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Clinical outcomes and practices in the maternity unit of a District Hospital

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CLINICAL OUTCOMES AND PRACTICES IN THE MATERNITY UNIT OF A DISTRICT HOSPITAL

Mr Oupa Moalusi

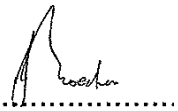
A RESEARCH REPORT SUBMITTED TO THE FACULTY OF HEALTH SCIENCES, UNIVERSITY OF THE WITWATERSRAND, IN PARTIAL FULFILMENT OF THE MASTER OF PUBLIC HEALTH IN THE FIELD OF HOSPITAL MANAGEMENT

JOHANNESBURG

MAY 2011

DECLARATION

I, OUPA LAZARUS MOALUSI, declare that this research report is my own work. It is being submitted for the degree of Master of Public Health (Hospital Management) at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or for any examination at this or any other university.



.....

25 May 2011

DEDICATION

I dedicate this work to:

My fiancé, Mmathapelo, for the support she provided me and the love and patience she had for me during the course of my studies.

My kids, Naledi, Thapelo and Kgosatsana for the little time that I spent with you.

Lastly, all my family, friends, relatives and colleagues for the support and encouragement you provided me, even though I had very little time to spend with you to concentrate on my studies. I will always remember your support and guidance.

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Mr A Koki

Ms O Mohalalelo

The Admissions Section staff of Schweizer-Reneke Hospital

The Maternity Section staff of Schweizer-Reneke Hospital

ABSTRACT

Introduction:

Maternal and child care is one of the priority health issues that have been identified as requiring urgent attention in South Africa. Despite various efforts, South Africa has not seen improvements in maternal and perinatal outcomes. It is therefore essential that services and practices in hospitals rendering maternity care be reviewed and audited, so that current services can be improved and new services developed if necessary. In Schweizer-Reneke Hospital the clinical outcomes and clinical practices at the maternity unit have never been clearly described. The aim of the study was to describe the clinical outcomes and the associated clinical practices in the maternity unit of the hospital from 1 January 2009 to 31 December 2009.

Methodology:

The study setting was the maternity unit of Schweizer-Reneke District Hospital, a level 1 district hospital in a rural district of the North West Province. It comprised of a retrospective review of data from the District Health Information System and of the delivery records, specifically the partogram from 1 January 2009 to 31 December 2009. The study also examined records of Perinatal Problem Identification Programme and Mortality and Morbidity Review meetings. The study population included all the patients who delivered at the maternity unit during the study period. The measurement tools for data collection were data capture sheets on excel spreadsheets. The source of the data was the maternity register, maternity case records, Perinatal Problem Identification Programme records, District Health Information System and Unit Administration files (for records of meetings). The researcher personally captured the data.

Results:

Out of 699 deliveries conducted at the hospital 80.1% were normal deliveries, 16.3% caesarean sections and 3.6% vacuum-assisted deliveries. The record review revealed errors in the number of caesarean sections and vacuum-assisted deliveries

on the DHIS. The perinatal mortality rate was calculated to be 56 per 1000 live births during the study period. Again the record review identified more perinatal deaths (41) than what was reported on the DHIS. No maternal deaths were recorded during the study period. A total of 295 records were analysed for completeness of the partogram. Out of the 295 partograms analysed none of them had data completed according to standard. The analysis of the completion of the partogram show that there is a significant association between recording of certain aspects of the partogram (risk factors, parity, age, fetal heart, contractions, cervical dilatation, problems and management plan) and mode of delivery whereas with other aspects there is no significant association. The aspects of the partogram that were completed according to standard by the perinatal outcome were poorly recorded, ranging from 0% to 54%. The association between mode of delivery and perinatal outcome was found to be statistically significant (p value 0.000). All of the fresh stillbirths and 90% of macerated stillbirths were born by normal vertex delivery. For the period under study one MMR meeting was conducted.

Conclusion:

The study found that there were poor clinical practices and outcomes in the maternity unit of Schweizer-Reneke Hospital. There are signs of poor information management as indicated by the discrepancies between data on hospital records and the DHIS. The reasons for this could not be established. Perinatal Problem Identification Problem and Mortality and Morbidity Review meetings were not conducted regularly and therefore could not be used to improve clinical practices and outcomes.

Recommendations:

Major steps need to be taken to improve clinical governance within the maternity unit of Schweizer-Reneke Hospital. Strategies to recruit and retain Professional Nurses need to be developed. The high percentage of macerated stillbirths needs to be investigated at district level and antenatal care needs to be improved. Studies focusing on the direct effect of inadequate recording on mortality and morbidity and the causes or reasons for inadequate completion of the partogram are necessary.

