ketones	0	0
Leucocytes	1	1
Normal	40	33
Not recorded	67	56
Total	**120**	**100**

4.3.9   HIV test results if refused at initial visit (n=49)

In the table on HIV test results, 14 (12%) of the mothers tested positive and 24 (20%) tested negative. According to Haeri, Shauer, Dale, Leslie, Baker, Saddlemire and Boggess (2009:315), spontaneous preterm birth at <37 weeks gestation occurred more frequently among HIV positive mothers.

Table 4.14   HIV test results if refused at initial visit (n=120)

HIV test results if refused at initial visit	Frequency	Percentage
Positive	14	12
Negative	24	20
Not recorded	11	9
Not applicable	71	59
Total	**120**	**100**

4.3.10   Haemoglobin levels at 32 weeks of gestation (n=120)

Majority of the mothers 27 (22%) had a haemoglobin level of 12 g/dl to 18 g/dl at 32 weeks of gestation during their subsequent antenatal visit. Furthermore, 45 (38%) of the mothers had haemoglobin of <12 g/dl and 15 (12%) had haemoglobin level of below 10 g/dl. However, 33 (28%) mothers had no record of their haemoglobin level at 32 weeks of gestation at their subsequent antenatal visit.

Table 4.15   Haemoglobin levels at 32 weeks of gestation (n=120)

Haemoglobin levels at 32 weeks of gestation	Frequency	Percentage
12 g/dl-18 g/dl	27	22
<12 g/dl	45	38
<10 g/dl	15	12
Not recorded	33	28
Total	**120**	**100**

4.3.11   Haemoglobin repeated at 38 weeks of gestation (n=120)

Majority of the mothers 7 (6%) had a haemoglobin level of 12 g/dl to 18 g/dl repeated at 38 weeks of gestation during their subsequent antenatal visit. Furthermore, 7 (6%) of the mothers had haemoglobin of below 12 g/dl and 9 (7%) had haemoglobin level of below 10 g/dl. However, 97 (81%) mothers had no record of their haemoglobin level repeated at 38 weeks of gestation during their subsequent antenatal visit.

According to Hadipour, Norimah, Poh, Firoozehchian, Hadipour and Akaberi (2010:563-564) on their study to assess the prevalence of anaemia among pregnant women, neonates from mothers without anaemia were heavier than those from anaemic mothers.

Table 4.16   Haemoglobin repeated at 38 weeks of gestation (n=120)

Haemoglobin levels at 38 weeks of gestation	Frequency	Percentage
12 g/dl-18 g/dl	7	6
<12 g/dl	7	6
<10 g/dl	9	7
Not recorded	97	81
Total	**120**	**100**

From figure 4.20 on the Haemoglobin levels, almost 87 (72%) of the women had results during 32 weeks of gestation. Only 23 (19%) mothers had haemoglobin results at 38 weeks of gestation. Poor management of these women was noted during antenatal care.
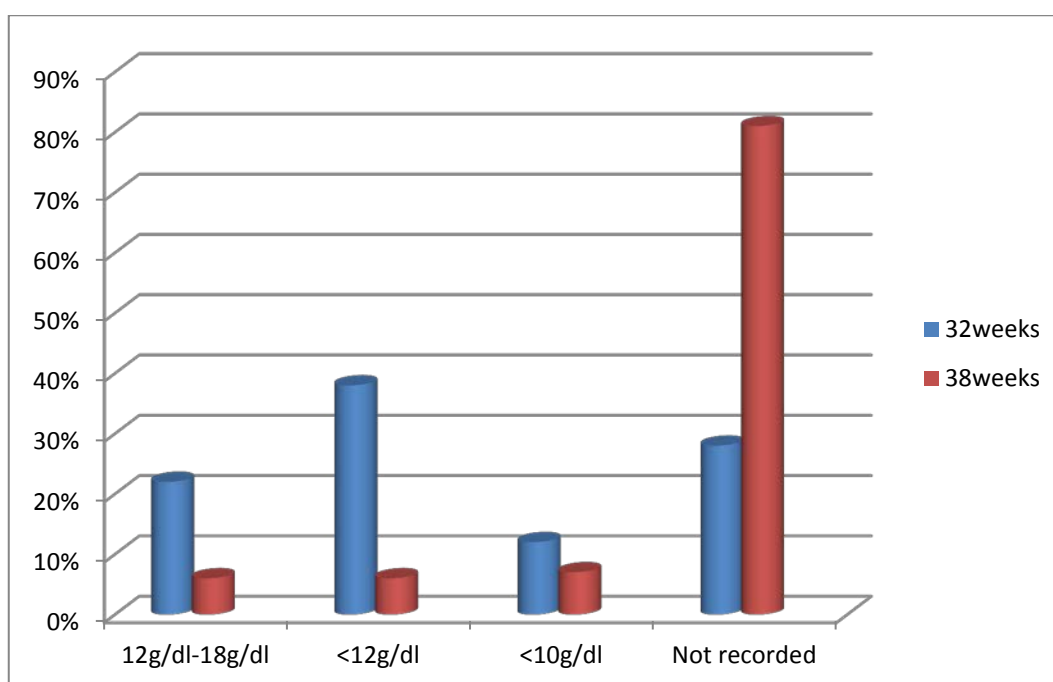
Figure 4.20   Haemoglobin levels during antenatal visits (n=120)

4.3.12   Repeat information of danger signs (n=120)

Repeat information of danger signs was done for 76 (63%) mothers during subsequent antenatal visit. However, 44 (37%) mothers had no record of repeat information of danger signs of pregnancy.

4.3.13   Delivery plan reviewed on subsequent antenatal visits (n=120)

Delivery plan was reviewed for ninety mothers (75%) on subsequent antenatal visits. The total of 30 (25%) mothers had no record of review of their delivery plan during subsequent antenatal visits. In a study done in rural Tanzania, the place of delivery plays a vital role on the neonatal outcome, whereby delivery outside the health facility is a risk factor to neonatal mortality (Ajaari et al 2012:57).

4.4   SECTION C: ADMISSION IN LABOUR

Section C describes the findings about initial assessment in labour. Labour is assessed for baseline data on progress, maternal condition and the foetal condition. Risk factors and history about labour is collected and assessment of the woman's condition is done. Blood investigations on HIV are also performed if missed during antenatal care.

4.4.1 Antenatal risk factors noted (n=120)

Antenatal risk factors were identified in 85 (71%) mothers and none observed in 27 (22%) mothers. For 8 (7%) mothers, the risk factors were not identified on admission in labour.

4.4.2 Antenatal history taken (n=120)

Antenatal history was taken in 32 (27%) mothers on admission in labour and for 7 (6%) mothers it was not taken. Almost 3 (2%) mothers had their history not recorded. More significantly, majority of the mothers 78 (65%) had their antenatal history taken during antenatal visits. According to the Basic antenatal care protocol (BANC), antenatal history should be taken for all mothers on initial visit to the clinic and admission in labour. This will assist the health care worker to detect conditions that were missed during ANC visits (Pattinson 2007:18-20).

4.4.3 HIV status not known and voluntary counselling and testing done (n=120)

Almost 99 (82%) mothers were coded on admission in labour. However, 5 (5%) mothers were not coded and a total of 16 (13%) mothers were not tested on admission in labour.

4.4.4 Foetal movements checked (n=120)

On admission in labour, majority of mothers 95 (79%) reported normal foetal movements. One (1%) mother had diminished foetal movements on admission in labour. However, foetal movements were not recorded for 24 (20%) mothers on admission in labour.

4.4.5 Rupture of membranes and condition of liquor (n=120)

A total of 70 (58%) mothers had intact membranes on admission. Twenty-seven (23%) mothers had ruptured membranes on admission and 23 (19%) mothers had no record of whether the membranes had ruptured or not.

The condition of liquor was clear for 15 (55%) mothers and meconium stained for one (4%) mother. Two (7%) mothers had offensive liquor and 9 (33%) mothers had no record of ruptured membranes.

4.4.6 Duration of rupture of membranes (n=120)

Almost 8 (7%) mothers had membranes ruptured for less than 4 hours. For 6 (5%) mothers, the duration was between 5 and 24 hours. A total of 4 (3%) mothers had membranes ruptured for more than 24 hours. Nine (8%) mothers had no record of the duration of rupture of membranes. Premature rupture of membranes (PROM) was found to be amongst the conditions at risk of transfer of the neonates to the NICU in Tanzania (Mmabaga, Lie, Kibiki, Olomi, Kvale, & Datveit 2011:8).

4.4.7 Temperature checked and recorded (n=120)

Almost 79 (66%) mothers had a normal temperature ranging between 36ºC and 37ºC. Ten (8%) mothers had a temperature recording of below 36ºC. Fifteen (13%) mothers were pyrexia with a temperature above 37ºC 16 (13%) mothers their temperature was not recorded. Maternal fever during labour increases the risk for neonatal death by about 10 times (Saugstad 2011:252).
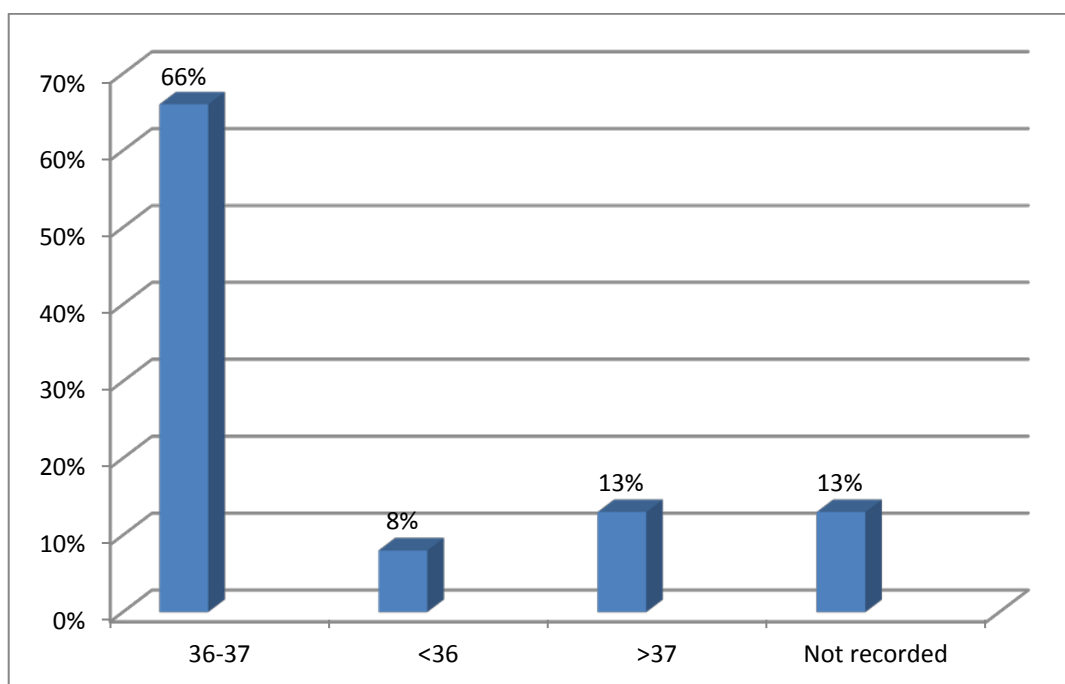
Figure 4.21   Temperature recordings on admission in labour (n=120)

4.4.8 Blood pressure recordings (n=120)

Blood pressure measurement for 40 (33%) mothers ranged within normal limits between 100/60-120/80 mmHg. For 22 (18%) mothers, the blood pressure was between 121/80-130/90 mmHg. Twenty-nine (24%) mothers had a slightly elevated blood pressure of above 140/90 mmHg. However, blood pressure was not recorded for 29 (24%) mothers on admission in labour.

4.4.9 Oedema observed and site of oedema (n=120)

Oedema was observed on the legs of 25 (21%) mothers and 3 (2%) had oedema of the hands. However, an overwhelming majority of the mothers 92 (77%) had no record of oedema on admission in labour.

4.4.10 Pallor present (n=120)

Pallor was present in 8 (7%) mothers and 92 (77%) mothers had pink mucous membranes. For 20 (16%) mothers, the condition of mucous membranes was not recorded.

4.4.11 Symphysis fundal height measurements (n=120)

Table 4.17 shows that for 67 (56%) of the mothers, Symphisis fundal height (SFH) was between 10th and 90th percentile. For 22 (18%) of the mothers the SFH was above 90th percentile. Eight mothers (7%) had an SFH below the 10th percentile. No record was found for 23 (19%). According to the BANC protocols, the SFH determines the foetal growth in utero and might be a sign that there is placental insufficiency. In a study done on neonatal outcome in hypertensive disorders of pregnancy the prevalence of small for gestational age infants was significantly higher in all the mothers with hypertension (Ferrazzani et al 2011:446).

Table 4.17   Symphysis fundal height measurements (n=120)

Symphysis fundal height measurements.	Frequency	Percentage
Between 10th and 90th percentile	67	56
Above 90th percentile	22	18
Below 10th percentile	8	7
Not recorded	23	19
Total	**120**	**100**

4.4.12   Palpation in weeks (n=120)

In table 4.18 measurement of fundal height by palpation was below 28 weeks of gestation for 19 (16%) mothers, between 28 and 38 weeks of gestation for 53(44%) mothers and above 37 weeks for 33 (27%) mothers. Fifteen (13%) mothers had no record of fundal height measurements by palpation on admission in labour.

Table 4.18   Measurement of fundal height by palpation (n=120)

Measurement of fundal height by palpation	Frequency	Percentage
<28 weeks	19	16
28-38 weeks	53	44
>37 weeks	33	27
Not recorded	15	13
Total	**120**	**100**

4.4.13   Lie of foetus (n=120)

Majority of the mother's foetal lie was found to be longitudinal 94 (78%). Oblique lie was diagnosed for 9 (8%) mothers. Seventeen (14%) mothers had no record of lie of the foetus.

4.4.14   Presentation and position of the foetus (n=120)

Presentation of the foetus was found to be cephalic in 101 (84%) mothers during admission in labour. Two mothers (2%) had breech presentation and seventeen (14%) mothers had no record of presentation of the foetus. Anterior position was diagnosed for 100 (83%) mothers. Twenty (17%) mothers had no record of foetal position on admission in labour. Mal-presentation and breech presentation increases risk of neonatal death more than 6-fold (Saugstad 2011:253).

4.4.15 Level of presenting part in fifth above the pelvic brim (n=120)

Figure 4.22 shows that the level of the presenting part was 5/5 above brim for 41 (34%) mothers, 4/5th for 28 (23%), 3/5th 20 (16%), 2/5th for 7 (6%) and not recorded for 24 (20%) mothers.
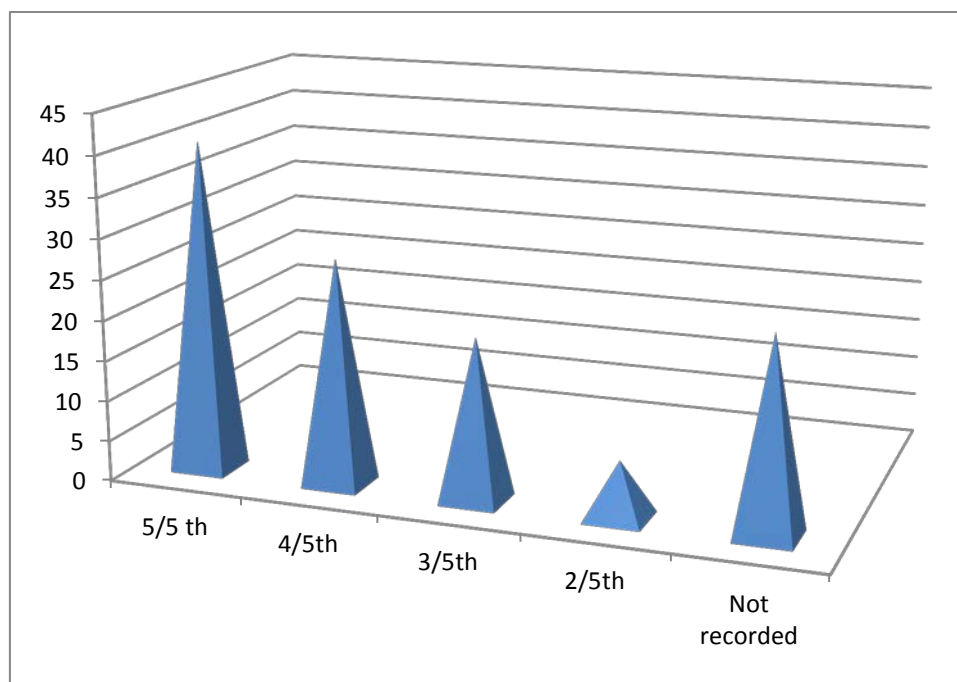
Figure 4.22   Level of presenting part above pelvic brim (n=120)

4.4.16 Strength of contractions (n=120)

Table 4.19 shows that the strength of contractions were mild for 27 (23%) mothers, moderate for 7 (6%), strong for 6 (5%) and not recorded for 23 (19%) and no contractions for 27 (23%) of the mothers. Almost 30 (25%) were booked for elective Caesarean section and had no record of strength of contractions in labour. According to the maternal guidelines on the management of the woman in labour contractions should be monitored ½ hourly in active phase of labour. This will assist the midwife in determining the progress of labour and identify problems immediately (DoH 2007b:36).

Table 4.19   Strength of contractions 2 hourly (n=120)

Strength of contractions 2 hourly	Frequency	Percentage
No contractions	27	23
Mild	27	23
Moderate	7	6
Strong	6	5
Not recorded	23	19
Not applicable	30	25
Total	**120**	**100**

4.4.17   Foetal heart rate (n=120)

Table 4.20 shows that foetal heart rate was monitored and ranged between 120-160 beats per minute (b/m) for 34 (28%) mothers,<120 b/m for 16 (13%), >160 b/m for 32 (27%) mothers. Foetal heart rate monitoring during labour is vital in order to determine the foetal condition. This will assist in early detection of foetal distress and management thereof (DoH 2007b:36).

Table 4.20   Foetal heart monitored (n=120)

Foetal heart monitored	Frequency	Percentage
120-160 b/m	34	28
<120 b/m	16	13
>160 b/m	32	27
Not recorded	8	7
Not applicable	30	25
Total	**120**	**100**

4.4.18   Estimated foetal weight (n=120)

In table 4.21 foetal weight was estimated <2499grams for 31 (26%) mothers and between 2500-4000 grams for 20 (17%) mothers. Two (1%) mothers had an estimated foetal weight of above 4000 grams and 37 (31%) mothers had no record of estimated foetal weight on admission in labour. According to Buchmann (2008:32), there is no significance to neonatal outcome when foetal weight is estimated prior to delivery.