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GLOSSARY OF TERMS

Term	Description
Fresh Stillbirth	An intrauterine death occurring after 28 weeks' gestation and / or weighing 500g or more resulting from a delivery in a facility under supervision, where the stillborn fetus died just before or during expulsion or extraction from the mother (Department of Health, 2009).
Macerated Stillbirth	An intrauterine death occurring after 28 weeks' gestation and / or weighing 500g or more prior to the complete expulsion or extraction from its mother of a product of conception. The death is indicated by the fact that after such separation the fetus does not breathe or show any evidence of live, such as beating of the heart, pulsation of the umbilical cord or definite movement of the involuntary muscles (Department of Health, 2009).
Perinatal Mortality Rate	Total number of stillbirths and deaths of infants 0 – 28 days old as against the total number of live births.
Partogram	A pre-printed paper form, on which labour observations are recorded with the aim of providing a pictorial overview of labour

LIST OF ABBREVIATIONS

ART	Antiretroviral Therapy
CS	Caesarean Section
DHIS	District Health Information System
MDG	Millennium Development Goals
MMR	Mortality and Morbidity Review
NCCEMD	National Committee for Confidential Enquiries into Maternal Deaths
NHS	National Health System
NVD	Normal Vertex Delivery
OPD	Outpatient Department
PHC	Primary Health Care
PPIP	Perinatal Problem Identification Programme
VAD	Vacuum-Assisted Deliveries
WHO	World Health Organisation

CHAPTER 1
INTRODUCTION

The purpose of this study was to describe the clinical outcomes and practices at the maternity unit of Schweizer-Reneke Hospital. This introductory chapter will provide a background of the study and of the hospital, and cover the statement of the problem, literature review, justification for the study, and its aim and objectives.

1.1. BACKGROUND

1.1.1. BACKGROUND OF THE STUDY

Maternal and child care is one of the priority health issues that have been identified as requiring urgent attention in South Africa. Despite various efforts, South Africa has not seen improvements in maternal and perinatal outcomes (Department of Health, 2010a; Department of Health, 2010b). It is therefore essential that services and practices in hospitals rendering maternity care be reviewed and audited, so that current services can be improved and new services developed if necessary (Department of Health, 2000; Department of Health, 2010a; Department of Health, 2010b).

In Schweizer-Reneke Hospital the clinical outcomes and clinical practices at the maternity unit have never been clearly described and this study seeks to identify these outcomes and the associated clinical practices.

1.1.2. BACKGROUND OF SCHWEIZER-RENEKE HOSPITAL

Schweizer-Reneke Hospital, the district hospital under study, is one of the five district hospitals in the Dr Ruth Segomotsi Mompati District, the most rural district in the North West Province. It is located within the Mamusa health sub district which also consists of five fixed clinics, one Community Health Centre and one mobile clinic. Figure 2.1 below shows a map of Dr Ruth Segomotsi Mompati District Municipality coloured in blue, with the hospital marked by a green triangle in the

centre of the district. The municipality comprises of five local municipalities. Molopo and Kagisano local municipalities are situated on the north and have since been combined to make one municipality called Kagisano & Molopo local municipality. Grater Taung and Lekwa Teemane local municipalities are situated on the south western area with Naledi and Mamusa (coloured orange) on the eastern side. The head office of the Department of Health is situated in Naledi local municipality.

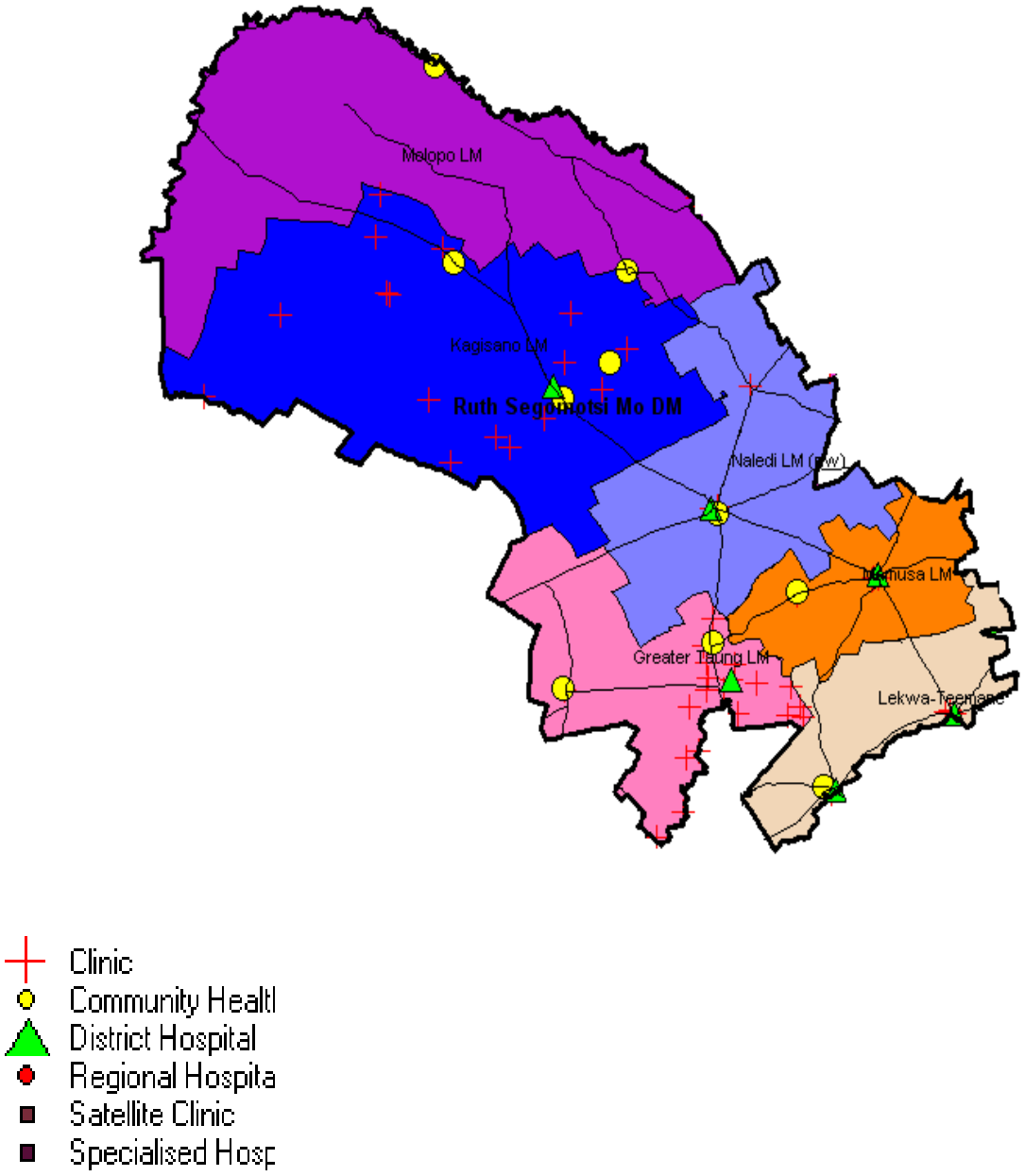


Figure 1.1 Map of Dr Ruth Segomotsi Mompati District (Department of Health North West Province, 2010)

The hospital has a total of 59 approved beds, nine of which are postnatal and two of which are delivery beds in the maternity unit. For nursing, the staff establishment of the hospital comprises of 31 Professional Nurse posts, 17 Staff Nurse posts and 16 Nursing Assistant posts. The vacancy rate for Professional Nurses during the study period was 58% while all Staff Nurse posts and Nursing Assistants were filled. The ruralness of the area and lack of staff accommodation, among other factors, make it difficult for the hospital to retain Professional Nurses, hence the high vacancy rate. On a monthly basis the maternity unit is allocated five Professional Nurses, two Staff Nurses and five Nursing Assistants to provide nursing cover for twenty four hours. The same staff simultaneously provide nursing cover for the female general ward.

In terms of doctors, the staff establishment comprises of seven Medical Officers posts including the Clinical Manager / Chief Medical Officer. All of them have to cover the following areas: Casualty / OPD including the ART clinic, wards, theatre (minor and emergency operations including Caesarean Sections (CS)), PHC clinics and after hours calls. All the Medical Officers posts were filled during the period under study.

According to data from the District Health Information System (DHIS) the total number of deliveries at the maternity unit of Schweizer-Reneke Hospital was 699 between 1 January 2009 and 31 December 2009, with 114 of them by Caesarean Section.

1.2. STATEMENT OF THE PROBLEM

At Schweizer-Reneke Hospital, there are various concerns regarding clinical care within the maternity unit. According to the professional opinion of managers in the hospital there is no evidence of adherence to clinical practices in the maternity unit. In addition, the clinical outcomes, in terms of deaths and mode of delivery, are not well documented. The clinical outcomes and the associated clinical practices in the maternity unit are important in contributing to the achievement of the Millennium Development Goals (MDGs) of reducing childhood and maternal deaths.

Furthermore, evidence of Perinatal Problem Identification Programme (PPIP) and Maternal Mortality and Morbidity Review (MMR) meetings is lacking.

1.3. LITERATURE REVIEW

In this section relevant literature regarding the use of the partogram in clinical practice, mode of delivery, maternal and perinatal mortality and various factors associated with it are discussed.

1.3.1. THE USE OF THE PARTOGRAM

The partogram is a simple, inexpensive tool which provides a continuous pictorial overview of labour. It is used by many hospitals to assist them in the detection of prolonged labour (Lavender, 2003; Neilson, Lavender, Quenby, Wray, 2003 Lavender, Hart, Smyth, 2008). It was developed by Phillpot in 1972 for use in a hospital in Zimbabwe, where doctors were in short supply (Lavender, 2003; Neilson, Lavender, Quenby, et al., 2003; Lavender, Hart, Smyth, 2008). His objective was to provide a practical tool with which midwives and assistants could record all intrapartum details, not just cervical dilatation. Alternatively the partogram can be considered to be a tool for recording observations of clinical significance with the objective of reducing lengthy note taking, thus enabling midwives to use their time more effectively (Lavender, 2003; Lavender, Hart, Smyth, 2008). More than twenty years after its introduction, and using a partogram adapted from that formulated by Philpott and Castle, the WHO conducted a prospective non-randomised study of 35 484 women in South East Asia and concluded that the partogram was a necessary tool in the management of labour and recommended its universal application (Neilson, Lavender, Quenby, et al., 2003; World Health Organization Maternal Health and Safe Motherhood Programme, 1994). A more recent Cochrane review reported that the partogram may still be useful in low resource settings but that further evidence is required for its use in high resource settings (Lavender, Hart, Smyth, 2008).

The South African Department of Health has advocated that the correct use of the partogram should become the norm in each institution conducting births, and stated that a quality assurance programme should be implemented, using an appropriate tool to assess this (Department of Health, 2006). However, the use of the partogram and maternity case records still remains a huge challenge for the country as a whole. Partograms are not being used correctly and in some cases they are not used at all, as evidenced by the relatively low proportion of institutions that scored satisfactorily on the use of the partogram (Department of Health, 2006). For example, two studies conducted in Gauteng, at different levels of the health care system, report low completion rates of the partogram (Basu K.J, Hoosain S, Leballo G, Leistner E, Masango D, Mercer M, Mohapi M, Petkar S and Tshiove N.A, 2009; Thomas, Jina, Tint, et al., 2007), with one, showing only an improvement of up to 55% completion rates after intervening (Thomas, Jina, Tint, et al., 2007).