Table 4.21   Estimated foetal weight (n=120)

Estimated foetal weight	Frequency	Percentage
<2499 grams	31	26
2500-4000 grams	20	17
>4000 grams	2	1
Not recorded	37	31
Not applicable	30	25
Total	**120**	**100**

4.4.19   Vaginal examination done on admission (n=120)

Vaginal examination was done to 90 (75%) mothers and 30 (25%) mothers were booked for elective caesarean section. Vaginal examination is done whereby normal vertex delivery is expected in order to determine the progress of labour. This is done by assessing dilatation and condition of the cervix. The findings on assessment will assist the midwife act promptly if the maternal and foetal condition is at risk (DoH 2007b:36-37). In the findings of a study done in Johannesburg tertiary institution on outcome of neonates with perinatal asphyxia was that the majority 270 (60%) of neonates with perinatal problems were born by normal vaginal delivery (Padayachee & Ballot 2013:91).

4.4.20   Condition of the cervix (n=120)

Table 4.22 shows that the condition of the cervix was not effaced for 16 (13%) mothers, effacing for 40 (33%), fully effaced for 11 (9%) and not recorded for 23 (19%) mothers. Condition of the cervix will assist the midwife in confirming whether the woman is in labour or not (Fraser, Cooper & Nolte 2010:453).

Table 4.22   Condition of the cervix (n=120)

Condition of the cervix	Frequency	Percentage
Not effaced	16	14
Effacing	40	33
Fully effaced	11	9
Not recorded	23	19
Not applicable	30	25
Total	**120**	**100**

4.4.21 Dilatation of the cervix (n=120)

Majority of the mothers 40 (33%) had a cervical dilatation of below 3 cm on admission. Thirty-six mothers (30%) had cervical dilatation of 4 cm to 8 cm whereas 4 mothers (3%) were almost fully dilated on admission. But, 11 mothers (9%) had no record of cervical dilatation on admission in labour. Thirty (25%) mothers were booked for Caesarean section and had no record of cervical dilatation. According to Yisma, Dessalegn, Ayalew and Fesseha (2013:5) measurement of cervical dilatation was recorded in 248 (84%) partographs they reviewed but almost half of these were substandard.

4.4.22 Caput (n=120)

Table 4.23 shows that caput was absent in 80 (67%) and not recorded for 10 (8%) of the women in labour. The presence of caput depicts some difficulty during labour especially if it is excessive. In a study done by Yisma et al (2013:6) on the completion of the modified WHO partogram during labour in Ethiopia lack of documentation and suboptimal documentation of some parameters on the progress of labour was observed. This then lead to lack of early detection of complications during labour and timely intervention to both the mother and foetus.

Table 4.23   Caput (n=120)

Caput	Frequency	Percentage
Absent	80	67
Present	0	0
Not recorded	10	8
Not applicable	30	25
Total	**120**	**100**

4.4.23 Moulding (n=120)

In table 4.24 moulding was present in 3 (2%) of the mothers and absent in 79 (66%).Moulding was not recorded for 8(7%) of the women in labour. According to the Maternal Care Guidelines (DoH 2007b:44), the presence of moulding during labour depicts cephalo-pelvic disproportion.

Table 4.24   Moulding (n=120)

Moulding	Frequency	Percentage
Absent	79	66
Present	3	2
Not recorded	8	7
Not applicable	30	25
Total	**120**	**100**

4.4.24   Descent of foetal head (n=120)

Table 4.25 shows that descent was -1 station for 37 (31%) mothers, 0 station for 30 (25%), +1 station for 6 (5%) and +2 station for 3 (2%) mothers in labour. Recording was not done for 14 (12%) mothers. In the study done by Yisma et al (2013:5) on completion of the modified WHO partogram descent of the presenting part was not recorded in 353 (84%) partogram reviewed.

Table 4.25   Level of presenting part (n=120)

Level of presenting part	Frequency	Percentage
-1 station	37	31
0 station	30	25
+1 station	6	5
+2 station	3	2
Not recorded	14	12
Not applicable	30	25
Total	**120**	**100**

4.4.25   Pelvic assessment done (n=120)

Pelvic assessment was done to 53 (44%) mothers on admission in labour. Majority of the mothers 42 (35%) had an adequate pelvis. Five (4%) mothers had a borderline pelvis and 2 (1%) mothers had an inadequate pelvis. However, 37 (31%) mother's pelvises were never assessed on admission in labour.

4.4.26   Urine analysis (n=120)

Table below shows that proteinuria was detected in 5 (4%) mothers, 3 (3%) had glucose and urine was normal for 13 (11%) mothers. The majority of mothers 65 (54%) had their urine not tested on admission in labour. Maternal conditions were strongly associated

with the risk for perinatal death in both the secondary and tertiary level of care (Moura et al 2014:3).

Table 4.26   Urine analysis (n=120)

Urine analysis	Frequency	Percentage
Protein	5	4
Glucose	3	3
Blood	4	3
Leucocytes	0	0
Ketones	0	0
Normal	13	11
Not recorded	65	54
Not applicable	30	25
Total	**120**	**100**

4.5   SECTION D: INTRA-PARTUM CARE

Section D describes the findings of monitoring labour in both latent and active phase. Labour is monitored for progress, maternal condition and the foetal condition.

4.5.1 Partogram used (n=120)

Partogram is a tool used to monitor every woman while in labour. The tool assists and guides the midwife how to monitor the woman in labour. With this tool the midwife will be able to identify abnormalities during labour and act promptly. It also acts as a legal record which can be produced in any lawsuit for the practising midwife (Dippenaar & Da Serra 2012:338).

According to the maternity guidelines in South Afica, it is a standard that all women who are in labour should be monitored with the partogram. The partogram is used to monitor the woman in labour and helps in identifying abnormalities, interpreting findings correctly, identifying warning signs of abnormalities, acting on abnormalities in recordings and early referral (DoH 2007b:36; Dippenaar & Da Serra 2012:338).

Figure 4.23 below shows that the partogram was used for 80 (67%) mothers. Nevertheless, for 10 (8%) mothers, the partogram was not used in active phase of

labour as they arrived already in an advanced stage. In addition, 30 (25%) mothers underwent elective Caesarean section and the partogram was not used.
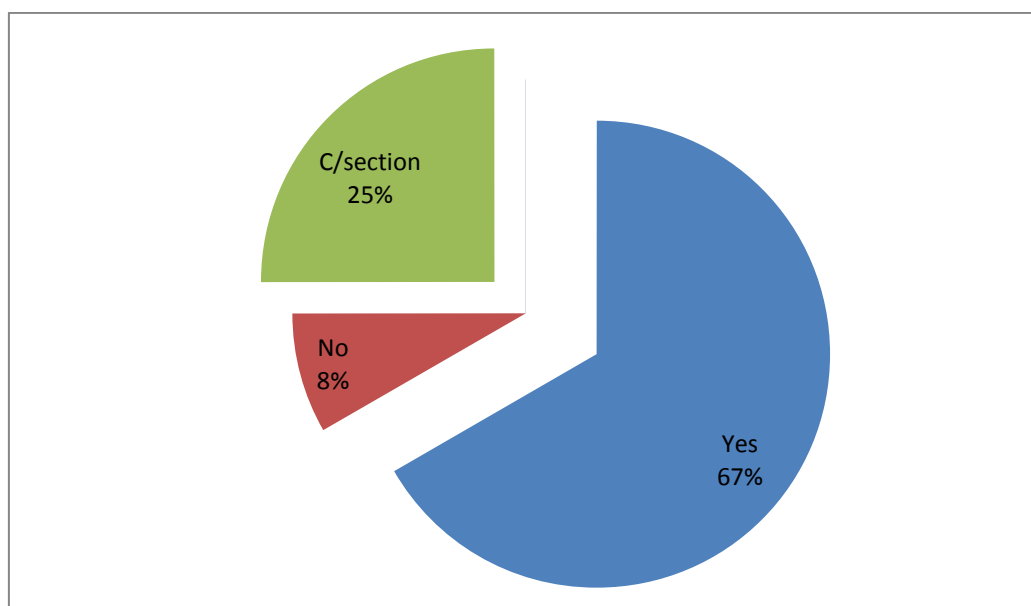
Figure 4.23 Partogram used (n=120)

4.5.2 Latent phase of labour monitored (n=120)

Latent phase of labour was monitored for 56 (47%) mothers. For 22 (18%) mothers latent phase of labour was not monitored and 12 (10%) mothers had no record on latent phase of labour. Thirty (25%) mothers underwent elective Caesarean section. Recording of the latent phase will assist the midwife in identifying prolonged labour as it should not last more than eight hours. Prolonged latent phase of labour can have a negative impact on the foetal condition whereby the infant might be born with respiratory problems (Dippenaar & Da Serra 2012:338).

Table 4.27   Latent phase of labour monitored (n=120)

Latent phase of labour monitored	Frequency	Percentage
Yes	56	47
No	22	18
Not recorded	12	10
Not applicable	30	25
Total	**120**	**100**

4.5.3 Blood pressure monitored 4 hourly in latent phase of labour (n=120)

The blood pressure was monitored 4 hourly for 43 (35%) mothers. In addition, 19 (16%) mothers had their blood pressure monitored infrequently. However, for 14 (12%) mothers, the blood pressure was not monitored 4 hourly and 14 (12%) mothers had no recordings of the blood pressure.

Table 4.28   Blood pressure monitored 4 hourly (n=80)

Blood pressure monitored 4hourly	Frequency	Percentage
Yes	43	35
No	14	12
Infrequent	19	16
Not recorded	14	12
Not applicable	30	25
Total	**120**	**100**

4.5.4 Blood pressure measurements 4 hourly (n=120)

Blood pressure measurement for 39 (32%) mothers ranged within normal limits between 100/60-120/80 mmHg. For 17 (14%) mothers, the blood pressure was between 121/80-130/90 mmHg. Fifteen (13%) mothers had a slightly elevated blood pressure of above 140/90 mmHg. However, blood pressure was not recorded for 19 (16%) mothers during the latent phase of labour.

Table 4.29   Blood pressure measurements (n=120)

Blood pressure measurements	Frequency	Percentage
100/60-120/80 mmHg	39	32
121/80-130/90 mmHg	17	14
>140/90 mmHg	15	13
Not recorded	19	16
Not applicable	30	25
Total	**120**	**100**
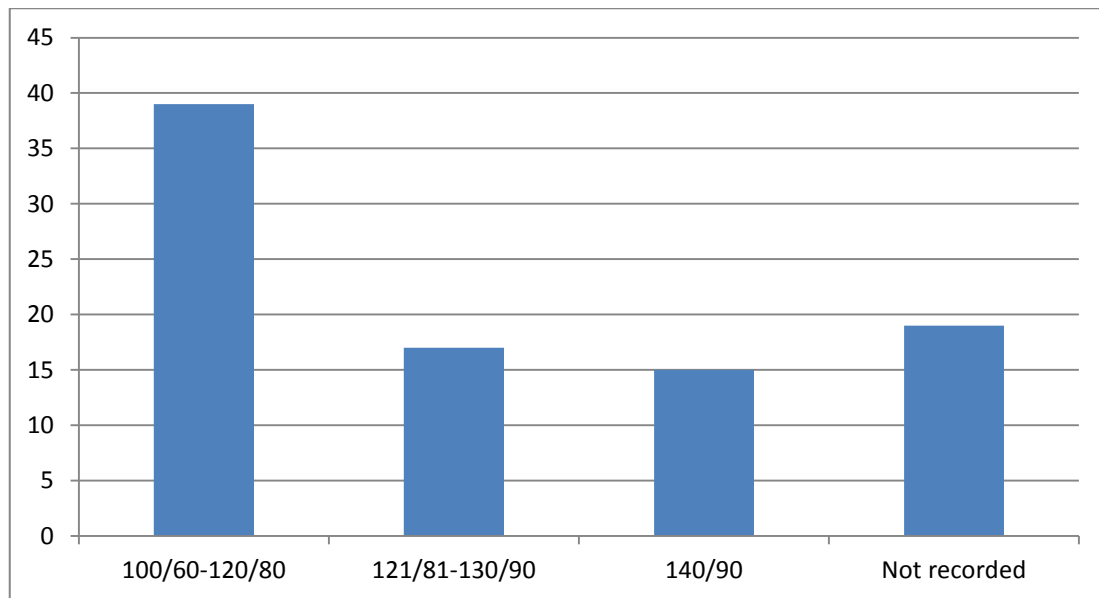
Figure 4.24   Blood pressure measurements during latent phase of labour (n=120)

4.5.5   Temperature monitored 4 hourly in latent phase of labour (n=120)

Table 4.30 shows that temperature was monitored 4 hourly for 43 (36%) mothers and not monitored for 12 (10%) mothers. Infrequent monitoring was noted in 20 (16%) mothers and 15 (13%) had no record of temperature monitoring at four hourly intervals.

Table 4.30   Temperature monitored 4 hourly (n=120)

Temperature monitored 4 hourly	Frequency	Percentage
Yes	43	36
No	12	10
Infrequent	20	16
Not recorded	15	13
Not applicable	30	25
Total	**120**	**100**

4.5.6   Uterine contractions monitored 2 hourly in latent phase of labour (n=120)

Almost 35 (29%) mothers had their uterine contractions monitored in latent phase of labour. However, 25 (21%) mothers were monitored infrequently and 15 (12.5%) mothers their uterine contractions were not monitored 2 hourly and 15 (12.5%) of the mothers had no record of monitoring of uterine contractions in latent phase of labour.

4.5.7 Strength of contractions monitored 2 hourly in latent phase of labour (n=120)

Strength of contractions was monitored mild for 29 (24%) mothers and 33 (28%) mothers had moderate contractions. Strong contractions were monitored in 7 (6%) mothers and 5 (4%) had no contractions. Monitoring of the strength of contractions was not done for 16 (13%) mothers in latent phase of labour.

Table 4.31   Strength of contractions 2 hourly (n=120)

Strength of contractions 2 hourly	Frequency	Percentage
No contractions	5	4
Mild	29	24
Moderate	33	28
Strong	7	6
Not recorded	16	13
Not applicable	30	25
Total	**120**	**100**

4.5.8 Foetal heart rate monitored 2 hourly in latent phase of labour (n=120)

Foetal heart rate was monitored 2 hourly for 28 (23%) mothers while 47 (39%) mothers had their foetal heart rate monitored infrequently. However, 15 (13%) mothers had no record of the 2 hourly foetal heart rates in the latent phase of labour. Only a third of the women had their foetal heart rate monitored during the latent phase of labour, thus reflects substandard care during labour. In the study done on the completion of the WHO partogram during labour, foetal heart rate (32,9%) was one of the parameters that was not monitored accordingly (Yisma et al 2013:6).

4.5.9 Vaginal examination done 4 hourly in latent phase of labour (n=120)

Vaginal examination was done 4 hourly for 54 (45%) mothers and not done for 9 (7%) mothers. Infrequent vaginal examination was noted in 20 (17%) mothers and 7 (6%) had no record of vaginal examination done four hourly.

Table 4.32   Vaginal examination done 4 hourly (n=120)

Vaginal examination done 4 hourly	Frequency	Percentage
Yes	54	45
No	9	7
Infrequent	20	17
Not recorded	7	6
Not applicable	30	25
Total	**120**	**100**

4.5.10   Active phase of labour monitored (n=120)

Table 4.33 shows that active phase of labour was monitored for 38 (32%) and not monitored for 15 (12%) mothers. Infrequent monitoring was noted in 19 (16%) and not recorded for 18 (15%) mothers.

Table 4.33   Active phase of labour monitored (n=120)

Active phase of labour monitored	Frequency	Percentage
Yes	38	32
No	15	12
Infrequent	19	16
Not recorded	18	15
Not applicable	30	25
Total	**120**	**100**

4.5.11   Maternal condition monitored in active phase of labour (n=120)

Maternal condition was monitored for 50 (42%) mothers in active phase of labour. For 28 (23%) mothers, labour was infrequently monitored whereas 12 (10%) mothers were not monitored in active phase of labour. Thirty (25%) mothers underwent elective Caesarean section. Therefore, inappropriate management of the woman during labour contributed to intra-partum related birth asphyxia (Velaphi & Rhoda 2012:70).

4.5.12   Blood pressure monitored hourly in active phase of labour (n=120)

Blood pressure measurement for 20 (17%) mothers ranged within normal limits between 100/60-120/80 mmHg. For 21 (18%) mothers, the blood pressure was between 121/80-130/90 mmHg and 17 (14%) mothers had a slightly elevated blood pressure of above 140/90 mmHg. However, blood pressure was not recorded for 32 (26%) mothers during the active phase of labour.

4.5.13 Temperature monitored 4 hourly in active phase of labour (n=120)

Table 4.34 shows that temperature ranged within 36-37^{0}C for 33 (27%) mothers and below 36^{0}C for 9 (8%) mothers. Pyrexia was noted in 30 (25%) of the mothers and for 18 (15%) temperature was not monitored 4 hourly.

Table 4.34   Temperature monitored 4 hourly (n=120)

Temperature monitored 4 hourly	Frequency	Percentage
36-37^{0}C	33	27
< 36^{0}C	9	8
>37^{0}C	30	25
Not recorded	18	15
Not applicable	30	25
Total	**120**	**100**

4.5.14 Urine analysis done and measured 2 hourly in active phase of labour (n=120)

Urine analysis was recorded for 21 (26%) mothers in active phase of labour. There was a total of 7 (9%) specimens with proteins and 4 (5%) with glucose. Five (6%) specimens had blood and 3 (4%) were normal. Disappointingly, urine analysis was not done for 59 (74%) mothers.

4.5.15 Foetal heart rate monitored ½ hourly in active phase of labour (n=120)

Table 4.35 shows that foetal heart rate was monitored ½ hourly in active phase of labour and ranged between 120-160 b/m for 38 (32%) mothers, for 12 (10%) mothers had their foetal heart rate ranging below 120 b/m. Foetal tachycardia was noted in 12 (10%) mothers as the foetal heart rate was above 160b/m. However, 28 (23%) mothers had no record of the ½ hourly foetal heart rates in the active phase of labour. Foetal heart rate should be monitored continuously during labour for early detection of abnormalities and prompt action (Velaphi et al 2012:69).

Table 4.35   Foetal heart monitored ½ hourly (n=120)

Foetal heart monitored ½ hourly	Frequency	Percentage
120-160 b/m	38	32
<120 b/m	12	10
>160 b/m	12	10
Not recorded	28	23
Not applicable	30	25
Total	**120**	**100**

4.5.16   Cardiotocograph used in active phase of labour (n=120)

Cardiotocograph was used for 13 (11%) mothers while it was not used for 77 (64%) mothers. Thirty (25%) mothers underwent elective Caesarean section.

4.5.17   Treatment given during labour (n=120)

Figure 4.25 shows that intravenous fluids was given to 44 (37%) mothers, antihypertensive treatment 13 (11%) mothers, sedatives 8 (7%), oxytocin 2 (2%) and antibiotics to 25 (21%) mothers. 12 (10%) mothers had no record of any treatment given during labour. Fourteen (12%) mothers were not given any treatment during active phase of labour.
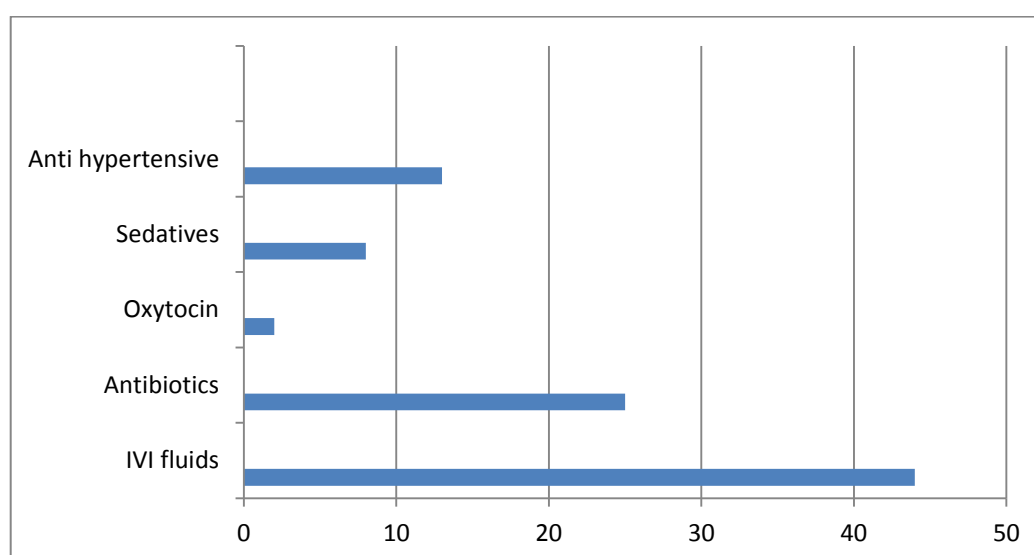
Figure 4.25   Treatment given during labour (n=120)

4.5.18 Condition of liquor 2 hourly if membranes ruptured in active phase of labour (n=120)

A total of 58 (48%) mothers had ruptured membranes during active phase of labour. 29 (24%) mothers drained clear liquor, 10 (8%) had meconium stained and 7 (6%) drained offensive liquor 12 (10%). Five (4%) mothers had no record of the condition of amniotic fluid during active phase of labour. Meconium-stained amniotic fluid is one of the determinants of foetal distress in vertex presentation. This is supported by Saugstad (2011:252) who found that it is one of the labour complications and it increases the risk for neonatal death 10 times.

4.5.19 Progress of labour monitored in active phase of labour (n=120)

Progress of labour was monitored at regular intervals for 30 (25%) mothers and infrequently for 38 (32%) mothers. Almost 22 (18%) mothers were not monitored for their progress of labour.

Table 4.36   Progress of labour monitored (n=120)

Progress of labour monitored	Frequency	Percentage
Regularly	30	25
Infrequent	38	32
Not recorded	22	18
Not applicable	30	25
Total	**120**	**100**

4.5.20 Contractions monitored hourly in active phase of labour (n=120)

Majority of the mothers 31 (26%) had mild contractions and moderate contractions were recorded for 12 (10%) mothers. Strong contractions were recorded for 12 (10%) mothers while for 35 (29%) mothers, contractions were not recorded.

4.5.21 Level of presenting part monitored in active phase of labour (n=120)

The level of the presenting part was at -1 for 11 (9%) mothers, 0 station for 20 (16%) mothers and +1 station for 21 (18%) mothers. The level of the presenting part was at +2 for 14 (12%) and not recorded for 24 (20%) mothers.

Table 4.37   Level of presenting part (n=120)

Level of presenting part	Frequency	Percentage
-1 station	11	9
0 station	20	16
+1 station	21	18
+2 station	14	12
Not recorded	24	20
Not applicable	30	25
Total	**120**	**100**

4.5.22   Cervical dilatation monitored 2 hourly in active phase of labour (n=120)

Almost 19 (16%) of the primigravidas were dilating at 1 cm per hour and 2 cm per hour 24 (20%) for the multiparas women. A total of 18 (15%) mothers were dilating less than the normal ranges and 9 (7%) dilated more than the normal ranges. However, 20 (17%) of the mothers had no record of cervical dilatation.

Table 4.38   Cervical dilatation 2 hourly (n=120)

Cervical dilatation 2 hourly	Frequency	Percentage
1 cm per hour in primigravida	19	16
2 cm per hour in multipara	24	20
Less than above	18	15
More than above	9	7
Not recorded	20	17
Not applicable	30	25
Total	**120**	**100**

4.5.23   Caput and moulding recorded 2 hourly in active phase of labour (n=120)

Figure 4.26 shows the presence of caput and moulding recorded in the active phase of labour. Caput was present in 11 (9%) and absent in 59 (49%) of the mothers in labour. But there was no record of caput in 20 (17%) mothers.

Moulding was present in 3 (3%) mothers and absent in 63 (52%) of the mothers. Moulding was not recorded for 24 (20%) mothers in active phase of labour.
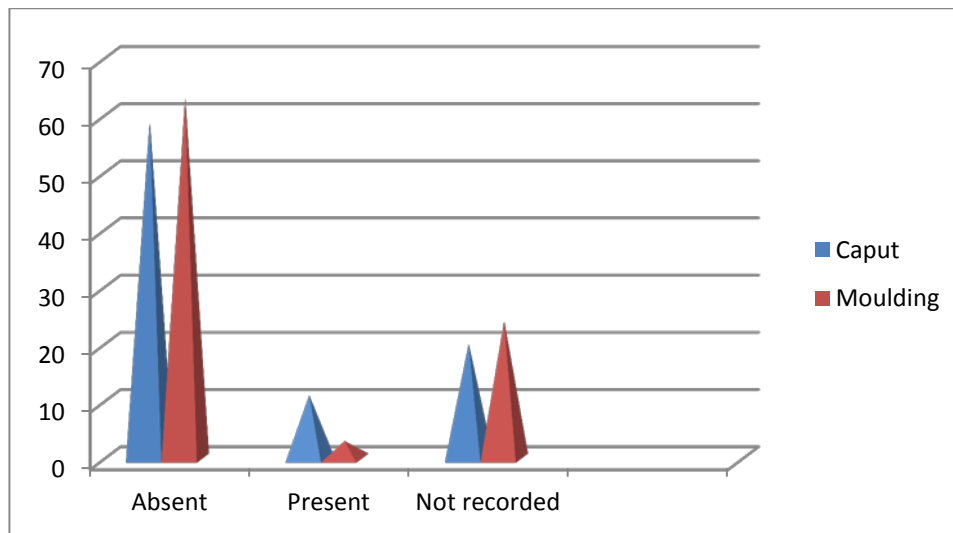
Figure 4.26   Caput and moulding recorded during labour (n=120)

4.5.24   Identified problems recorded in labour (n=120)

Figure 4.27 shows that the majority of mothers 32 (27%) had foetal distress during labour. Maternal exhaustion was detected in 18 (15%) mothers, mal-presentations in 4 (3%), cephalo-pelvic disproportion 4 (3%) and bleeding was observed in 3 (3%) mothers. Premature rupture of membranes was observed in 5 (4%) mothers and a total of 24 (20%) had no record of problems identified during labour.
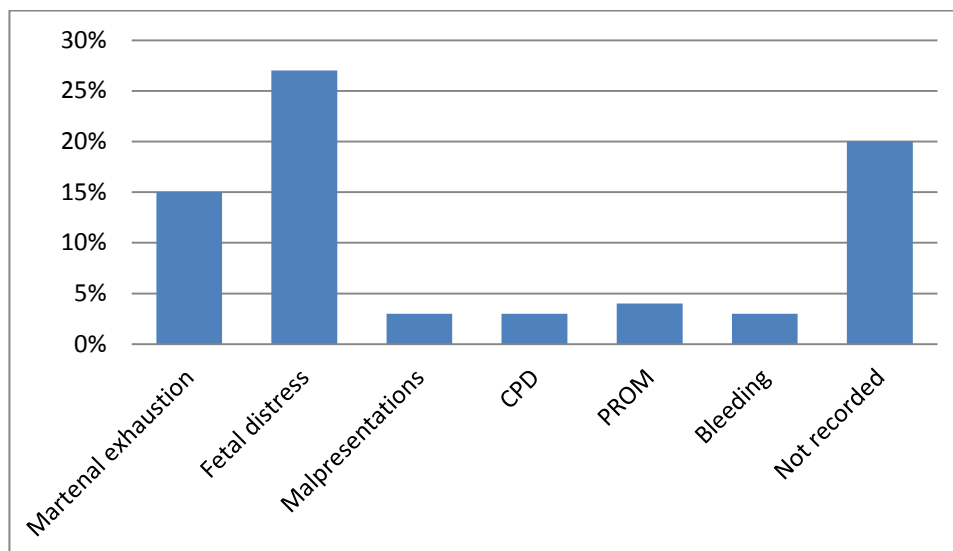
Figure 4.27   Problems identified during labour (n=120)

4.5.25 Proposed management (n=120)

Table 4.39 shows that 44 (37%) of the mothers were referred to the doctor for further management, 28 (23%) mothers were not referred and for 18 (15%) no record was found if they were referred.

Table 4.39   Proposed management (n=120)

Proposed management	Frequency	Percentage
Referred	44	37
Not referred	28	23
Not recorded	18	15
Not applicable	30	25
Total	**120**	**100**

4.6   SECTION E: MANAGEMENT OF SECOND STAGE OF LABOUR

This section addresses the delivery of the baby, assessment of the baby's Apgar score and the measures taken to resuscitate the baby. The baby's birth weight and drugs given were also analysed after delivery.

4.6.1 Method of delivery (n=120)

Figure 4.28 below shows that 90(75%) had normal vaginal delivery and 30 (25%) of the mothers had an assisted delivery. In a study done on the effect of prolonged second stage of labour on maternal and neonatal outcomes, delivery mode had no effect on neonatal outcomes (Li et al 2011:411).
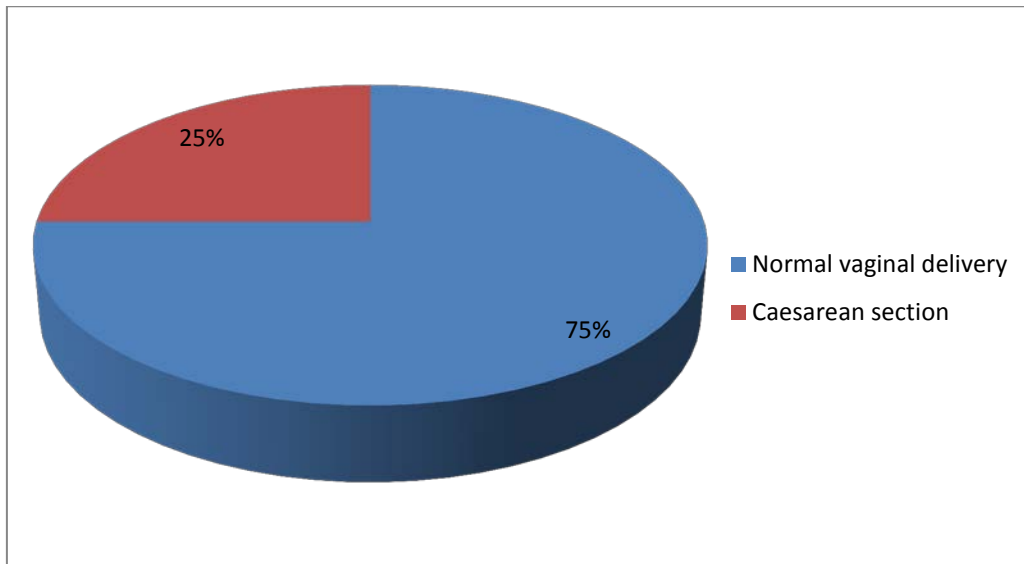
Figure 4.28   Method of delivery (n=120)

4.6.2 Complications during delivery (n=120)

Almost 35 (29%) mothers had complications and 89 (71%) mothers had no complications during delivery. Cephalopelvic disproportion was found in 4 (3%) mothers, asphyxia 6 (5%) and premature rupture of membranes for 10 (8%) mothers. Meconium stained liquor was observed for 3(3%) mothers, preterm labour 1(1%) and postpartum haemorrhage for 11 (9%) mothers. According to Li et al (2011:411) prolonged second stage of labour will increase the incidence of perineal laceration, and postpartum haemorrhage. Maternal age and parity contributed to obstetric complications such as caesarean section and instrumental deliveries and corresponding poor neonatal outcome (Nkwabong et al 2011:4)

Table 4.40   Complications during delivery (n=120)

Complications	Frequency	Percentage
Yes	35	29
No	85	71
Total	**120**	**100**
Type of complications	**Frequency**	**Percentage**
CPD	4	3
Asphyxia	6	5
Prom	10	8
PPH	11	9
MSL	3	3
Preterm labour	1	1
Not applicable	85	71
Total	**120**	**100**

4.6.3 Apgar scoring in one minute and five minutes (n=120)

Table 4.41 shows that 16 (13%) of the babies had an Apgar score below 3/10 at birth in one minute and 32 (27%) had an Apgar score below 7/10 while 3 (3%) of the babies had no record of their Apgar score at birth in one minute. In a study done in China, Apgar scored at one minute and can increase the incidence of asphyxia at birth (Li, Zhang, Ling & Jin 2011:410).

Table 4.41   Apgar scoring in one minute and five minutes (n=120)

Apgar scoring	Frequency	Percentage
<3/10	16	13
3/10-6/10	32	27
>7/10	69	57
Not recorded	3	3
Total	**120**	**100**

4.6.4 Resuscitation needed (n=120)

Table 4.42 shows that 63 (52%) babies were resuscitated at birth. According to Velaphi et al (2012:69), neonatal stimulation at birth by wiping the baby and keeping him warm reduces intra-partum related neonatal deaths by one third. Provision of resuscitation equipment and training of health care providers reduces neonatal deaths.

Table 4.42   Resuscitation needed (n=120)

Resuscitation needed	Frequency	Percentage
Yes	63	52
No	49	41
Not recorded	8	7
Total	**120**	**100**

4.6.5 Steps taken to resuscitate the baby (n=120)

Table 4.43 shows that a total of 38 (32%) babies were resuscitated by suctioning, bag and mask 39 (32%), 7 (6%) babies were suctioned and intubated. According to Lee et al (2011:23), neonatal resuscitation training in facilities reduces intra-partum related

deaths as the majority of babies only need immediate assessment at birth and simple new-born care.

Table 4.43   Steps taken to resuscitate the baby (n=120)

Resuscitate	Frequency	Percentage
Suctioning	38	32
Suction, bag and mask	39	32
Suction and intubate	7	6
Not recorded	8	7
Not applicable	28	23
Total	**120**	**100**

4.6.6 Duration of resuscitation (n=120)

The findings in this study on table 4.44 shows that a total of 40 (33%) were resuscitated for 5-10 minutes and 20 (17%) resuscitated for more than 10 minutes despite simple stimulation. According to Velaphi et al (2012:69), about (5-10%) of new-borns need some assistance with breathing and only a percentage require extensive resuscitation?

Table 4.44   Duration of resuscitation (n=120)

Resuscitation	Frequency	Percentage
<5 minutes	23	19
5-10 minutes	40	33
>10 minutes	20	17
Not recorded	9	8
Not applicable	28	23
Total	**120**	**100**

4.6.7 Prophylactic drugs given (n=120)

Konakion was administered to 45 (35%) babies and eye ointment 61 (51%) as prophylaxis. Only 1 (1%) got nevirapine and AZT was administered to 2 (2%) babies as prophylaxis for HIV. According to the PMTCT guidelines antiretroviral prophylaxis should be administered to all babies born to HIV positive mothers soon after birth (DoH 2010:20).

Table 4.45   Prophylactic drugs given (n=120)

Prophylactic drugs	Frequency	Percentage
Konakion	45	35
Eye ointment	61	51
Nevirapine	1	1
AZT	2	2
Not recorded	11	9
Total	**120**	**100**

4.6.8 Congenital abnormalities present (n=120)

Table 4.46 shows that 14 (12%) of the babies had congenital abnormalities at birth. In a study done in Dili, East Timor it found that congenital malformations were associated with the highest risk of death (Bucens et al 2013:3).

Table 4.46   Congenital abnormalities present (n=120)

Congenital abnormalities	Frequency	Percentage
Yes	14	12
No	106	88
Total	**120**	**100**

4.6.9 Baby's weight at birth (n=120)

From table 4.47 on the babies' weight at birth 39 (33%) were extreme low birth weight and 24 (20%) also weighed less than 2000 grams. Almost 16 (13%) babies weighed 2000 grams and 2400 grams and the birth weight for 41 (34%) was normal. Prematurity was found to be the common condition amongst these neonates. According to Lawn, Wilczyska and Cousens (2006:711), prematurity and its complications was one of the global predictors to neonatal morbidity and mortality.

Table 4.47   Baby's weight at birth (n=120)

Baby's weight	Frequency	Percentage
1000 g-1499 g	39	33
1500 g-1999 g	24	20
2000 g-2400 g	16	13
>2500 g	41	34
Total	**120**	**100**

4.6.10   Duration of labour (n=120)

Table 4.48 shows that the duration of labour was less than 4 hours for 36 (30%) of the mothers. The duration of labour was prolonged for 13 (11%) of the mothers. According to Li et al (2011:411), prolonged second stage of labour can decrease the Apgar score scale in one minute and increase the incidence of asphyxia at birth.