1.3.2. CAESAREAN SECTION AND ASSISTED DELIVERIES

When there is a clear indication of obstruction in the first stage of labour, delivery by CS is usually required (Neilson, Lavender, Quenby, et al., 2003; Patah &, Malik, 2011). CS rates and indications vary in different centres and often reflect the maternal health status and services of a given environment (Sule & Matawal, 2003, Patah & Malik, 2011). In Sub-Saharan Africa, caesarean section rates range from 5.0 in Zaire to 21.8% in Nigeria (Dumont, de Bernis, Bouvier-Colle, Bréart, MOMA study group, 2001). In South Africa, the caesarean section rate in the public sector has been steadily increasing from 16.0% in 2003 to 21.3% in 2009. A similar trend is noted in district hospitals with a rate of 14.0% in 2003 to 16.1% in 2009 (Day & Gray, 2010).

Caesarean section deliveries, if done for the correct indications, are meant to result in improved maternal and especially perinatal outcomes. However, with an increasing trend in elective CSs globally, this is not often found to be true (Betrán, Merialdi, Lauer, Bing-Shun, Thomas, Van Look, Wagner, 2007; Patah & Malik, 2011), and it is ironic that in many parts of the western world, there are concerns

about CS rates steadily rising without any evidence of reduction in perinatal mortality and morbidity (Neilson, Lavender, Quenby, et al., 2003).

Results and findings of a few studies point out that high CS rates may be associated with high maternal and neonatal morbidity and mortality rates. Betrán, Merialdi, Lauer, et al. (2007) state that in many developed countries, CS rates have increased, and attention has focused on strategies to reduce use due to concerns that higher CS rates do not confer additional health gain but may increase maternal risks, they have implications for future pregnancies and have resource implications for health services (Betrán, Merialdi, Lauer, et al., 2007). The results of their study also indicate that when CS rates rise substantially above 15%, risks to reproductive health outcomes may begin to outweigh the benefits (Betrán, Merialdi, Lauer, et al., 2007). They further state that according to data from the United Kingdom Confidential Enquiry into Maternal Deaths, an elective CS with no emergency presents a 2.84 times greater chance of a maternal death than a vaginal birth, suggesting that, when population CS rates rise beyond medically necessary levels, risks may outweigh benefits. Thus, high CS rates may be an indicator for excess maternal mortality in developed countries (Betrán, Merialdi, Lauer, et al., 2007).

Furthermore, a study conducted by Villar, Carroli, Zavaleta, Donner, Wojdyla, Faundes, Velazco, Bataglia, Langer, Narvaez, Valladares, Shah, Campodonico, Romero, Reynoso, Padua, Giordano, Kublicas, and Acosta. (2007) showed that women undergoing CS deliveries had an increased risk of severe maternal morbidity compared with women undergoing vaginal deliveries. The results of their study also showed that for all conditions, a CS delivery (either elective or intrapartum) was associated with a significantly higher risk than a vaginal delivery. Compared with vaginal deliveries, the risk was three to five times higher for maternal deaths, four times higher for hysterectomy, and twice as high for being admitted to an intensive care unit or having a hospital stay for more than seven days (Villar, Carroli, Zavaleta, et al., 2007). In view of the results of all these studies it is safer for mothers and babies to explore all other modes of delivery before a CS is considered, unless there is an unavoidable indication for a CS.

Apart from CS there are other mode of deliveries designed to assist a woman in labour to deliver e.g. forceps and vacuum-assisted deliveries (VAD). The WHO considers operative vaginal delivery to be a critical part of basic emergency obstetric care (Hook & Damos, 2008). In the United States it has been found that although rates of operative vaginal delivery are dropping, the vacuum has emerged as the most popular delivery instrument (Hook & Damos, 2008).

The purpose of an assisted vaginal delivery is to expedite delivery so as to limit maternal and neonatal morbidity. Hook & Damos (2008) state that the American College of Obstetricians and Gynecologists recommends operative vaginal delivery when there is a prolonged second stage of labor or nonreassuring fetal heart tones that would indicate fetal compromise, or if the second stage needs to be shortened for maternal benefit (e.g. maternal exhaustion).

Adequate knowledge and skill on the use of these instruments are however essential. To reduce the risks associated with operative vaginal deliveries health professionals must therefore be competent and confident in the use of both instruments. Health professionals should receive appropriate training in operative vaginal delivery supervised by a consultant obstetrician or other skilled member of staff. In the United Kingdom, competence must first be confirmed by a consultant obstetrician prior to undertaking unsupervised deliveries (Woodward Z, 2009). In addition, there should be guidelines available, as in the United Kingdom, where the operative vaginal delivery guideline applies to all obstetricians and maternity staff who may need to use forceps or vacuum extractors for assisted vaginal deliveries (Woodward Z, 2009). In addition, the implementation of these guidelines is important.