Table 4.48   Duration of labour (n=120)

Duration of labour	Frequency	Percentage
<4hours	36	30
2-5 hours	35	29
11-18hours	36	30
>18hours	13	11
Total	**120**	**100**

4.6.11   Blood loss (n=120)

Majority of the mothers 56 (47%) had a blood loss of 155 ml-490 cubic millimeters. In addition, 42 (35%) mothers had a blood loss below 150 cubic millimeters and for 5 (4%) mothers their blood loss was above 500 ml. However, for 17 (14%) mothers the blood loss was not recorded. According to Li et al (2011:411) in their study on the effect of prolonged second stage on maternal and neonatal outcomes, the delivery mode was the single effective factor that determined the amount of blood loss after delivery.

4.6.12   Condition of placenta (n=120)

The placenta was complete for 116 (96%) deliveries and incomplete for 2 (2%) deliveries. For 2 deliveries (2%), there was no record of the condition of the placenta.

4.7   SECTION F: NEONATAL CARE

Neonatal care involves the care given to the newborn baby when admitted in the Neonatal Intensive Care Unit. The reasons for admission, perinatal risk factors and the number of days stayed in the unit are described below.

4.7.1   Age on admission (n=120)

Majority of babies 90 (75%) were admitted within the first 6 hours of their life. Half of the babies 25 (21%) were admitted within 6-24 hours of their life. Five (4%) of the babies were admitted over 7 days of their life. The findings of this study are the same to the one done in East Timor hospital whereby the majority 1051 (45.9%) of the babies were admitted within the first 24 hours life (Bucens et al 2013:3).

4.7.2   Reason for admission (n=120)

The common reason for admission was prematurity with 52 (43%) babies. Birth asphyxia accounted for 48 (40%) babies. Neonatal infection was found to be the reason for admission in 15 (13%) babies. In addition, 4 (3%) of the babies were admitted with congenital abnormalities and jaundice while 1 (1%) was admitted for gestational diabetes mellitus. In the study done in East Timor neonate hospital, the common reason for admission was infection 868 (38%), followed by respiratory disease 449 (22%), asphyxia 282 (12%) and prematurity 242 (11%). The findings differ with those of this study as most of the deliveries happened at home (Bucens et al 2013:4).

4.7.3   Problems identified on admission (n=120)

Respiratory distress accounted for 92 (77%) babies who were admitted in the Neonatal Unit. Furthermore, 16 (13%) babies had signs of infection, vomiting, jaundiced and being hypothermic on admission. Moreover, 4 (3%) babies had a problem of failure to suck while 4 (3%) had convulsions. Two babies (2%) had signs of shock and other 2 (2%) had hypoglycaemia. In a study done by Mmbaga et al (2011:8), the majority of babies were admitted in the Neonatal Unit with respiratory distress with low Apgar score below 7,442 (91.9%) and prematurity 1652 (41.5%). In East Timor neonate hospital the common reason for admission was infection followed by respiratory disease, asphyxia and prematurity (Bucens et al 2013:4).

4.7.4 Immediate management of the identified problems (n=120)

Majority of the babies 114 (95%) were referred for immediate management by the medical practitioner as they were diagnosed with respiratory problems at birth. However, 6 (5%) babies were not referred immediately as these babies were referred from other hospitals already managed. The majority of babies needed resuscitation at birth and this might be related to intra-partum asphyxia. The findings are similar to the study done in Bangladesh whereby birth asphyxia accounted for 45% of the total neonatal deaths (Khatun et al 2012:4).

4.7.5 Perinatal risk factors identified (n=120)

The perinatal risk factors were identified on admission for 110 (92%) babies on admission in the Neonatal Unit. However, risk factors were not identified for 9 (7%) babies and for 1 (1%) not recorded. In the study done by Mmbaga et al (2011:7) their findings were Pre-eclampsia 711 (32%), premature rupture of membranes 468 (54.7%) and Caesarean birth 6472 (24%) accounted for transfer of babies to the neonatal unit.

4.7.6 Maternal risk factors (n=120)

Almost 58 (48%) babies were admitted to the Neonatal Unit due to maternal infections. Twenty-two (18%) of the babies were admitted in accordance to the maternal hypertensive disorders. Twenty-four (20%) babies were admitted post caesarean section delivery with respiratory problems. Six (5%) of the babies were large for gestational age and for 10 (8%) babies the maternal risk factors were not identified. The findings of this study are supported by Ezechi and David (2012:7) who gave an overview of the global perinatal mortality that certain maternal health conditions such as hypertension, anaemia, infections (malaria, HIV) predispose to intrauterine growth restriction, low birth weight and perinatal death.

4.7.7 Neonatal risk factors (n=120)

Preterm birth and prematurity are risk factors accounted for 58 (48%) of the total babies admitted in the neonatal unit. Asphyxia was observed in 16 (13%) babies and infections accounted for 10 (8%) of the admissions. According to Ugwu (2012:135-136), study on

pattern of morbidity and mortality in the new-born Special Care Unit a total of babies admitted with different conditions accounted to 228 (35.1%) neonatal sepsis, prematurity 108 (16.4%) and birth asphyxia 116 (24.1%). In East Timor neonate hospital the common reason for admission was infection 868(38%) followed by respiratory disease 499 (22%), asphyxia 282 (12%) and prematurity 242 (11%) (Bucens et al 2013:4).

Table 4.49   Neonatal risk factors (n=120)

Neonatal risk factors	Frequency	Percentage
Meconium stained liquor	16	13
Small for Gestational Age	12	10
Preterm	58	48
Large for Gestational Age	3	3
Post term	3	3
Asphyxia	15	13
Jaundice/Infections	10	8
Abnormalities	3	3
Total	**120**	**100**

4.7.8 Estimated gestational age on admission (n=120)

Majority of babies were preterm 85 (71%) and 32 (27%) were term babies and 3 (2%) were post term. Preterm delivery accounted for 28% of neonatal deaths of babies transferred to the NICU in Northern Tanzania (Mmbaga 2011:7).

4.7.9 Classification of infant according to weight (n=120)

Almost 62 (52%) babies were small for gestational age. In addition, 52 (43%) babies were born at an average weight for their gestational age and 6 (5%) babies were large for their gestational age. Low birth weight contributed to (40%-80%) of neonatal morbidity and mortality. High admissions were also observed amongst babies with birth weight above 4000 grams (Mmbaga 2011:7).

4.7.10   Resuscitation in neonatal unit (n=120)

Majority of babies 107 (82%) needed resuscitation in the Neonatal Unit. These are the babies who were delivered in the labour ward and had to be given surfactant immediately after delivery to enhance lung maturity. A total of 23 (18%) babies were not resuscitated in the Neonatal Unit. According to Velaphi et al (2012:70), majority of babies with respiratory distress syndrome are likely to develop hypoxia and will therefore need supplemental oxygen.

4.7.11   Duration of resuscitation (n=120)

Almost 68 (57%) of the babies were resuscitated for less than 30 minutes and 45 (37%) of the babies needed resuscitation for more than 30 minutes and 7 (6%) had no record of resuscitation in the Neonatal Unit.

4.7.12   Review by medical practitioner and plan of care available (n=120)

Most of the babies 80 (67%) were reviewed by the medical practitioner every 4 hours. In addition, 29 (24%) babies were seen by the doctor at six hour intervals while 11 (9%) babies were reviewed by the medical practitioner daily.

4.7.13   Management and monitoring the baby (n=120)

Management of the baby included the administration of oxygen therapy, medications, temperature recordings, monitoring intake and output at hourly, 3 hourly and 6 hourly intervals.

- **Vital signs recordings**

Hourly vital signs were done to almost 96 (80%) of the babies admitted in the unit. Three hourly observations were performed to a total of 18 (15%) and 6 (5%) of the babies had their vital signs monitored six hourly.

- **Oxygen therapy**

Oxygen therapy was administered to 96 (73%) babies on admission in the Neonatal Unit. However, 35 (27%) babies did not receive oxygen therapy on admission in the Neonatal Unit.

- **Intake and output monitoring**

Almost all the babies are given intravenous fluids on hourly basis 74 (62%), three hourly 43 (36%), six hourly 3 (3%). This includes the total fluids required for the baby according to his age and birth weight.

- **Medications**

Medications were administered to all the babies on admission. These included the antibiotics and supplements until the babies are discharged. The medications are administered as immediate doses, three hourly six hourly and on daily basis.
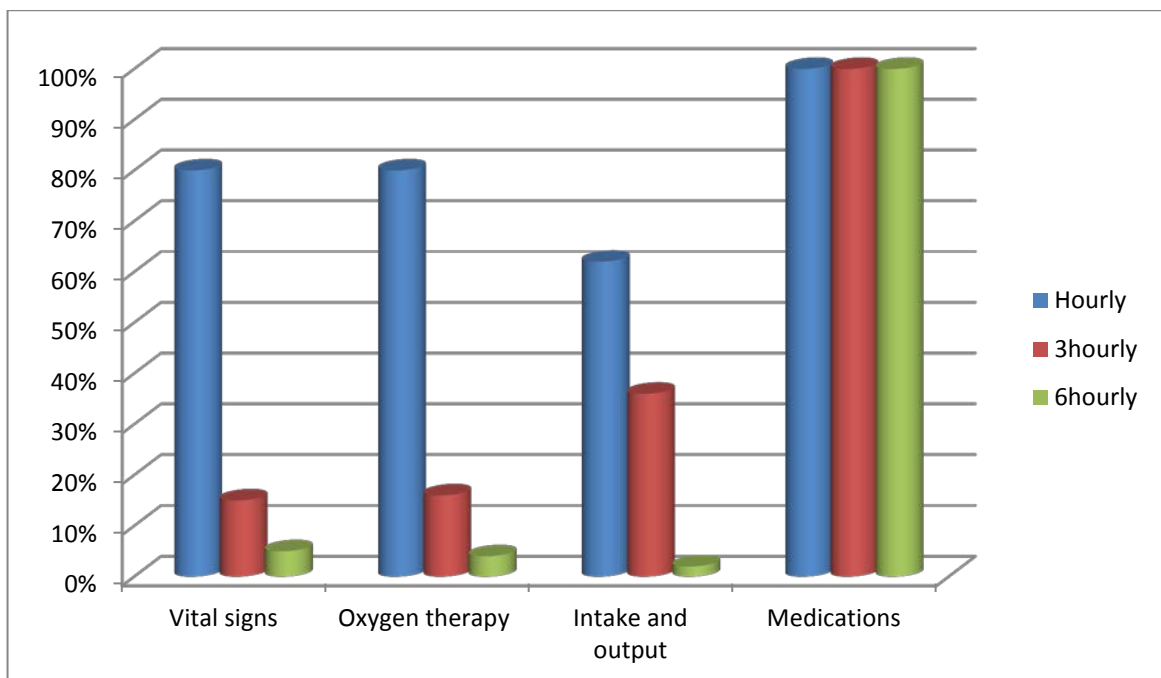
Figure 4.29   Management and monitoring of the baby (n=120)

4.7.14 Primary cause of the baby's death (n=120)

Spontaneous preterm and immaturity accounted for 16 (13%) deaths. The findings of the study correlate with the perinatal mortality report for 2008-2010 in KwaZulu-Natal. Fifty-four (54%) of the final causes of neonatal deaths was accounted by immaturity and preterm births in KwaZulu-Natal. The second cause of neonatal death was hypoxia (DoH 2011:142). In this study, intra partum asphyxia accounted for 5 (4%) deaths. The findings correlate with the study done in one tertiary institution in Johannesburg whereby perinatal; asphyxia accounted for 4.7% per 1000 live births (Padayachee & Ballot 2013:89-93). One baby (1%) had foetal abnormality at birth. Four (4%) babies died of neonatal infections. Two (2%) babies died of intrauterine growth retardation.

4.7.15 Number of days in Neonatal Unit on discharge or death (n=120)

Majority of the babies 63 (53%) stayed in the unit for less than seven days. A total of 46 (38%) babies stayed for less than a month and 11 (9%) babies stayed for more than a month in the unit. In a study done on the causes of neonatal and maternal deaths, the majority of neonatal deaths occurred during 0-7 days (Khatun et al 2012:4). According to Bucens et al (2013:3), majority of babies stayed for less than 7 days in the Neonatal Unit.

4.8 CONCLUSION

In this chapter, analysed data were presented in graphs and tables. Discussions and reference to other studies were also made in relation to the findings of this study.

Chapter 5 will give the summary and recommendations of the study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1   INTRODUCTION

This chapter presents a discussion of the research design and method, a summary and research findings related to the predictors to the high neonatal mortality and morbidity. Evidence from previous research will be examined and compared with the findings of this study. Conclusions will be drawn regarding the significance of the study and recommendations for further research.

5.2   RESEARCH DESIGN AND METHOD

The non-experimental, quantitative and retrospective approach was used to determine the factors that contributed to high neonatal morbidity and mortality rate in Limpopo Province. The study population included the babies admitted in the Neonatal Unit with problems after birth. Systematic random sampling was used to determine the study population. The total of (n=120) records of mothers and the babies were randomly selected from the admission register in the Neonatal unit. An audit tool was used to collect data on care of the mother during pregnancy, labour, delivery and the babies admitted in the Neonatal Unit. Data were collected by the researcher alone to ensure privacy and confidentiality. Analysis and interpretation of data were presented in frequency tables and graphs. The findings of the study are only   generalised to one tertiary institution in Limpopo Province.

5.3   SUMMARY AND INTERPRETATION OF THE   RESEARCH   FINDINGS

5.3.1 Section A: First antenatal visit

This section summarises the age distribution, booking status, previous obstetric, medical and family history of the mother. This included physical examination and investigations done on the first antenatal visit. This will enable the health care worker to identify the risk factors in the present pregnancy and manage the woman appropriately.

5.3.1.1 Previous obstetric history

Age distribution

Almost 51 (42%) of the mother's age ranged between 25-35 years and 27 (23%) between 22-24 years for those babies who were admitted in the Neonatal Unit. For 34 (28%) mothers their age ranged between 16 and 21 years. Advanced maternal age (35 years and above) was noted in 8 (7%) of the mothers. The majority of the mothers whose babies were admitted in the NICU were of child bearing age.

Booking status

The majority of mothers (97%) were booked and (3%) were not booked. Almost (75%) attended clinic locally and (15%) attended clinic at the hospital. This showed that most of the mothers were examined at the antenatal clinic and relevant investigations done to exclude any problems.

Parity

Half of the mothers (50%) were primigravidas and 16 (13%) of them gave birth to preterm babies with respiratory distress. In addition, 18 (15%) of the mothers had five pregnancies and above.

History of perinatal death

Ten (8%) of the mothers had a history perinatal death in their previous pregnancies. Nine mothers (8%) had abortion in their previous pregnancy at 24 weeks of gestation and below. Two mothers (2%) had stillbirth in their previous pregnancy and only 2 (2%) experienced neonatal death within the first 7 days.

Complications in the previous pregnancy

Twenty (17%) of the mothers had complications in their previous pregnancy. Hypertensive disorder 5 (4%) and gestational diabetes mellitus 1 (1%) was found to account in mothers whose babies were admitted in the Neonatal Unit. These findings predict that most of the pregnant mothers were identified early during the antenatal period and managed appropriately. One mother had a history of tuberculosis and 12 (10%) of the mothers had a history of surgery. Assisted delivery accounted for 3 (2%) and obstetric haemorrhage 1 (1%).

History of medical conditions

The majority of the mothers had a history of diabetes mellitus 7 (6%) and 11 (9%) hypertensive diseases. Respiratory disease was found in 1 (1%) mother and 2 (2%) reported allergy. Family history of medical conditions was reported in 24 (20%) and the common conditions were gestational diabetes mellitus 7 (6%) and hypertension 11 (9%).

Surgical history

The majority of mothers underwent an obstetrical surgery 9 (7%) and 2 (2%) had a general surgery in their previous pregnancy.

Prematurity was identified as the common problem in 6 (5%) of the babies for admission especially in mothers of advanced aged 35 years and above. Primigravidas 16 (13%) also gave birth to preterm babies with respiratory problems.

There was a high association to the mothers who attended antenatal care at the clinic to the high neonatal morbidity, as 90 (75%) of them delivered at the hospital.

5.3.1.2   Present obstetric history

Gestational age at initial ANC visit

The majority of mothers 85 (71%) started antenatal care during the second trimester and only 6 (5%) of them booked early, no record was found for 3 (3%) mothers on their gestational age on initial ANC visit.

First foetal movements

Eighty eight (73%) mothers experienced foetal movements at 20 to 24 weeks of gestation. This is the time that mothers seek medical attention during the second trimester. For 5 (4%) mothers there was no record of when foetal movements were felt.

According to the maternity care guidelines and BANC protocols, women are expected to seek medical attention immediately after missing her first period. The findings in the study is that late booking was noted in 84 (72%) of the mothers as they seek medical attention during the second trimester of pregnancy.

Sonar done for baseline data

Sonar was done for 24 (20%) mothers during antenatal care. The findings of this study tally with the guidelines on maternal health care where sonar is only done to those mothers who are not sure of their dates or are at high risk with pregnancy complications, for example, pregnancy induced hypertension.

Physical examination

According to the BANC protocols all pregnant woman should be examined on their initial visit at the antenatal clinic in order to identify women at risk and manage them accordingly. The height and weight of the mothers was measured for half (50%) of the mothers in this study. Nineteen (16%) of the mother's height measured below 150 cm and this is a risk factor for cephalo-pelvic disproportion. The height of 60 (50%) mothers was not measured on their first antenatal visit. Half (50%) of the mothers weighed between 51 kg and 70 kg and 12 (10%) had a weight record below 50 kg on their first antenatal visit.

Poor recording was identified as an omission on the first antenatal visit as half of the women did not have their weight and height measured in the initial antenatal visit. According to the Maternity Guidelines of South Africa (2007b:20), full examination of the pregnant woman should be done on initial visit as a baseline data for the client on subsequent visits. There was a strong association of low birth weight in mothers who weighed between 51 and 70 kg and to those mothers who weighed below 50 kg on their first antenatal visit.

Blood pressure measurements at first antenatal visit

Sixteen (13%) mothers had a slightly elevated blood pressure of above 140/90 mmHg. The blood pressure was not recorded for 33 (28%) mothers at their first antenatal visit. This is a risk as pregnancy-induced hypertension is one of the causes of maternal deaths due to inadequate care during pregnancy (WHO 2014). Monitoring the blood pressure will assist in early identification of women at risk and immediate intervention. Low-birth weight 53 (44%) was observed in mothers with a slightly elevated blood pressure of 140/90 mmHg.

Heart and respiratory rate was normal for the majority of the women (>90%). Tachypnoea was noted in one mother and (3%) had a pulse rate above 100 beats per minute.

Urine analysis

Almost 83 (69 %) of the mothers had their urine tested on initial antenatal visit and (31%) of the mothers urinalysis was not done. Proteinuria 10 (8%) and glucose 2 (2%) were detected in 12 (10%) of the urine specimens. However, 37 (31%) of the mothers did have their urine tested on initial antenatal visit. Proteinuria is considered to be one of the markers for poor pregnancy outcome and in turn risk for neonatal morbidity and mortality (Ferrazzani et al 2011:447).

Colour of mucous membranes

Pallor was noted in 15 (13%) mothers and 101 (84%) of them had normal mucous membranes. The presence of pallor in pregnant women signifies anaemia and this might put the foetus at risk of intrauterine growth restriction.

Examination of abdomen

Majority of the mothers 104 (86%) had a normal abdomen. Tenderness was noted in 1 (1%) mother and mass was found in 8 (7%) mothers.

Symphysis fundal measurement

Fundal height measurement ranged between the 10th and 90th percentile in 95 (79%) of the mothers. A total of 11 (9%) of the mothers had their symphysis fundal measurements ranging above the 90th percentile and (3%) had the range below the 10th percentile. Symphysis fundal height measurement helps in identifying intrauterine growth restriction and foetal macrosomia.

Presence of oedema and site

Oedema was present in 8 (7%) of the mothers and 14 (12%) had no record of presence of oedema. The common site of oedema was noted on the face and legs in 9 (8%) mothers. Presence of oedema especially of the face and lower limbs is common in pregnant women with pregnancy induced hypertension.

5.3.1.3   Investigations

RPR and VDRL results

The majority of mothers 101 (84%) in this study tested negative for rapid plasma regain. Six (5%) of the mothers tested positive for rapid plasma regain while 13 (11%) of the mothers did not have record of the VDRL results. Almost all mothers who tested positive for RPR were treated fully.

Rhesus factor

The Rhesus factor results were positive for 103 (86%) mothers. Four mothers were rhesus negative and 13 (11%) of them had no record of the Rhesus factor.

Haemoglobin checked and level

Majority of the mothers 44 (37%) had a normal haemoglobin level of 12 g/dl to 18 g/dl at their first antenatal visit. A total of 14 (12%) women who were anaemic (haemoglobin level below 10 g/dl) at their first antenatal visit delivered infants with low birth weight 9 (64%). Anaemia in many studies is found to be contributory to low birth weight babies.

HIV coding

Mothers were coded HIV positive 36 (30%) on their antenatal cards and 79 (66%) mothers were coded HIV negative. The findings in this study on HIV testing and counselling were satisfactory. This showed that the health care providers tried their level best to give information on HIV testing and counselling on first contact with the client.

According to the Prevention of mother to child transmission (PMTCT) clinical guidelines all mothers who tested HIV positive during pregnancy should be started with anti-retroviral treatment (ART). In this study those mothers who tested HIV positive 36 (30%) during antenatal visit, majority of them were on anti-retro-viral treatment (ART). Three (8%) were on mono therapy and 1 (3%) was treated with dual therapy.

Supplements and vaccines given

Majority of the women were given supplements 107 (89%) of iron and ferrous sulphate at their first antenatal visit. The findings of a study done by Zerfu and Ayele (2013:2) were that prenatal supplementation with iron daily are effective to reduce the risk of low birth weight and maternal anaemia and calcium supplementation is associated with significant protective benefit in the prevention of pre-eclampsia and improving the mean infant birth weight. In this study two doses of tetanus toxoid vaccine were administered to 89 (74%) mothers. This helps in the reduction and elimination of tetanus during the neonatal and infancy period.

Antenatal follow up and delivery plan

Majority of the mothers 82 (69%) attended antenatal follow-up at the local clinic. A total of 28 (23%) mothers attended antenatal care at the district hospital. Six (5%) mothers attended antenatal care at the regional hospital and no record for 4 (3%) mothers. A total of 28 (23%) pregnant mothers were identified as high risk clients and had to attend antenatal clinic at the regional hospital. These are the mothers who are having pregnancy related complications such as PIH and gestational diabetes mellitus.

5.3.2 Section B: Subsequent antenatal visit

Section B discusses number of antenatal visits, foetal movements recorded, blood pressure, pulse, and pallor checked. This includes measurement of symphysis fundal height, urine analysis, haemoglobin levels and HIV tests done on subsequent visits.

Number of antenatal visits

Majority 91 (76%) of mothers visited the clinic more than twice during their pregnancy. Thirteen (11%) mothers attended antenatal clinic once and 16 (13%) attended twice. The findings are acceptable as the report on the coverage of the key maternal interventions by the DoH (2008/9) was (92%) with more than one antenatal visit during their pregnancy. In a study done in Pakistan the majority of asphyxiated babies were born to mothers who attended ANC on irregular basis or have never attended at all.

Foetal movements felt

Majority of the mothers 108 (90%) experienced normal foetal movements. Six mothers (5%) experienced abnormal movements. However, foetal movements were not recorded for 6 (5%) mothers. Normal foetal movements are regarded as one of the determinants of foetal condition. Reduced foetal movements are regarded as a risk factor for intrauterine death especially in the presence of hypertensive disorders.

Blood pressure and pulse checked

The total of 63 (53%) of the mothers had a normal blood pressure at their subsequent antenatal visit. Nineteen (16%) mothers had a slightly elevated blood pressure of above 140/90 mmHg. However, the blood pressure was not recorded for 9 (7%) mothers at their subsequent antenatal visit.

Symphysis fundal height

Majority of the mothers 84 (70%) symphysis fundal height measurement ranged between the 10th and 90th percentile. Fifteen mothers (12%) had their symphysis fundal measurements ranging above the 90th percentile and 2 (2%) had the range below the 10th percentile. Nineteen (16%) mothers had no recordings of the symphysis fundal measurement at their subsequent antenatal visit.

Measurement by palpation

Majority of mothers (77%) were palpated and fundal height measured between 28-38 weeks of gestation. The fundal height measurement ranged below 28 weeks of gestation for (18%) of the mothers.

Pelvic assessment

Pelvic assessment was only done to (4%) of the mothers and for (96%) pelvic assess was not done.

Investigations

Proteinuria and glucose were detected in (10%) specimens of the mothers on subsequent antenatal visits. However, the majority of the mothers (56%) did not have their urine tested. Proteinuria is one of the clinical sign to diagnose pre-eclampsia in pregnancy. Pre-eclampsia increases the risk of perinatal morbidity and mortality and has a negative effect on neonatal outcome (Ferrazzani et al 2011:448).

HIV test was done for 38 (32%) mothers who refused to be tested at the initial visit. Majority of the mothers (49%) tested negative and (29%) tested positive for HIV. Eleven mothers had no record of their HIV status on subsequent antenatal visits.

Haemoglobin test ranged between 10-18 mg/dl for 72 (60%) mothers at 32 weeks of gestation. A total of only 14 (12%) mothers had haemoglobin results at 38 weeks of gestation ranging between 10-18 mg/dl. The majority of mothers 97 (81%) had no record of the haemoglobin levels at 38 weeks of gestation. Poor management of these mothers was observed during antennal care. Lack of documentation and suboptimal documentation of some parameters of pregnant women hinders early detection of complications and prompt referral (Yisma et al 2013:6).

Repeat information of danger signs

Repeat information of danger signs was done for 76 (63%) mothers during subsequent antenatal visit. Forty-four (37%) mothers had no record of repeat information of danger signs of pregnancy.

Review of delivery plan

Delivery plan was reviewed for ninety (75%) mothers on subsequent antenatal visits. The total of 30 (25%) mothers had no record of review of their delivery plan during subsequent antenatal visits.

5.3.3 Section C: Admission in labour

Section C describes the summary findings about initial assessment in labour. This includes the history taken about labour and assessing the woman's general health status. Risk factors are also identified for both the mother and the foetus on admission. Blood investigations on HIV are also performed if they were missed during antenatal visits.

History taken and antenatal risk factors identified

History was recorded and antenatal risk factors identified in 85 (71%) mothers and none observed in 27 (22%) mothers. For 8 (7%) mothers, the risk factors were not identified on admission in labour. According to the Basic antenatal care protocol (BANC), antenatal history should be taken for all mothers on initial visit to the clinic and admission in labour. This will assist the health care worker to detect conditions that were missed during ANC visits (Pattinson 2007:18-20).

HIV testing and coding

HIV testing done for 99 (82%) mothers and were coded on admission in labour. Five (5%) mothers were not coded and a total of 16 (13%) mothers were not tested on admission in labour. Knowing the HIV status of mothers in labour will ensure that midwives take precautionary measures such as avoiding episiotomies, to prevent transmission to the baby during and after delivery (DoH 2010:18-19).

Rupture of membranes and condition of liquor

A total of 70 (58%) mothers had intact membranes on admission. Twenty-seven (23%) mothers had ruptured membranes on admission and 23 (19%) mothers had no record of whether the membranes had ruptured or not. Premature rupture of membranes was found to be amongst the conditions at risk of transfer of the neonates to the NICU In Tanzania (Mmabaga et al 2011:8). Reduced amount of amniotic fluid has a negative effect on the progress of labour and due to lack of fluid wedge the women is at risk of prolonged labour. The woman is also at risk of acquiring infections which can ascend to the uterus. Antibiotics should be given to mothers who experienced early rupture of membranes as a precautionary measure (Velaphi et al 2012:69).

The condition of liquor was clear for 15 (55%) mothers and meconium stained for 1 (4%) mother. Two (7%) mothers had offensive liquor. Nine (33%) mothers had no record of ruptured membranes. Assessing the condition of liquor during labour such as meconium stained liquor, assist the midwife in determining foetal condition and early identification of foetal distress (Velaphi et al 2012:69).

Duration of ruptured membranes

Almost 8 (7%) mothers had membranes ruptured for less than 4 hours. For 6 (5%) mothers, the duration was between 5 and 24 hours. A total of 4 (3%) mothers had membranes ruptured for more than 24 hours. Nine (8 %) mothers had no record of the duration of rupture of membranes. Antibiotics should be given to mothers who experienced prolonged rupture of membranes as a precautionary measure (Velaphi et al 2012:69).

Vital signs monitoring

Vital signs were monitored and recorded for 79 (66%) mothers; they had a normal temperature ranging between 36ºC and 37ºC. Ten (8%) mothers had a temperature recording of below 36ºC while 15 (13%) mothers had an elevated temperature above 37ºC. However, 16 (13%) mothers their temperature was not recorded. Maternal fever during labour is a sign of infection and increases the risk for neonatal about 10 times (Saugstad et al 2011:252).

Blood pressure measurement

Blood pressure measurement for 40 (33%) mothers ranged within normal limits between 100/60-120/80 mmHg. For 22 (18%) mothers the blood pressure was between 121/80-130/90 mmHg. Twenty-nine (24%) mothers had a slightly elevated blood pressure of above 140/90 mmHg. However, blood pressure was not recorded for 29 (24%) mothers on admission in labour. Pregnancy complicated by hypertension is a risk factor of preterm delivery and very low birth weight babies (Ferrazzani et al 2011: 447).

Urinalysis was done for 25 (21%) women and proteinuria was detected in (6%) specimens and urine was not tested on (73%) of them. The presence of protein in urine is one of the clinical sign of diagnosing pre-eclampsia (Ferrazzani et al 2011:448).

Pallor and oedema

Physical examination on pallor and oedema- Oedema was observed on the legs for 25 (21%) mothers and 3 (2%) had oedema of the hands. Majority of the mothers 92 (77%)

had no record of oedema on admission in labour. Pallor was observed in 8 (7%) mothers and 92 (77%) had normal mucous membranes.

Abdominal palpation done and symphysis fundal height measurement

The majority had normal growth rate of their foetuses during pregnancy with a total of 67 (56%) symphysis measurements between the 10th and 90th percentile. Symphysis measurement above 90th percentile in succession can be caused by multiple pregnancy, macrosomia and diabetes mellitus (Pattinson 2007:36).

Abdominal palpation

Abdominal palpation in 28-38 weeks was found in 53 (44%) mothers, 19 (16%) were below 28 weeks and 33 (27%) were above 37 weeks by palpation. No record was found for 15 (13%) mothers on fundal height measurement by palpation. According to the BANC protocols measurement of fundal height by palpation should be done in correlation with measurement by using the measuring tape in centimetres to determine the period of gestation (Pattinson 2007:34-35).

Presentation and position of the foetus

Presentation of the foetus was found to be cephalic in 101 (84%) mothers during admission in labour. Two mothers (2%) had breech presentation and anterior position diagnosed for 100 (83%) mothers. Nevertheless, 17 (14%) mothers had no record of foetal presentation. Malpresentation and breech presentation increases the risk of neonatal death more than 6-fold (Saugstad 2011:253).

Level of presenting part above pelvic brim

The level of the presenting part was at 5/5th for the majority 41 (34%) of the mothers and 24 (20%) mothers had no record of the presenting part. For 55 (46%) mothers, the level of the presenting part was within 4/5th to 2/5th above the pelvic brim.

Foetal heart rate recording

Foetal heart rate ranged between 120 b/m and 160 b/m for 34 (28%) of the mothers. Foetal tachycardia was detected in 32 (27%) of the mothers and foetal heart rate not recorded for 27 (23%) mothers. Foetal heart rate should be monitored continuously during labour for early detection of abnormalities and prompt action (Velaphi et al 2012:69).

Uterine contractions

The mild contractions were recorded in 89 (74%) of the mothers and 11 (9%) of the mothers had moderate uterine contractions on admission in labour. Eight women (7%) had strong contractions on admission in labour.

Estimation of foetal weight

Foetal weight was estimated at below 2499 grams for 31 (26%) mothers and 20 (17%) estimated at 2500 grams and 4000 grams. However, estimation of foetal weight was not done for 65 (55%) mothers. Weight for the foetus was estimated above 4000 grams for 2 (2%) of the mothers.

Pelvic assessment

Pelvic assessment was done to 53 (44%) mothers on admission in labour. Majority of the mothers 42 (35%) had an adequate pelvis. In addition, 9 (8%) mothers had a borderline pelvis and 2 (2%) mothers had an inadequate pelvis. However, 37 (31%) mothers did not have pelvis assessment on admission in labour.

Vaginal examination and cervical dilatation

Vaginal examination was done to 90 (75%) mothers and 30 (25%) mothers were booked for elective Caesarean section.

Majority of the mothers 40 (33%) had a cervical dilatation of below 3cm on admission. Thirty six mothers (30%) had cervical dilatation of 4 cm to 8 cm. Four (3%) mothers

were almost fully dilated on admission. Eleven mothers (9%) had no record of cervical dilatation on admission in labour.

Caput and moulding

Caput and moulding was noted in 3 (3%) of the women in labour. For 24 (20%) of the mothers caput and moulding was not recorded on admission in labour.

Descent of foetal head station was 0 for 30 (25%) mothers, 37 (31%) were at -1 station, 6(5%) at +2 station 3(3%) and no record was found for 14 (12%) on admission in labour.

Position and lie of presenting part

Majority of the mother's foetal lie was found to be longitudinal 94 (78%). In addition, oblique lie was diagnosed for 9 (8%) mothers while17 (14%) mothers had no record of lie of the foetus.

Poor recording of some parameters was found to be common in this study and this hindered early detection of complications and prompt obstetric intervention (Yisma et al 2013:6).

5.3.4 Section D: Intra partum care

Section D describes the summary findings of monitoring labour in both latent and active phase. Labour is monitored for progress, maternal condition and the foetal condition.

Latent and active phase of labour

The use of the partogram

The partogram was used for 80 (67%) mothers in both latent and active phase of labour. However, the partogram was not used for10 (8%) of the mothers and 30 (25%) mothers delivered by Caesarean section. Partogram is a legal document and it also

helps the midwife to monitor the progress of labour. Poor utilization of the partogram implies that there is poor management of women during labour (Yisma et al 2013:6).

Latent phase of labour monitored

Latent phase of labour was monitored for 56 (47%) mothers and monitoring was not done for 21 (18%) mothers. Almost 3 (3%) had no record on latent phase of labour.

Blood pressure monitoring in latent phase of labour

Blood pressure was monitored for 43 (35%) mothers, not monitored for 14 (12%) and infrequently monitored for 19 (16%) mothers during latent phase of labour. Nine mothers had no record of the BP (blood pressure) recordings, 39 (32%) mothers were normotensive, 15 (13%) had a slightly elevated BP 140/90mmHg. Maternal hypertension in pregnancy contributed to negative neonatal outcomes if not managed properly during pregnancy (Ferrazzani et al 2011:447).

Temperature recordings were done 4 hourly for (36%) mothers and infrequently for (16%) mothers in the latent phase of labour.

Foetal heart rate in latent phase of labour

Foetal heart rate was monitored 2 hourly for (23%) mothers and (39%) had infrequent monitoring in the latent phase of labour.

Uterine contractions monitored in the latent phase of labour

Almost 35 (29%) mothers had their uterine contractions monitored, 25 (21%) mothers were monitored infrequently while 15 (12%) had no record of uterine contractions in the latent phase of labour.

Vaginal examination done in the latent phase of labour

Vaginal examination was monitored 4 hourly for 45% mothers and for 7% not monitored. Vaginal examination is done every four hours whereby normal vertex

delivery is expected in order to determine the progress of labour. This is done by assessing dilatation and condition of the cervix. The findings on assessment will assist the midwife act promptly if the maternal and foetal condition is at risk (DoH 2007b:36-37).

Active phase of labour monitored

Active phase was monitored for 38 (32%) mothers and not monitored for 15 (12%) mothers. Infrequent monitoring was observed in 19 (16%) mothers and no record was found for 18 (15%) of the mothers in labour. Maternal condition and foetal condition together with the progress of labour is monitored every 30minutes in the active phase of labour. Poor monitoring can lead to intrapartum related birth asphyxia and increase neonatal morbidity and mortality (Velaphi & Rhoda 2012:76-71).

Blood pressure monitoring in active phase of labour

The total of 49% of the mothers had their blood pressure monitored during the active phase of labour. The blood pressure was not recorded for 26% mothers during the active phase of labour.