Obstetricians and gynaecologists in general prefer VAD over forceps deliveries, although increased usage of vacuums has also been associated with more frequent reports of adverse outcomes (Vacca, 2004). The operator is a key determinant of the success of a VAD and conversely, unfavourable results that are attributed to the procedure are often due to the user's unfamiliarity either with the instrument or basic rules governing its use (Vacca, 2009). Patients suitable for VAD may be selected on

the history of the pregnancy and labour, assessment of the condition of the fetus and the mother, and evaluation of the abdominal and vaginal findings.

At a facility level it is important to review Caesarean section and assisted delivery rates so that these are within the local norms, but that this also results in improvement in maternal, and especially perinatal outcomes.

1.3.3. MATERNAL MORTALITY

The Saving Mothers 2005 – 2007: Fourth Report on Confidential Enquiries into Maternal Deaths in South Africa defines maternal deaths as “deaths of women while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes” (National Committee for Confidential Enquiries into Maternal Deaths, 2008). According to AbouZahr & Wardlaw (2001) the definition of maternal mortality in the tenth revision of the International statistical classification of diseases and related health problems includes deaths due to both direct obstetric causes and to conditions aggravated by pregnancy or delivery.

A number of international targets have been set in reducing maternal mortality. In 1987, the WHO launched the Safe Motherhood Initiative, which aimed to reduce maternal mortality and morbidity by 50% by the year 2000 (Mahler, 1987). Currently, part of the Millennium Development Goal 5 is to reduce by 2015 the maternal mortality ratio to 75% of the 1990 level (Neilson, Lavender, Quenby, et al., 2003; United Nations, 2000).

In Sub-Saharan African countries, the maternal mortality remains high and may be increasing in some areas (Munjanja, Majoko, Lindmark, 2008). According to the findings of the Saving Mothers 2005 – 2007 report there has been a 20.1% increase in the number of deaths reported during the 2005 – 2007 triennium compared with the 2002 – 2004 triennium (National Committee for Confidential Enquiries into Maternal Deaths, 2008). According to the report the “big five” causes of maternal deaths have remained the same, namely non-pregnancy related infections – mainly

AIDS, complications of hypertension, obstetric haemorrhage, pregnancy related sepsis and pre-existing maternal disease (National Committee for Confidential Enquiries into Maternal Deaths, 2008). What is worth noting from the report is that the most frequent health professional avoidable factors contributing to maternal deaths were failure to follow standard protocols and poor problem recognition and initial assessment (National Committee for Confidential Enquiries into Maternal Deaths, 2008).

Further afield, in a study conducted by AbouZahr & Wardlaw (2001), it was found that coverage of skilled care for women during the crucial period of childbirth has been unchanged or declining in large parts of Sub-Saharan Africa. This may be one of the reasons for the slow decline of mortality rate in Sub-Saharan Africa. In South Africa, recommendations for the reduction of maternal deaths concern the following four main areas: knowledge development, quality of care and coverage of reproductive health services, establishing norms and standards and community involvement (National Committee for Confidential Enquiries into Maternal Deaths, 2008).

Antenatal care has a crucial role to play in the reduction of maternal morbidity and mortality. In a study conducted in February 2008 by Basu & Seopela (2010) at Rahima Moosa Hospital in Johannesburg, it was found that inadequate documentation of the antenatal cards might result in sub-standard antenatal care particularly in a developing country setting, leading to increased maternal and fetal morbidity and mortality. Some of the findings in the study revealed that examinations at the first antenatal visit were generally poorly performed with important parameters such as weight, blood pressure, urine dipsticks and general clinical examinations not checked in almost 20% of the women. This may lead to a missed diagnosis of conditions such as pre-eclampsia and eclampsia, the second most common cause of maternal mortality in South Africa (Basu & Seopela, 2010).

1.3.4. PERINATAL MORTALITY

Besides maternal mortality, we also have to focus on perinatal and childhood mortality. MDG 4 is to reduce the number of childhood deaths under the age of five years by two thirds by 2015 (United Nations, 2000). South Africa is one of only 12 countries in which mortality rates for children have increased since the baseline for the MDGs in 1990 (Chopra, Daviaud, Pattinson, Fonn and Lawn, 2009). In South Africa, approximately 33% of deaths under five-year olds, 44% of infant deaths (before one year) and 87% of neonatal deaths (in the first month) actually occur during the first seven days after birth. If the MDG of significantly reducing childhood deaths is to be achieved, a substantial reduction in early neonatal deaths will be required (Pattinson, Woods, Greenfield, et al., 2005). The first steps in improving early neonatal survival are to document the number and rate of deaths during the first week, identify common causes and look for modifiable factors. Only then can a logical approach be made to plan intervention strategies.

1.3.5. PERINATAL AND MATERNAL MORTALITY AND MORBIDITY REVIEW MEETINGS

It has been noted that between a quarter and a half of maternal and neonatal deaths in the South African national audits have an avoidable health-system factor contributing to the death (Chopra, Daviaud, Pattinson, et al., 2009). Poor transport facilities, lack of healthcare facilities and lack of appropriately trained staff were the major administrative problems contributing to maternal deaths (National Committee for Confidential Enquiries into Maternal Deaths, 2008). In addition to the technical inputs required within a health system, programs also need committed health professionals who adhere to the clinical guidelines. Audits of maternal deaths or complications when performed in a formalised manner can improve the quality of maternity care (Munjanja, Majoko, Lindmark, 2008).