The temperature was only monitored for 60% mothers in the active phase of labour. The majority of mothers had their temperature ranging between 36-37ºC pyrexia >37ºC was observed in 30 (25%) mothers.

Foetal heart rate in active phase of labour

For 26 (22%) of the mothers the foetal heart rate was not monitored frequently in the active phase of labour. Foetal tachycardia (>160 b/m) was found in 12 (10%) mothers and foetal heart rate was not recorded in 28 (23%). Poor monitoring and recording of foetal heart rate during active labour is a risk for foetal distress and early neonatal death. The findings of the study are the same for the study done in Kenya, where foetal heart rate was not documented at all for 15% of the women in labour (USAID East Africa: Midwives' Research Network). Cardiotocograph machine was not used for 77(64%) of the mothers in the active phase of labour. Foetal heart rate monitored during

labour and proper management of asphyxiated babies at birth could reduce intra-partum related deaths (Velaphi et al 2012:70).

Uterine contractions monitored in the active phase of labour

Almost 31 (26%) mothers had their uterine contractions monitored as mild, 12 (10%) mothers had moderate contractions and 12 (10%) had strong contractions when admitted in labour. Almost 35 (29%) had no record of uterine contractions in the active phase of labour.

Cervical dilatation monitored in the active phase of labour

Cervical dilatation was monitored 2 hourly for 65 (54%) mothers and for 15 (12.5%) not monitored. Cervical dilatation for 19 (16%) primigravidas dilated at 1cm per hour and for multiparas women 24 (20%) dilated at 2cm per hour during the active phase of labour. Cervical dilatation was not recorded for 15 (12.5%) of the mothers in the active phase of labour.

Progress of labour

Progress of labour was monitored regularly for 30 (25%) mothers and infrequently for 38 (32%) mothers while 22 (18%) had no record of progress of labour. Monitoring of progress of labour with the use of a partogram will assist in early identifications of abnormalities and immediate action taken to correct the situation (Dippenaar & da Serra 2012:338).

Level of presenting part

Level of presenting part was not monitored for 24% of the mothers in active phase of labour. Majority of the mothers 39% had the level of the presenting part at 0 Station during the active phase of labour. Assessment of the level of the presenting parts helps with the diagnosis of obstructed labour for early intervention.

Caput and moulding

Caput and moulding was not present in 60% of the mothers in labour. Moreover, there was no record of caput or moulding in 31% of the mothers in active phase of labour. The findings of the study done in Kenya moulding were not recorded for 71% of the women in labour (USAID East Africa: Midwife's Research Network).

Conditions of membranes during active phase of labour

Membranes were ruptured for 58 (48%) during active phase of labour. In addition, 29 (50%) mothers drained clear liquor, 10 (17%) had meconium stained, and 7 (12%) drained offensive liquor 12 (21%). Meconium stained fluid is one of the determinants of foetal distress in vertex presentation and this is supported by Saugstad (2011:252) that it is one of the labour complications and increases the risk for neonatal death 10 times.

Urine analysis

Urine analysis was recorded for 21 (26%) mothers and was not done for 59 (74%) mothers in active phase of labour. There was a total of 7 (9%) specimens with protein and 4 (5%) with glucose. Urinalysis was not done for 59 (74%) mothers during active phase of labour. Poor management was observed during active phase of labour and a risk to obstetric complications.

Treatments given

Treatments given included intravenous infusion for 14 (18%) mothers and antibiotics for 5 (6%) mothers. Sedatives (7%) and antihypertensive drugs were administered to 13 (11%) mothers during active phase of labour. Oxytocin was only administered to 2 (2%) of the mothers. According to the maternity guidelines pain relief should be offered to all women in labour. This will ensure physical comfort of the woman and allay anxiety during labour (DoH2007b:36-37).

Common problems identified

Maternal exhaustion 18 (15%) and foetal distress 32 (27%) were the common problems identified and premature rupture of membranes was noted in 3 (4%) of the mothers. No record of problems were identified for 24 (20%) of the mothers. Intrapartum hypoxia was found to be one of the factors identified as probably avoidable in neonatal deaths. This can be achieved by proper monitoring and prompt action in the presence of foetal distress (Velaphi et al 2012:68).

Proposed management referred was at 44 (37%) and not referred amounted to 27 (23%). Almost 19 (15%) of the mothers had no record of the proposed management during the active phase of labour.

5.3.5 Section E: Management of the second stage of labour

Section E summarises the method of delivery and complications that occurred during the second stage of labour. The Apgar score, resuscitation measures taken and the birth weight of the new-born baby are summarised. Included are the duration of labour and the prophylactic drugs given after delivery, blood loss and the condition of the placenta after delivery.

Majority of the mothers 80 (75%) had normal vertex delivery and 30 (25%) delivered by Caesarean section.

Complications during delivery

Complications during delivery accounted for 35 (29%) of the mothers. Premature rupture of membranes 10 (8%), post-partum haemorrhage 11 (9%) and 6 (5%) were the common complications.

Apgar scoring in one minute and five minutes

Majority of the babies 32 (27%) had an Apgar score of 3/10-6/10 and resuscitation was needed for 63 (52%) babies. Suctioning and bagging was done to 39 (32%) of the

babies at birth. Six babies (5%) were intubated immediately at birth with severe respiratory failure.

Resuscitation needed at birth and duration

Majority of the babies 40 (33%) were resuscitated within five to ten minutes while 20 (17%) babies were resuscitated for more than ten minutes at birth. According to Velaphi et al (2012:69) about (5-10%) of newborns need some assistance with breathing by simple stimulation and only (1%) require extensive resuscitation.

Prophylactic drugs given

Konakion and Chloromycetin eye ointment were common prophylactic drugs administered. These were administered to103 (86%) of the babies admitted in the Neonatal Unit.

The baby's birth weight

The majority of the babies 63 (53%) were underweight at 1000 grams to 1999 grams. The birth weight was above 2500 grams for 41 (34%) babies who were admitted in the neonatal unit during January 2012 to December 2012.

Congenital abnormalities was present in 14 (12%) of the babies delivered to this mothers.

Duration of labour

Duration of labour was below 4 hours for 30% and was above 18 hours for 11% mothers. The duration of labour ranged between 4 hours and 18 hours for a total of 71(59%) mothers.

In the third stage of labour, the blood loss was normal for 98 (82%) mothers. In addition, 42 (35%) mothers had a blood loss below 150 millilitres and for five (4%) mothers their blood loss was above 500 millilitres. However, blood loss was not recorded for 17 (14%) mothers.

The placenta was complete for 116 (96%) deliveries and incomplete for two (2%) deliveries. For two deliveries (2%), there was no record of the condition of the placenta.

5.3.6 Section F: Neonatal care

Section F describes the care given to the neonate on admission in the Neonatal Unit until discharge.

Age on admission

Majority 90 (75%) of the babies were admitted within the first six hours of their life and 5 (4%) were admitted after seven days of their life.

Reason for admission

The majority of the babies' reason for admission was prematurity 52 (43%) and birth asphyxia 48 (40%).These babies had respiratory distress 92 (77%) and signs of infection 16 (13%) on admission in the neonatal unit.

Majority of the babies 114 (95%) were managed immediately after birth as they were born within the institution and 6 (5%) of the babies were referrals from other hospitals and were managed prior to being transferred to the tertiary institution.

Further perinatal risk factors identified were identified on admission for 110 (92%) babies on admission in the Neonatal Unit.

Almost 58 (48%) babies were admitted to the Neonatal Unit due to maternal infections. Twenty-two (18%) of the babies were admitted in accordance to the maternal hypertensive disorders. Twenty-four (20%) babies were admitted post Caesarean section delivery with respiratory problems.

Neonatal risk factors identified

Neonatal risk factors identified preterm 58 (48%) and asphyxia 15 (13%) and meconium stained liquor 16 (13%) as well as small for gestational age 12 (10%) and 10 (8%) for infections.

Estimated gestational age

The estimated gestational age for the majority of babies were preterm 85 (71%) and 32 (27%) were term babies and 2 (2%) were post term.

Classification of infant according to weight for gestational age

Almost 62 (52%) babies were small for gestational age and 52 (43%) babies were born at an average weight for their gestational age. Six (5%) babies were large for their gestational age.

Plan of care available

Review by medical practitioner and plan of care was available for most of the babies 80 (67%).These babies were reviewed by the medical practitioner every 4 hours during their care in the neonatal unit. Twenty-nine (24%) babies were seen by the doctor at six hour intervals.

Resuscitation in neonatal unit

Majority of babies 107 (82%) needed resuscitation in the Neonatal Unit .These are the babies who were delivered in the labour ward and had to be given surfactant immediately after delivery to enhance lung maturity.

Almost 68 (57%) of the babies were resuscitated for less than 30 minutes and 45 (37%) of the babies needed resuscitation for 30 minutes and more.

Oxygen was administered to 88 (73%) babies on admission in the Neonatal Unit and the majority of these babies were born prematurely 58 (48%) with respiratory problems.

Vital signs monitoring

Majority of the babies 96 (80%) had their vital signs monitored hourly as they are admitted in the Intensive Care Unit. The babies are attached to monitors on admission and some of them are ventilated and 22 (18%) were monitored 3 hourly in the high care area.

The majority of the babies 118 (98%) had hourly monitoring of the intake and output. Medications were administered as prescribed to all the babies (100%) in the neonatal unit.

The primary cause of the infant's death

Spontaneous preterm and immaturity accounted for 16 (13%) deaths. Intra partum asphyxia accounted for 10 (8%) deaths and 1 baby (1%) with foetal abnormality. Four (4%) babies died of neonatal infections and two (2%) babies died of intrauterine growth restriction. According to the National Perinatal Morbidity and Mortality Committee Report 2008-2010, the most common primary cause of neonatal deaths is preterm birth, perinatal asphyxia combined with trauma (DoH 2011:). In an audit done in Abbottabad tertiary institution, birth asphyxia, sepsis and low birth weight were responsible for the majority of neonatal admissions and deaths (Anis-ur-Rehman, Quereshi, Najeeb, Siddiqui, Idris & Ahmad 2011:24).

Number of days in the neonatal unit

Majority of the babies 63 (53%) stayed in the unit for less than seven days. A total of 46 (38%) babies stayed for less than a month and 11 (9%) babies stayed for more than a month in the unit.

5.4   CONCLUSIONS

Based on the findings of the study the following problems were identified:

5.4.1 Antenatal care

- Most of the babies were born from primigravidas and mothers above 35 years.
- Hypertensive disorders and gestational diabetes mellitus were the common medical conditions present in the obstetrical history.
- Majority of the mothers delivered at the hospital though booked at the local clinic.
- The mothers started antenatal clinic in the second trimester of their pregnancy.
- Physical examination findings were incompletely documented in the mothers' antenatal cards.
- Thirty eight (32%) of the mothers refused to be tested on their first antenatal visit.
- Blood pressure was not recorded for (16%) of the mothers on their first antenatal visit.
- Only 12% of the mothers had haemoglobin results at 38 weeks of gestation on subsequent antenatal visits.

5.4.2 Admission in labour

- HIV testing and counselling not done for the majority mothers.
- No history of rupture of membranes for 29% mothers.
- Foetal heart rate was not monitored for 23% of the mothers.
- Blood pressure 24% and urinalysis were not done for almost 74% mothers on admission in labour.
- Cervical dilatation was not done for 11% mothers.

5.4.3 Intra-partum care

- The partogram was not used for 8% of the mothers in labour.
- The blood pressure and temperature was not recorded for 41% mothers during the active phase of labour.
- The foetal heart rate was not monitored frequently in the active phase of labour.
- Cervical dilatation was not recorded for 17% of the mothers in the active phase of labour.
- Level of presenting part was not monitored for 20% of the mothers in active phase.

- Premature rupture of membranes (8%) and post-partum haemorrhage (9%) were the common complications.
- Common problems identified were maternal exhaustion (15%) and foetal distress (27%) during the active phase of labour.

5.4.4 Management of second stage

- The majority of the babies (27%) had a low Apgar score of 3/10-6/10.
- Resuscitation was needed for (52%) babies immediately after delivery.
- Suctioning and bagging was done to (32%) of the babies at birth.
- Six babies were intubated immediately at birth with severe respiratory failure.
- The birth weight was below 1999 grams for (53%) of the babies.

5.4.5 Neonatal care

- The majority of the babies were admitted in the Neonatal Unit within the first 6 hours of their life.
- Prematurity and respiratory distress was the common conditions and reasons for admission.
- The majority of babies (37%) needed to be resuscitated in the neonatal unit for more than 30 minutes.
- Half of the babies were admitted in the intensive care unit in critical condition for hourly monitoring.
- A total of 48% babies had a risk factor of maternal infection as contributing to their condition.
- Spontaneous preterm, immaturity and intra-partum were the common causes of death

5.5 RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made which could be implemented to reduce the predictors to high neonatal mortality and morbidity.

For the education

- Strengthening clinical skills of all health care providers working in the maternity and neonatal units on a continuous basis. Training of midwives working in the labour ward and neonatal unit on resuscitation of the new-born.
- Education and training of health care providers on the importance of record keeping.

For clinical practice

- Emphasis should be stressed on the importance of auditing records of inpatients on a continuous basis.
- Implementation of national maternal and neonatal guidelines.
- Strengthening of programmes available on maternal and neonatal services.

For the management

- Benchmarking in other countries on what approaches were used to reduce the neonatal morbidity and mortality.
- Review of maternity guidelines and protocols continuously on maternal and neonatal care.
- Conducting quality improvement programmes on the maternal and neonatal care services.

For the community

- Education to the community on the importance of early attendance of antenatal clinic and its benefits.
- Conducting awareness campaigns on health services available on maternal and neonatal care.

For further research

- To identify the factors that hinder health care providers on recordkeeping during maternity care.
- To assess the knowledge and attitude of health care providers on maternal and neonatal care.
- To evaluate the utilisation of maternity services by the community at large.
- To determine the availability of human and material resources in maternal and neonatal services.

5.6   LIMITATIONS OF THE STUDY

The study was conducted in one tertiary institution and the findings of the study cannot be generalised for the whole Limpopo Province.

Some records contained loose papers and hence information could have been lost. Data collection was time consuming as the researcher had to peruse each file to get information.

Administrative profile pertaining to staff patient ratio and availability of equipment were not studied.

5.7   CONCLUDING REMARKS

High neonatal morbidity and mortality rates are still a challenge to many countries worldwide. These high rates contribute to the burden of disease in all countries especially the sub-Saharan region of Africa. Maternal health plays a major role in reducing these neonatal morbidity and mortality rates. The challenge is for the health care providers to strategize on how to reach all women and improve their health status.

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ANNEXURE A

ETHICAL CLEARANCE FROM HEALTH STUDIES HIGHER DEGREES COMMITTEE, UNISA

UNISA | university of south africa

UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE

HSHDC/90/2012

Date: 29 October 2012   Student No: 680-642-2

Project Title: The predictors contributing to high neonatal morbidity and mortality
                  in Limpopo Province.

Researcher: MJ Ramaboea

Degree: MA in Health Studies   Code: MPCHS94

Supervisor: Dr LM Modiba
Qualification: D Cur
Joint Supervisor: -

DECISION OF COMMITTEE
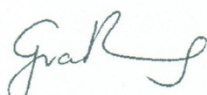
Approved   √   **Conditionally Approved**

Prof L Roets
CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE

Dr MM Moleki
ACTING ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES

ANNEXURE B

LETTER SEEKING CONSENT FROM THE DEPARTMENT OF HEALTH: LIMPOPO PROVINCE

19 Thyme Street
Ivypark Ext 17
Polokwane
0700
18.01.2013

The Chief Executive Officer
Mankweng Hospital
Private Bag X1117
Sovenga
0727

Request for permission to conduct research study in Capricorn District.

I hereby wish to apply for a permission to conduct a study in Mankweng Hospital. Currently I am a student registered Masters in Health Studies with the University of South Africa (UNISA). The research will be conducted in Neonatal Unit/Ward.

The study examines: **The predictors contributing to high neonatal morbidity and mortality in Limpopo province.** The objective of the study is to determine factors contributing to high neonatal morbidity and mortality in the Capricorn District.
Attached please find the ethical clearance certificate.

Kind Regards

Yours faithfully
Ms Ramaboea Moyahabo Joyce
St No: 680-6422

ANNEXURE C

LETTER OF APPROVAL: DEPARTMENT OF HEALTH: LIMPOPO PROVINCE

DEPARTMENT OF HEALTH

Enquiries: Selamolela Donald   Ref:4/2/2

Ramaboea MJ

Ivypark Ext 17

Polokwane

0700

Dear Ms Ramaboeoa MJ

Re: Permission to conduct the study titled: The predictors contributing to high neonatal morbiditity and mortality in Limpopo Province.

1. The above matter refers.

2. Permission to conduct the above mentioned study is hereby granted.

3. Kindly be informed that:-

   - Further arrangement should be made with the targeted institutions.

   - In the course of your study there should be no action that disrupts the services.

   - After completion of the study, a copy should be submitted to the Department to serve as a resource.

   - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.

Your cooperation will be highly appreciated.

General Manager: Strategic Planning, Policy and Monitoring

Date...27/11/2018...

18 College Street, Polokwane, 0700, Private Bag x9302, POLOLKWANE, 0700
Tel: (015) 293 6000, Fax: (015) 293 6211/20 Website: http/www.limpopo.gov.za
The heartland of Southern Africa – *development is about people*

ANNEXURE D

APPROVAL FROM HOSPITAL COMPLEX ETHICS
COMMITTEE

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

ETHICS COMMITTEE
CLEARANCE CERTIFICATE
UNIVERSITY OF LIMPOPO
POLOKWANE MANKWENG HOSPITAL COMPLEX
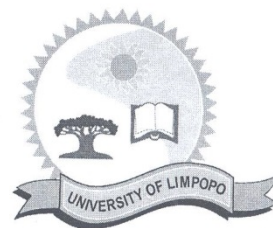
PROJECT NUMBER : PMREC – 52/2013

TITLE : The predictors contributing to high neonatal morbidity and mortality Province, South Africa

RESEARCHER : Ms MJ Ramaboea

ALL PARTICIPANTS : N/A

Supervisor : N/A

DATE CONSIDERED : 27 February 2013

DECISION OF COMMITTEE

- Recommended for approval

DATE : 05 March 2013

PROF A J MBOKAZI
Chairperson of Polokwane Mankweng
Hospital Complex Ethics Committee

NOTE: *The budget for research has to be considered separately. Ethics committee is not providing any funds for projects.*

ANNEXURE E

REQUEST LETTER TO THE HOSPITAL

19 Thyme Street
Ivypark Ext 17
Polokwane
0700
08.04.2013

The Clinical Manager
Mankweng Hospital
Private Bag X1117
Sovenga
0727

Request for permission to collect data in Mankweng hospital.

I hereby wish to apply for a permission to conduct a study in Mankweng Hospital. Currently I am a student registered Masters in Health Studies with the University of South Africa (UNISA). Data will be collected in the Neonatal Unit/Ward and Records department.

The study examines: **The predictors contributing to high neonatal morbidity and mortality in Limpopo province.** The objective of the study is to determine factors contributing to high neonatal morbidity and mortality at Mankweng hospital.
Attached please find the ethical clearance certificate from the University of Limpopo Polokwane Mankweng Complex.

Kind Regards

Yours faithfully
Ms Ramaboea Moyahabo Joyce
St No: 680-6422 (Cell no: 0725439460)

ANNEXURE F

LETTER OF APPROVAL: HOSPITAL MANAGEMENT

LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH AND SOCIAL DEVELOPMENT

POLOKWANE/MANKWENG HOSPITAL COMPLEX

CAMPUS ☐ POLOKWANE ☒ MANKWENG

ENQUIRIES Lehlokoa M.J. .... TELEPHONE No 015 286 1014 ....

REFERENCE No. S5/3/4 .... DATE .... 16 April 2013 ....

Ms Ramaboea M.J.
19 Thyme Street
Ivy Park Ext 17
POLOKWANE
0727
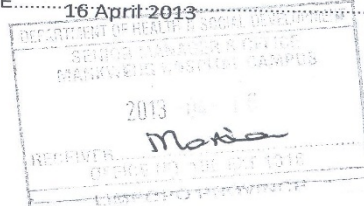
REQUEST TO CONDUCT RESEARCH AT MANKWENG HOSPITAL: RAMABOEA M.J. (STUDENT NO. 680-6422)

1. The above matter has reference.

2. Your request for permission to conduct research in Neonatal Unit and Records unit is granted.

3. The institution grants you permission and you are expected to comply with the conditions as outlined in the letter from provincial department of health.

4. Your cooperation in this regard is highly appreciated.

....
ACTING CEO: MANKWENG HOSPITAL

2013/04/16
....
DATE

◀ **Excellent Service Delivery** ▶

The heartland of Southern Africa – Development is about people!

ANNEXURE G

AUDIT TOOL

SECTION: A FIRST ANTENATAL VISIT

1.   PREVIOUS OBSTETRIC HISTORY

1	2	3

1.1 Client registration number

For official use

1.2 Age:

Age	Answer
1.2.1 <15 years	1
1.2.2 16 -18years	2
1.2.3 19 -21 years	3
1.2.4 22 -24 years	4
1.2.5 25 -35 years	5
1.2.6 >35 years	6

	4

1.3 Antenatal booking status:

	Yes	No
1.3.1 Booking status	1	2

	5

1.4 Antenatal clinic attendance:

Clinic attended	Answer
1.4.1 Local	
1.4.2 Hospital	
1.4.3 Private practitioner	
1.4.4 Specialist	
1.4.5 Not recorded	
1.4.6 Other, please specify……………………………	

	6

1.5 Parity:

Parity	Answer
1.5.1 0	1
1.5.2 1-2	2
1.5.3 3-4	3
1.5.4 >5	4

	7

1.6 Gravidity:

Gravidity	Answer
1.6.1 1	
1.6.2 2- 3	
1.6.3 4 – 5	
1.6.4 >5	

	8

1.7 Abortion:

	Yes	No
1.7.1 Abortion	1	2

	9

	10

1.8 If yes , weeks of gestation ,…………………………………

1.9 Stillbirth:

	Yes	No
1.9.1 Stillbirth	1	2

	11

1.10   Neonatal death:

	Yes	No
1.10 Neonatal death	1	2

	12

1.11   If yes , period of the neonatal death:

Days after birth	Answer
1.11.1 Within 24 hours	1
1.11.2 Within seven days	2
1.11.2 Within a month	3
1.11.3 Not applicable	4

	13

1.12 Complications in the previous pregnancy ,labour and puerperium:

	Yes	No
1.16 Complications in the previous pregnancy ,labour and puerperium	1	2

	14

1.13 If yes, indicate complication:

Complication	Answer
1.13.1 Hypertensive disorders	1
1.13.2 Gestational diabetes	2
1.13.3 Preterm labour	3
1.13.4 Obstetric haemorrhage	4
1.13.5 Premature rupture of membranes	5
1.13.6 Infections	6
1.13.7 Prolonged labour	7
1.13.8 Assisted delivery	8
1.13.9 Other , please specify ………………………….	9
1.13.10 None	10

	15
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	23
	24

2. MEDICAL HISTORY

2.1 History of medical condition

Medical condition	Answer
2.1.1 Cardiac	1
2.1.2 Diabetic	2
2.1.3 Hypertension	3
2.1.4 Kidney diseases	4
2.1.5 Epilepsy	5
2.1.6 Tuberculosis	6
2.1.7 Liver diseases	7
2.1.8 Allergies	8
2.1.9 Other , please specify ………………………….	9
2.1.10 None	10

	25

2.2 If yes , on treatment:

	Yes	No
2.2.1 Treatment	1	2

	26

2.3 If having allergy, what type of allergy:

Type of allergy	Answer
2.3.1 Food	1
2.3.2 Medication	2
2.3.3 Not recorded	3

	27

2.4 Lifestyle habits:

Lifestyle habits	Answer
2.4.1 Smoking	1
2.4.2 Alcohol	2
2.4.3 Other , please state………………………………….	3
2.4.4 None	4

	28

2.5 Surgical history:

Type of surgery	Answer
2.5.1 General surgery	1
2.5.2 Gynaecological surgery	2
2.5.3 Obstetrical surgery	3
2.5.4 Other , please state……………………………………	4
2.5.5 None	5

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3   FAMILY HISTORY

3.1 Family history:

Medical condition	Answer
3.1.1 Cardiac	1
3.1.2 Diabetic	2
3.1.3 Hypertension	3
3.1.4 Kidney disease	4
3.1.5 Epilepsy	5
3.1.6 Tuberculosis	6
3.1.7 Liver disease	7
3.1.8 Congenital abnormalities	8
3.1.9 Multiple pregnancy	9
3.1.10 Other , please specify ………………………….	10
3.1.11 None	11

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4   PRESENT OBSTETRIC HISTORY

4.1 Gestational age at initial visit to antenatal clinic:

Gestational age at initial visit	Answer
4.1.1 0-11 weeks of gestation	1
4.1.2 12-16 weeks of gestation	2
4.1.3 17- 24 weeks of gestation	3
4.1.4 25 -28 weeks of gestation	4
4.1.5 >28 weeks of gestation	5
4.1.6 Not recorded	6

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4.2 Fetal movements felt at:

Fetal movements	Answer
4.2.1 16 -19 weeks	1
4.2.2 20-24 weeks	2
4.2.3 >24 weeks	3
4.2.4 Not recorded	4

	32

 4.3 Sonar done for baseline information:

	Yes	No
Sonar done		

	33

5. PHYSICAL EXAMINATION

5.1 Height in centimetres:

Height in centimetres	Answer
5.1.1 <150cm	1
5.1.2 >150cm	2
5.1.3 Not recorded	3

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5.2 Weight in kilograms:

Weight in kilograms	Answer
5.2.1 <50kg	1
5.2.2 51-70kg	2
5.2.3 >71kg	3
5.2.4 Not recorded	4

	35

5.3 Blood pressure in mmHg:

Blood pressure in mmHg	Answer
5.3.1 100/60 -120/80	1
5.3.2 >122/80- 130/90	2
5.3.3 >140/90	3
5.3.4 Not recorded	4

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5.4 Urine analysis

Urine analysis	Answer
5.4.1 Protein	1
5.4.2 Glucose	2
5.4.3 Blood	3
5.4.4 Ketones	4
5.4.5 Leucocytes	5
5.4.6 Normal	6
5.4.7 Not recorded	7

	37
	38
	39
	40
	41
	42
	43

5.5 Condition of teeth:

Condition of teeth	Answer
5.5.1 Dental caries	1
5.5.2 Loose teeth	2
5.5.3 Dentures	3
5.5.4 Normal	4
5.5.5 Not recorded	5

	44

5.6 Pallor:

Pallor	Answer
5.6.1 Pink	1
5.6.2 Pale	2
5.6.3 Cyanosed	3
5.6.4 Jaundiced	4
5.6.5 Not recorded	5

	45

5.7 Condition of thyroid:

Condition of thyroid	Answer
5.7.1 Enlarged	1
5.7.2 Normal	2
5.7.3 Not recorded	3

	46

5.8 Condition of breasts:

Condition of breasts	Answer
5.8.1 Soft and secreting	1
5.8.2 Lump	2
5.8.3 Not recorded	3

	47

5.9 Presence of oedema:

	Yes	No	Not recorded
Oedema			

	48

5.10 If yes, indicate site of oedema:

Site of oedema	Answer
5.10.1 Legs	1
5.10.2 Face	2
5.10.3 Hands	3
5.10.4 Whole body	4
5.10.5 Not recorded	5

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	50
	51
	52
	53

5.11 Examination abdomen

Abdominal examination	Answer
5.11.1 Mass	1
5.11.2 Tenderness	2
5.11.3 Normal	3
5.11.4 Not recorded	4

	54

5.12 Respiratory rate:

Respiratory rate	Answer
5.12.1 Normal	1
5.12.2 Dyspnoea	2
5.12.3 Tachypnoea	3
5.12.4 Shallow	4
5.12.5 Not recorded	5

	55

5.13 Pulse rate:

Pulse rate	Answer
5.13.1 60-100	1
5.13.2 >100	2
5.13.3 <60	3
5.13.4 Not recorded	4

	56

5.14 Symphysis Fundal Measurement:

Symphysis Fundal Measurement	Answer
5.14.1 Between 10th and 90th percentile	1
5.14.2 Above 90th percentile	2
5.14.3 Below 10th percentile	3
5.14.4 Not recorded	4

	57

6. INVESTIGATIONS

6.1 RPR or VDRL results:

	Positive	Negative	Not recorded
6.1.1 RPR/VDRL results	1	2	3

	58

6.2 If positive:

	Treated fully	Incomplete treatment	Not recorded
6.2.1 If positive	1	2	3

	59

6.3 Rhesus factor checked:

	Positive	Negative	Not recorded
6.3.1 Rhesus factor	1	2	3

	60

6.4 Haemoglobin checked:

	12g/dl-18g/dl	<12g/dl-10g/dl	<10g/dl	Not recorded
6.4.1 Haemoglobin	1	2	3	4

	61

6.5 HIV tested

	Positive	Negative	Not recorded
6.5.1 HIV test	1	2	3

	62

6.6 If positive ,PMTCT :

	Mono therapy	Dual therapy	Referred	ART	Not recorded
6.6.1 PMTCT	1	2	3	4	5

	63

6.7 Supplements given:

	Yes	No	Not recorded
6.7.1 Supplements given	1	2	3

	64

6.8 Vaccines given:

	Yes	No	Not recorded
6.8.1 Vaccines given	1	2	3

	65

6.8.2 If yes , state the vaccine ……………………………………………......

	66

6.9 Risk grading done:

High risk	Medium risk	Low risk	Not recorded
1	2	3	4

	67

6.10 Antenatal follow up:

	Clinic	CHC	District hospital	Regional hospital	Not recorded
6.10 ANC follow ups	1	2	3	4	5

	68

6.11 Delivery plan:

Clinic	Community Health Centre	District hospital	Regional hospital	Not recorded
1	2	3	4	5

	69

SECTION B : SUBSEQUENT ANTENATAL VISITS

7 Antenatal visits

7.1 Number of antenatal visits:

1 visit	2 visits	3 visits	➢ 3 visits
1	2	3	4

	70

7.2 Fetal movements recorded

	Normal	Abnormal	Not recorded
7.2.1 Fetal movements	1	2	3

	71

7.3 Blood pressure checked:

Blood pressure in mmHg	Answer
7.3.1 100/60 -120/80	1
7.3.2 >121/80- 130/90	2
7.3.3 >140/90	3
7.3.4 Not recorded	4

	72

7.4 Pulse rate checked:

Pulse rate	Answer
7.4.1 60-100	1
7.4.2 >100	2
7.4.3 <60	3
7.4.4 Not recorded	4

	73

7.5 Pallor:

Pallor	Answer
5.5.1 Pink	1
5.5.2 Pale	2
5.5.3 Cyanosed	3
5.5.4 Jaundiced	4
5.5.5 Not recorded	5

	74

7.6 Symphysis fundal height :

Symphysis Fundal Measurement	Answer
7.6.1 Between 10th and 90th percentile	1
7.6.2 Above 90th percentile	2
7.6.3 Below 10th percentile	3
7.6.4 Not recorded	4

	75

7.7 Measurement by palpation:

Palpation	Answer
7.7.1 <28 weeks	1
7.7.2 28 – 36 weeks	2
7.7.3 >37 weeks	3

	76

7.8 Pelvic assessment done :

	Yes	No
7.8.1 Pelvic assessment done	1	2

	77

7.9 Urine analysis:

Urine analysis	Answer
7.9.1 Protein	1
7.9.2 Glucose	2
7.9.3 Blood	3
7.9.4 Ketones	4
7.9.5 Leucocytes	5
7.9.6 Normal	6
7.9.7 Not recorded	7

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	79
	80
	81
	82
	83
	84

7.10 HIV test done if refused at initial visit:

	Positive	Negative	Not recorded
7.10.1 HIV testing	1	2	3

	85

7.11 Haemoglobin repeated at 32 and 38 weeks:

	12g/dl-18g/dl	<12g/dl-10g/dl	<10g/dl	Not recorded
7.11.1 Haemoglobin at 32 weeks	1	2	3	4
7.11.2Haemoglobin at 38 weeks	1	2	3	4

	86
	87

7.12 Repeat information for danger signs of pregnancy:

	Yes	No	Not recorded
7.12.1 Information on danger signs of pregnancy	1	2	3

	88

7.13 Delivery plan reviewed:

	Yes	No	Not recorded
7.13.1 Plan reviewed	1	2	3

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SECTION C: ADMISSION IN LABOUR

8 Admission in labour

8.1 Antenatal risk factors noted:

	Yes	No	Not recorded
8.1.1 ANC risk factors	1	2	3

	90

8.2 If woman unbooked , antenatal history taken:

	Yes	No	Not recorded	Not applicable
8.1.2 Antenatal history	1	2		3

	91

8.3 HIV status recorded:

	Yes	No	Not recorded
8.3.1 HIV status	1	2	3

	92

8.4 HIV status not known , Voluntary Counselling and Testing done:

	Yes	No	Not recorded	Not applicable
8.4.1VCT done if HIV status not known	1	2	3	4

	93

8.5 Foetal movements checked:

	Absent	Diminished	Normal	Not recorded
8.5.1 Foetal movements	1	2	3	4

	94

8.6 Rupture of membranes:

	Intact	Diminished	Normal	Not recorded
8.6.1 Rupture of membranes	1	2	3	4

	95

8.7 Condition of liquor:

	Clear	Meconium stained	Offensive	Not recorded	Not applicable
8.7.1 Colour of liquor	1	2	3	4	5

	96

8.8 Duration of rupture of membranes:

	Less than 4 hours	5 hours-24 hours	More than 24 hours	Not recorded	Not applicable
Duration of rupture of membranes	1	2	3	4	5

	97

8.9 Temperature checked and recorded:

	36-37	<36	>37	Not recorded
8.9.1 Temperature		1		3

	98

8.10 Blood pressure checked and recorded:

Blood pressure in mmHg	Answer
8.10.1 100/60-120/80	1
8.10.2 >121/81-130/90	2
8.10.3 >140/90	3
8.10.4 Not recorded	4

	99

8.11 Oedema observed:

Site of Oedema	Answer
8.11.1 Legs	1
8.11.2 Face	2
8.11.3 Hands	3
8.11.4 Whole body	4
8.11.5 None	5

	100

8.12 Pallor

Pallor	Answer
8.12.1 Pink	1
8.12.2 Pale	2
8,12.3 Cyanosed	3
8.12.4 Jaundiced	4
5.12.5 Not recorded	5

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8.13 Abdominal examination:

8.13.1 Symphysis Fundal Height:

Symphysis Fundal Measurement	Answer
8.13.1.1 Between 10th and 90th percentile	1
8.13.1.2 Above 90th percentile	2
8.13.1.3 Below 10th percentile	3
8.13.1.4 Not recorded	4

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8.13.2 Palpation:

Palpation	Answer
8.13.2.1 <28 weeks	1
8.13.2.2 28-36 weeks	2
8.13.2.3 > 37 weeks	3

	103

8.13.3 Lie of the foetus:

Lie of the foetus	Answer
8.13.3.1 Longitudinal	1
8.13.3.2 Oblique	2
8.13.3.3 Transverse	3
8.13.3.4 Not recorded	4

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8.13.4 Presentation:

Presentation	Answer
8.13.4.1Cephalic	1
8.13.4.2 Breech	2
8.13.4.3 Face	3
8.13.4.4 Brow	4
8.13.4.5 Not recorded	5

	105

8.13.5 Position:

Position	Answer
8.13.5.1 Anterior Position	1
8.13.5.2 Posterior Position	2
8.13.5.3 Not recorded	3

	106

8.13.6 Attitude:

Attitude	Answer
8.13.6.1 Flexed	1
8.13.6.2 Deflexed	2
8.13.6.3 Extended	3
8.13.6.4 Not recorded	4

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8.13.7 Level of presenting part in fifth above the pelvic brim:

Level of presenting part	Answer
8.13.7.1 5/5	1
8.13.7.2 4/5	2
8.13.7.3 3/5	3
8.13.7.4 2/5	4
8.13.7.5 1/5	5
8.13.7.6 0/5	6
8.13.7.7 Not recorded	7

	108

8.13.8 Liquor volume:

Liquor volume	Answer
8.13.8.1 Adequate	1
8.13.8.2 Polyhydramnios	2
8.13.8.3 Olygohydromnios	3
8.13.8.4 Not recorded	4

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8.13.9 Uterine tone:

Uterine tone	Answer
8.13.9.1 Soft	1
8.13.9.2 Rigid	2
8.13.9.3 Tender	3
8.13.9.4 Not recorded	4