The National Guidelines for Maternity Care in South Africa states that weekly or monthly audit meetings (Mortality and Morbidity Review meetings) should be held in all institutions rendering maternity services, and be attended by all doctors and

midwives directly involved in the care of pregnant women. The content of these meetings should include presentations and discussions of weekly (or monthly) statistics, with a special focus on maternal and perinatal deaths (Department of Health, 2000). The emphasis is on identifying problems and finding solutions to these problems (Department of Health, 2000).

To assist in the investigation of perinatal deaths, the Perinatal Problem Identification Programme (PPIP) was developed in the 1990s by the Research Unit for Maternal and Infant Health Care Strategies of the South African Medical Research Council and has been extensively field tested since 1996/7 (Pattinson, Woods, Greenfield, et al., 2005). The aim of the programme was to identify the common causes of death and associated factors which could be addressed to reduce the perinatal mortality rate (Pattinson, Woods, Greenfield, et al., 2005). Although not time consuming or labour intensive, PPIP relies on the presence of regular mortality meetings to discuss perinatal deaths and the possible shortcomings in care (Pattinson, Woods, Greenfield, et al., 2005).

1.4. JUSTIFICATION FOR THE STUDY

As there are global and national efforts to reduce maternal and perinatal mortality, it is important that within hospitals there is an assessment of mortality rates, and an evaluation of the clinical practices that are known to reduce mortality and morbidity. In Schweizer-Reneke Hospital there were indications (e.g. the high CS rate) that there may be poor management practices in the maternity unit but no previous study has investigated this in detail.

This study therefore established the maternal and perinatal mortality rates for the hospital and describes the use of the partogram, as a form of clinical practice, in the unit. This is because the partogram has been found to be a useful tool for detecting prolonged labour. The study will thus investigate whether the partogram is being used to its full benefit. It is also important to investigate the effectiveness of PPIP and MMR meetings in the hospital, because the aim of the programme is to identify

the common causes of death and associated factors which could be addressed to reduce the mortality rate.

Similarly, a review of mode of deliveries is important as this has service delivery and cost implications, as well as clinical implications for the mother and baby. The partogram is meant to assist in the identification of problematic deliveries, where either a caesarean section or assisted delivery might be indicated. Reviewing the use of the partogram in relation to the mode of delivery may indicate a gap in the monitoring of some patients, potentially leading to poor outcomes.

The results of the study will be used to improve maternity services at the hospital, as these could help in planning strategies to improve maternal and perinatal outcomes.

1.5. AIMS AND OBJECTIVES

1.5.1. STUDY AIM

The aim of the study was to describe the clinical outcomes and practices at the maternity unit of Schweizer-Reneke Hospital from 1 January 2009 to 31 December 2009.

1.5.2. STUDY OBJECTIVES

1. To describe the proportion of patients in the maternity unit with various clinical outcomes in the form of:
    a. mode of delivery (normal deliveries, CSs, and assisted deliveries) during the study period.
    b. final outcome of mother and baby (alive versus maternal deaths and/or perinatal deaths) during the study period.
2. To describe the completeness of partograms during the study period according to the World Health Organization standards.

3. To describe the associations between clinical practices (completeness of partogram) and clinical outcomes (mode of delivery and final outcome of mother and baby).
4. To determine the quality (number of meetings, attendants of the meeting and contents of the minutes of the meeting) of Perinatal Mortality and Morbidity Review and Maternal Mortality and Morbidity Review meetings held during the study period, in identifying factors associated with causes of death.

CHAPTER 2
METHODOLOGY

The methodology for this study was selected on the basis of its aims and objectives. In this chapter the following are discussed: study setting, study design, study population, study sample, data collection, including the research tools used, the pilot study, data processing methods and data analysis, and ethical considerations.

2.1. STUDY SETTING

The study took place at the maternity unit of Schweizer-Reneke Hospital, a level 1 district hospital in a rural district of the North West Province.

2.2. STUDY DESIGN

A cross-sectional study design was used, comprising of a retrospective review of the records of deliveries from 1 January 2009 to 31 December 2009. This included the maternity registers, data from the DHIS and maternity case records. The study also examined the records of MMR meetings.

2.3. STUDY POPULATION

All patients who delivered at the maternity unit during the study period were included in the study. Patients who appeared in the hospital records but delivered in transit (ambulances / private vehicles), at home or in casualty, were excluded due to the fact that the labour process was not documented from the beginning. Records of MMR meetings available at the maternity unit during the study period were also included.

2.4. STUDY SAMPLE

The study sample varied according to the objectives.

- For objective 1, the necessary records on all deliveries for study period were

reviewed.

- For objective 2 and 3, ten maternity case records of normal vaginal deliveries were first randomly selected for each month of the year. In addition, the records of all women who had assisted deliveries, i.e. CSs and VADs, and all women who delivered stillbirths for the study period were reviewed.
    - Rational for sampling and sample size:
      An assumption was made that 50% of normal vaginal deliveries would not have all aspects of the partogram completed, with a worst potential result of 40%. Based on this assumption, a sample size of 96 was required for a 95% confidence level. Ten records were reviewed for every month, to oversample for records with missing information, and also to account for possible variations in services over the study period. The records of all women who had assisted deliveries and all women who delivered stillbirths were reviewed as these were very few in number.
- For objective 4, all records of MMR meetings held during the study period were reviewed.

2.5. DATA COLLECTION, INCLUDING MEASUREMENT AND DATA SOURCES

The measurement tools for data collection were data capture sheets (Annexure A - C) developed on excel spreadsheets.

- **Annexure A (Tool 1):**
    - Data collection for objectives 1 and 3
    - Source of data: Maternity register, Total Births Data Sheets (PPIPv2) and DHIS.
    - Data to be collected: Number of Deliveries, Caesarean Sections, Vacuum-Assisted Deliveries and Forceps-Assisted Deliveries, Macerated Stillbirths, Fresh Stillbirths, Early Neonatal Deaths and Maternal Deaths.

- **Annexure B (Tool 2):**
  - Data collection for objectives 2 and 3
  - Source of data: Maternity Case Records/Partograms.
  - Data to be collected: Risk factors, fetal condition, progress of labour, contractions, maternal condition, management plan and recording times. This data was recorded as 2 = performance according to standard (meaning the performance was according to the country's standards, or if there is none, according to WHO standards), 1 = substandard performance (meaning the performance was "somewhere in the middle" between according to standard and not done at all, meaning either the time intervals were longer than according to guidelines, or the recordings are not as detailed as according to guidelines and 0 = not performed.

- **Annexure C (Tool 3):**
  - Data collection for objective 4
  - Source of data: Unit Administration Files
  - Data to be collected: Minutes of meetings, type of meeting, date of meeting, month under review, total number of attendants, categories of attendants, number of maternal deaths reported, number of perinatal deaths reported, number of cases specifically discussed, problem areas identified, action taken and follow up of action taken.

The researcher personally captured all of the data.

For the purposes of this study, the use of the partogram was used as a proxy measure for the quality of clinical practices, and maternal and perinatal deaths and assisted deliveries (including CSs) were considered to be clinical outcomes.

2.6. PILOT STUDY

The data capture sheets were piloted at Vryburg District Hospital, the neighbouring hospital almost the same size as the hospital under study. The use of the data capture sheets was assessed and no changes were made.

2.7. DATA PROCESSING METHODS AND DATA ANALYSIS

The records reviewed were from 1 January 2009 until 31 December 2009. Data was collected using the data capture sheets. The data was entered onto an Excel spread sheet and was imported into EpiInfo software 3.5.1 for analysis. Descriptive statistics which included means and ranges for continuous variables such as number of deliveries, CSs and maternal deaths were calculated, and proportions and frequencies were calculated for categorical variables such as completeness of the partogram, and risk factors.

The following associations were tested:

- Completeness of various components of the delivery record (partogram) with mode of delivery.
- Completeness of various components of the delivery record (partogram) with perinatal outcomes.
- Mode of delivery with perinatal outcomes.

This was done by doing Chi square tests or Fisher Exact tests if expected cell sizes were less than five. A p value of 0.05 was considered to be significant.

2.8. ETHICAL CONSIDERATIONS

Permission to conduct the study was obtained from the University of the Witwatersrand's Research Ethics Committee (Ethics Number M10252) (Annexure D) and the North West Province Department of Health and Social Development (Annexure E). All information was collected anonymously using the data capture tools and patients' confidentiality was respected. The study was a record review, and therefore no new information was collected and no patients were interviewed. The researcher remained impartial during the collection process and made the staff aware of the research process.

CHAPTER 3
RESULTS

The results obtained from the analysis of data are described in this chapter.

3.1. MODE OF DELIVERY

The mode of deliveries during 2009 based on the DHIS at the hospital is described in Table 3.1. Of the 699 deliveries, 80.1% were normal deliveries, 16.3% were CSs and 3.6% VADs. There was no forceps delivery during this period. Using the sampling strategy a total of 295 records were reviewed. The record review revealed errors in the number of CSs and VADs on the DHIS. On the DHIS, it was noted that there was 114 CS deliveries whereas the record review indicated there was in actual fact 138 CS deliveries. Similarly, 25 VADs were recorded on the DHIS as opposed to 29 such deliveries found through the record review. The total number of normal vaginal deliveries was not assessed on the record review.

Table 3.1 Mode of delivery over the study period of 2009

Month	Total	NV deliveries*		CS deliveries*		VA deliveries*	
		Number	%	Number	%	Number	%
Jan	54	47	87.0%	5	9.3%	2	3.7%
Feb	53	43	81.1%	8	15.1%	2	3.8%
Mar	51	44	86.3%	6	11.8%	1	2.0%
Apr	67	55	82.1%	10	14.9%	2	3.0%
May	46	37	80.4%	5	10.9%	4	8.7%
Jun	42	32	76.2%	7	16.7%	3	7.1%
Jul	57	43	75.4%	13	22.8%	1	1.8%
Aug	61	54	88.5%	5	8.2%	2	3.3%
Sep	60	45	75.0%	13	21.7%	2	3.3%
Oct	61	49	80.3%	10	16.4%	2	3.3%
Nov	58	45	77.6%	11	19.0%	2	3.4%
Dec	89	66	74.2%	21	23.6%	2	2.2%
TOTAL BASED ON DHIS	**699**	**560**	**80.1%**	**114**	**16.3%**	**25**	**3.6%**
TOTAL BASED ON RECORD REVIEW AND INCLUDED IN REST OF STUDY	**295**	**128**		**138**		**29**	

* NV: Normal vaginal deliveries, CS: caesarean section deliveries, VA: vacuum-assisted deliveries

3.2. PERINATAL OUTCOME

The perinatal outcomes at the hospital during 2009 that were reported on the DHIS are described in the Table 3.2. The perinatal mortality rate was calculated to be 56 per 1000 live births during this period. Again the record review identified more perinatal deaths (41) than what was reported on the DHIS (37).