	110

8.13.10 Strength of contractions:

	No contractions	Mild	Moderate	Strong	Not recorded
8.13.10.1 Strength of contractions	1	2	3	4	5

	111

8.13.11 Foetal heart rate:

	201-160b/m	<120b/m	>160b/m	Not recorded
8.13.11.1 Foetal heart rate	1	2	3	4

8.13.12 Estimation of foetal weight:

	<2.499kg	2.5- 4kg	>4kg	Not recorded
8.13.12.1 Estimation of foetal weight	1	2	3	4

8.14 Vaginal examination:

	Done	Not done
8.14 Vaginal examination	1	2

8.15: If vaginal examination was done , complete the following questions:

8.15.1 Condition of vulva and vagina:

Condition of vulva and vagina	Answer
8.13.9.1 Healthy	1
8.13.9.2 Sores/Warts	2
8.13.9.3 Oedematous	3
8.13.9.4 Not recorded	4

8.15.2 Cervix:

Cervix	Answer
8.13.9.1 Uneffaced	1
8.13.9.2 Effacing	2
8.13.9.3 Fully effaced	3
8.13.9.4 Not recorded	4

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8.15.3 Position of cervix:

Position of cervix	Answer
8.13.9.1 Posterior	1
8.13.9.2 Middle	2
8.13.9.3 Anterior	3
8.13.9.4 Not recorded	4

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8.15.4 Consistency of cervix:

Consistency of cervix	Answer
8.15.4.1 Firm	1
8.15.4.2 Soft	2
8.15.4.3 Not recorded	3

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8.15.5: Dilatation of cervix:

Dilatation of cervix	Answer
8.15.5.1 <3cm	1
8.15.5.2 4-8cm	2
8.15.5.3 9-10cm	3
8.15.5.4 Not recorded	4

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8.15.6:Rupture of membranes:

Rupture of membranes	Answer
8.15.6.1 Intact	1
8.15.6.2 Spontaneous rupture	2
8.15.6.3 Artificial rupture	3
8.13.6.4 Not recorded	4

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8.15.7: Condition of liquor:

Condition of liquor	Answer
8.15.7.1 Clear	1
8.15.7.2 Meconium stained	2
8.15.7.3 Offensive	3
8.15.7.4 Not recorded	4

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8.15.8: Duration of rupture of membranes:

	Less tha 4 hours	5 hours - 24 hours	More than 24 hours	Not recorded
8.15.8.1 Duration of rupture of membranes	1	2	3	4

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8.15.9 Presenting part:

Presenting part	Answer
8.15.9.1 Vertex	1
8.15.9.2 Face	2
8.15.9.3 Breech	3
8.15.9.4 Brow	4
8.15.9.5 Other……………………………………	5
8.15.9.6 Not recorded	6

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8.15.10 Position:

Position	Answer
8.15.10.1 Anterior position	1
8.15.10.2 Posterior position	2
8.15.10.3 Not recorded	4

	124

8.15.11 Moulding:

Moulding	Answer
8.15.11.1 Absent	1
8.1511.2 Parieto-parietal moulding	2
8.15.11.3 Occipio-Parietal moulding	3
8.15.11.4 Not recorded	4

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8.15.12 Caput:

Caput	Answer
8.15.12.1 Absent	1
8.15.12.2 Present	2
8.15.12.3 Not recorded	4

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8.15.13 Descent of foetal head:

Descent	Answer
8.15.13.1 -1 station	1
8.15.13.2 0 station	2
8.15.13.3 +1 station	3
8.15.13.4 +2 station	4
8.15.13.5 Not recorded	5

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8.16 Pelvic assessment:

8.16.1 Pelvic assessment done:

	Yes	No
8.16.1.1 Pelvic assessment	1	2

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8.16.2 Condition of pelvis:

Condition of pelvis	Answer
8.16.2.1 Adequate	1
8.16.2.2 Borderline	2
8.16.2.3 Inadequate	3
8.16.2.4 Not recorded	4

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8.17 Investigations:

8.17.1 Urine analysis:

Urine analysis	Answer
8.17.1.1 Protein	1
8.17.1.2 Glucose	2
8.17.1.3 Blood	3
8.17.1.4 Ketones	4
8.17.1.5 Leucocytes	5
8.17.1.6 Normal	6
8.17.1.7 Not recorded	7

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8.17.2 Blood investigations:

Blood investigations	Answer
8.17.2.1 Haemoglobin	1
8.17.2.2 Rhesus factor	2
8.17.2.3 Blood Grouping	3
8.17.2.4 VDRL/RPR	4
8.17.2.5 HIV	5
8.17.2.6 Not recorded	6
8.17.2.7 Not applicable	7

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SECTION D: INTRA PARTUM CARE

9 Intra partum care

Partogram used:

	Yes	No	Not recorded
9.1.1 Partogram used	1	2	3

9.2 If the answer to 9.1 is "yes", record the following questions:

9.2.1 Latent phase of labour monitored:

	Yes	No	Not recorded
9.1.1.1 Latent phase of monitored	1	2	3

9.2.2 Blood pressure and pulse 4hourly:

	Yes	No	Infrequent	Not recorded
9.2.2.1 Blood pressure and pulse 4hourly	1	2	3	4

9.2.3 Blood pressure recording in mmHg:

Blood pressure	Answer
9.2.3.1 100/60-120/80	1
9.2.3.2 >121/81-130/90	2
9.2.3.3 >140/90	3
9.2.3.4 Not recorded	4

9.2.4 Temperature 4 hourly:

	Yes	No	Infrequent	Not recorded
9.2.4.1 Temperature 4hourly	1	2	3	4

9.2.5 Temperature recording:

	Normal	Subnormal	Pyrexia	Not recorded
9.2.5.1 Temperature recording	1	2	3	4

9.2.6 Uterine contractions 2hourly:

	Yes	No	Infrequent	Not recorded
9.2.6.1 Uterine contractions 2hourly	1	2	3	4

9.2.7 Strength of contractions:

	No contractions	Mild	Moderate	Strong	Not recorded
9.2.7.1 Strength of contractions	1	2	3	4	5

9.2.8 Foetal heart rate 2hourly:

	Yes	No	Infrequent	Not recorded
9.2.8.1 Foetal heart rate 2hourly	1	2	3	4

9.2.9 Foetal heart rate recording:

	Yes	No	Infrequent	Not recorded
9.2.9.1 Fetal heart rate recording	1	2	3	4

9.2.10 Vaginal examination 4hourly:

	Yes	No	Infrequent	Not recorded
9.2.10.1 Vaginal examination 4hourly	1	2	3	4

9.2.11 Progress of labour:

	Good	Poor	Not recorded
9.2.11.1 Progress of labour	1	2	3

9.3 Active phase of labour monitored:

9.3.1 Active phase of labour recorded:

	Yes	No	Infrequent	Not recorded
9.2.9.1 Active phase of labour monitored	1	2	3	4

9.3.2 Maternal condition monitored:

	Yes	No	Infrequent	Not recorded
9.2.9.1 Maternal condition monitored	1	2	3	4

9.3.3 Blood pressure hourly:

Blood pressure hourly	Answer
9.2.3.1 100/60-120/80	1
9.2.3.2 >121/81-130/90	2
9.2.3.3 >140/90	3
9.2.3.4 Not recorded	4

9.3.4 Temperature 4hourly:

	36-37	<36	>37	Not recorded
8.9.1 Temperature		1		3

9.3.5 Urine analysis done 2hourly:

Urine analysis	Answer
9.3.5.1 Protein	1
9.3.5.2 Glucose	2
9.3.5.3 Blood	3
9.3.5.4 Ketones	4
9.3.5.5 Leucocytes	5
9.3.5.6 Normal	6
9.3.5.7 Not recorded	7

9.3.6 Urine volume 2hourly:

	>30mls/hour	Less than 30mls/hour	Anuria	Not recorded
9.3.6.1 Urine volume 2hourly	1	2	3	4

9.3.7 Foetal condition monitored:

	Yes	No	Infrequent	Not recorded
9.3.7.1 Foetal condition monitored	1	2	3	4

9.3.8 Foetal heart rate ½ hourly:

	120-160b/m	<120b/m	>160b/m	Not recorded
9.3.8.1 Foetal heart rate 2hourly	1	2	3	4

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9.3.9 Cardiotocograph used:

	Yes	No
9.3.9.1 Cardiotocograph		

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9.3.10 Condition of liquor 2hourly if membranes ruptured:

Condition of liquor 2hourly	Answer
8.15.7.1 Clear	1
8.15.7.2 Meconium stained	2
8.15.7.3 Offensive	3
8.15.7.4 Not recorded	4

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9.3.11 Progress of labour monitored:

	Regularly	Infrequently	Not recorded
9.3.11.1 Progress of labour	1	2	3

	171

9.3.12 Frequency and strength of contractions hourly:

	No contractions	Mild	Moderate	Strong	Not recorded
9.3.12 Frequency and Strength of contractions hourly	1	2	3	4	5

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9.3.13 Level of presenting part:

Descent	Answer
9.3.13.1 -1 station	1
9.3.13.2 0 station	2
9.3.13.3 +1 station	3
9.3.13.4 +2 station	4
9.3.13.5 Not recorded	5

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9.3.14 Cervical dilatation 2hourly:

Dilatation	Answer
9.3.14.1 1cm per hour in primigravida	1
9.3.14.2 2cm per hour in multipara	2
9.3.14.3 Less than the above	3
9.3.14.4 More than the above	4
9.3.14.5 Not recorded	5

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9.3.15 Caput 2hourly:

Caput	Answer
9.3.15.1 Absent	1
9.315.2 Present	2
9.3.15.4 Not recorded	3

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9.3.16 Moulding:

Caput	Answer
9.3.16.1 Absent	1
9.316.2 Present	2
9.3.16.5 Not recorded	3
9.3.16.4	

	176

9.3.17 Treatment given during labour:

Treatment given during labour	Anti-biotics	Sedatives/ analgesia	Oxyto-cin	IV fluids	Not recorded
9.3.17.1 Treatment given during labour	1	2	3	4	5

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9.3.18 Identified problems recorded:

Identified problems	Answer
9.3.11.8.1 Maternal exhaustion	1
9.3.18.2 Cephalo-pelvic disproportion	2
9.3.18.3 Fetal distress	3
9.3.18.4 Malpresentation	4
9.3.18.5 Other ,specify…………………………………	5
9.3.18.6 Not recorded	6

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9.3.19 Proposed management:

	Referred	Not referred	Not recorded
9.3.19.1 Proposed management	1	2	3

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SECTION E : MANAGEMENT OF THE 2nd STAGE OF LABOR

10 Management of the 2nd stage of labour recorded

10.1 Method of delivery

	Normal vaginal delivery	Caesarean section	Vacuum delivery	Forceps delivery
10.1.1 Method of delivery	1	2	3	4

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10.2 Complications during delivery:

	Yes	No
10.2 Complications	1	2

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10.2.2 If yes specify……………………………………

10.3 Apgar scoring assessment in one minute and five minutes:

Apgar score		Answer
1 minute	**5 minute**	
10.3.1 <3/10	<3/10	1
10.3.2 3-6/10	3-6/10	2
10.3.3 >7/10	>7/10	3
10.3.4 Not recorded	Not recorded	4

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10.4 Resuscitation needed:

	Yes	No	Not recorded
10.4.1 Resuscitation needed	1	2	3

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10.5 If yes, steps taken to resuscitate the baby:

Steps taken to resuscitate the baby	Answer
10.5.1 Suctioning	1
10.5.2 Suctioning, bag and mask ventilation	2
10.5.3 Suctioning and intubation	3
10.5.4 Ventilation and cardiac massage	4
10.5.5 Drugs given	5
10.5.6 Not recorded	6
10.5.7 Not applicable	7

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10.6 Duration of resuscitation:

	< 5 minutes	5-10 minutes	>10 minutes	Not recorded
10.6.1 Duration of resuscitation	1	2	3	4

	185

10.7 Prophylactic drugs given:

	Konakion	Eye ointment	Nevirapine	AZT	Not recorded
10.7.1 7Prophylactic drugs given		1	2	3	4

	186

10.8 Congenital abnormalities present:

	Yes	No	Not recorded
10.8.1 Congenital abnormalities	1	2	3

	187

10.9 Baby's weight:

Baby's weight	Answer
10.9.1 1000g-1499g	1
10.9.2 1500g-1999g	2
10.9.3 2000-2499g	3
10.9.4 >2500g	4
10.9.5 Not recorded	

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10.10 Duration of labour:

Duration of labour	Answer
10.10.1 <4 hours	1
10.10.2 5-10hours	2
10.10.3 11-18hours	3
10.10.4 >18hours	4
10.10.5 Not recorded	

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11. THIRD STAGE

11.1 Blood loss:

Blood loss	Answer
11.1.1 <150ml	1
11.1.2 155-490ml	2
11.1.3 >500ml	3
11.1.4 Not recorded	4

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11.2 Examination of placenta:

Examination of placenta	Answer
11.2.1 Complete	1
11.2.2 Incomplete	2
11.2.3 Ragged	3
11.2.4 Pale	4
11.2.5 Yellow stained	5
11.2.6 Other, state………………………………….	

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SECTION F: NEONATAL CARE

12. Neonatal care

12.1 Age on admission:

Age	Answer
12.1.1 <6hours	1
12.1.2 6-24hours	2
12.1.3 4-7days	3
12.1.4 >7days	4
12.1.5 Not recorded	5

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12.2 Reason for admission:

Reason for admission	Answer
12.2.1 Birth Asphyxia	1
12.2.2 Prematurity	2
12.2.3 Neonatal infection	3
12.2.4 Other ,specify	4
12.2.5 Not recorded	5

	193

12.3Problems on admission:

Problems on admission	Answer
12.3.1Signs of respiratory distress: Tachypnoea , recessions, grunting/cyanosis, nasal flaring	1
12.3.2 Signs of shock: Bleeding, pallor	2
12.3.3 Hypoglycaemia	3
112.3.4 Convulsions	4
12.3.5 Signs of infection: Jaundice ,hypothermia ,vomiting ,distended abdomen	5
12.3.6 Failure to suck	6
12.3.7 Not recorded	7

	194

12.4 Appropriate immediate management of problems:

	Referred	Not referred	Not recorded
12.4.1 Appropriate immediate management	1	2	3

| | 195 |

12.5 Further assessment done to identify perinatal risks:

	Yes	No	Not recorded
Perinatal risks identified	1	2	3

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12.6 Maternal risk factors:

Maternal risk factors	Answer
12.6.1 Maternal infections	1
12.6.2 Hypertensive disorders	2
12.6.3 Gestational diabetes	3
12.6.4 Assisted delivery	4
12.6.5 Other, state………………………………….	5
12.9.6 Not recorded	6

| | 197 |

12.7 Neonatal risk factors:

Neonatal risk factors	Answer
12.7.1 Meconium stained liquor	1
12.7.2 Small for gestational age	2
12.7.3 Preterm	3
12.7.4 Large for gestational age	4
12.7.5 Post-term	5
12.7.6 Other, state…………………………………	6

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12.8 The estimated gestational age:

Gestational age	Answer
12.8.1 Preterm	1
12.8.2 Term	2
12.8.3 Post-term	3
12.8.4 Not recorded	4

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12.9 Classification of infant according to weight for gestational age:

Classification	Answer
12.9.1 Small for gestational age	1
12.9.2 Average for gestational age	2
12.9.3 Large for gestational age	3
12.9.4 Not recorded	4

	200

12.10.1 Perinatal risks identified

	Yes	No	Not recorded
12.10.1 Perinatal risks identified	1	2	3

	201

12.11 Plan of care available

	Yes	No	Not recorded
12.11.1 Plan of care available	1	2	3

	202

12.12 Resuscitation in neonatal unit

	Yes	No	Not recorded
12.12.1Resuscitation in neonatal unit	1	2	3

	203

12.12.2 Duration of resuscitation

	< 30 minutes	>30 minutes	Not recorded
12.12.2Resuscitation in neonatal unit	1	2	3

	204

12.13 Oxygen administered

Oxygen administered	Yes	No	Not recorded
12.13.1	1	2	3

	205

12.14 Review by medical practitioner

	4 hourly	6hourly	Daily	Not recorded
12.14.1 Review by medical practitioner	1	2	3	4

	206

12.15 Vital signs monitored

	hourly	3hourly	6hourly	Not recorded
12.15.1 Vital signs monitored	1	2	3	4

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12.16 Intake and output monitoring

	hourly	3hourly	12hourly	Not recorded
12.16.1 Intake and output monitored	1	2	3	4

	208

12.17 Medications administered as prescribed

	Yes	No	Not recorded
12.17.1 Medications administered as prescribed	1	2	3

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12.18 The primary causes of the baby's death:

Maternal risk factors	Answer
12.18.1 Spontaneous preterm	1
12.18.2 Intra partum asphyxia and birth trauma	2
12.18.3 Fetal abnormality	3
12.18.4 Infections	4
12.18.5 Hypertension	5
12.18.6 Antepartum haemorrhage	6
12.18.7 Idiophathic intrauterine growth retardation	7
12.18.8 Pre-existing maternal disease	8
12.18.9 Other, state…………………………………….	9
12.18.10 Not recorded	10

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12.19 Number of days in the neonatal unit until discharge or death:

Number of days	Answer
12.19.1 <7days	1
12.19.2 < one month	2
12.19.3 > one month	3
12.19.4 Not recorded	4

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ANNEXURE H

STATISTICIAN REPORT

4.1   RESULTS AND DISCUSSIONS

Data obtained from the questionnaires was analysed and interpreted. The results are illustrated, using tables, graphs and charts. This chapter reveals the responses on a question-by-question basis. Results from all sections of the questionnaire are also compared to existing empirical evidence to assess consistency.

4.2   STATISTICAL PROCEDURES

This study used IBM SPSS Statistics 22 computer software for data analysis. According to Coakes (2005:65) SPSS is software for performing statistical procedures in the social sciences field. SPSS is among the most widely used programme for statistical analysis in social sciences. It is a complete statistical package that is based on a point and click interface. SPSS has almost all statistical features available and widely used by researchers to perform quantitative analysis.

Subsequently, Statistical methods such as Descriptive statistics (Frequency table, Pie chart and Bar) and inferential statistics such as the Chi-square, T-test, cross tabulation, Pearson Product-Moment Correlation and descriptive statistics were used to analyse data. Validity tests and reliability tests were performed and are presented below.