Table 3.2 Perinatal deaths reported on the DHIS during the study period 2009

Month	Total deliveries	Total live births	Perinatal deaths	
			Number	Rate per 1 000
Jan	54	50	4	78
Feb	53	52	1	19
Mar	51	47	4	81
Apr	67	62	5	78
May	46	42	4	93
Jun	42	39	3	76
Jul	57	55	2	36
Aug	61	57	4	70
Sep	60	59	1	16
Oct	61	58	3	51
Nov	58	54	4	74
Dec	89	87	2	25
TOTAL	**699**	**662**	**37**	**56**

According to the information presented above, there were 662 (94.7%) live births and 37 (5.3%) perinatal deaths reported on the DHIS. Table 3.3 below shows the type of perinatal outcome based on record review for the period under study. The perinatal mortality rate was calculated to be 61.9/1000 live births. The majority of the deaths were as a result of macerated stillbirths (20 out of the 41) followed by fresh stillbirths and early neonatal deaths respectively.

Table 3.3 Type of perinatal outcome based on record review during the study period 2009

Type of perinatal death	Number (N=295)	Mortality Rate per 1 000 based on number of live births on DHIS
Perinatal death	41	61.9
Fresh stillbirth	16	24.2
Macerated stillbirth	20	30.2
Early neonatal death	5	7.8

3.3. MATERNAL OUTCOME

No maternal deaths were recorded during the study period.

3.4. COMPLETENESS OF PARTOGRAMS

In total, 295 records were reviewed for completeness of the partogram. This is described in Table 3.4. Out of the 295 partograms analysed none of them had data completed according to standard. Aspects that were especially poorly completed included monitoring of fetal decelerations (94.5% not completed), recording of risk factors (87.1% not completed), recording whether the action line was crossed (79.3% not completed), and monitoring descend of the fetal head (74.6% not completed).

Table 3.4 Completeness of partogram (all deliveries) (N= 295)

Data analysed	Standard		Substandard		Not done	
	Number	%	Number	%	Number	%
Recording risk factors	36	12.2%	2	0.7%	257	87.1%
Recording parity	114	38.6%	59	20.0%	122	41.4%
Recording age	182	61.7%	0	0%	113	38.3%
Recording date	176	59.7%	4	1.4%	115	39.0%
Recording pelvis	154	52.2%	0	0%	141	47.8%
Recording low/high risk	97	32.9%	0	0%	198	67.1%
Monitoring fetal heart	52	17.6%	143	48.5%	100	33.9%
Monitoring decelerations[1]	3	1.0%	13	4.4%	279	94.5%
Monitoring cervical dilatation	83	28.1%	116	39.3%	96	32.5%
Monitoring descend of the head	35	11.9%	40	13.6%	220	74.6%
Monitoring contractions	52	17.6%	97	32.9%	146	49.5%
Monitoring maternal BP	37	12.5%	139	47.1%	119	40.3%
Monitoring maternal pulse	36	12.2%	107	36.3%	152	51.5%
Monitoring maternal temp	33	11.2%	107	36.3%	155	52.5%
Action line crossed	46	15.6%	15	5.1%	234.	79.3%
Recording assessment time	114	38.6%	81	27.5%	100	33.9%
Recording problems identified	56	19.0%	81	27.5%	158	53.6%
Recording management plan	56	19.0%	80	27.1%	159	53.9%

[1] Recording of decelerations of the fetal heart in relation to contractions.

3.5. ASSOCIATION BETWEEN PARTOGRAM RECORDING AND MODE OF DELIVERY

When recording the partogram eighteen assessment factors were recorded. To determine the association between partogram recording and mode of delivery the focus was kept on the following fourteen components (variables): recording of risk factors, risk level (low / high risk), parity, age, pelvis, fetal heart, decelerations, cervical dilatation, descend of the head, contractions, crossing of the action line, problems identified and management plan.

According to table 3.5, out of all the CSs performed 91.3% did not have risk factors recorded and only 8.7% had risk factors recorded according to standard. In all of the 28 (100%) VADs, risk factors were not recorded, while 102 (79.7%) of NVDs did not have risk factors recorded. The difference in recording was statistically significantly different.

Table 3.5 Recording of risk factors on partogram by mode of delivery (N=295)

Recording risk factors	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	24 (18.8%	12 (8.7%)	0 (0.0%)	0.0084
Substandard	2 (1.6%)	0 (0.0%)	0 (0.0%)	
Not done	102 (79.7%)	126 (91.3%)	29 (100.0%)	

* Fisher Exact test conducted

There was statistically significant difference in the recording of parity by mode of delivery. In 39.1% of Normal Vertex Deliveries (NVDs) parity was not recorded, while 47.8% of CSs did not have parity recorded, and in 20.7% of VADs the partograms did not have parity recorded.

Table 3.6 Recording of parity on partogram by mode of delivery (N=295)

Recording parity	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	56 (43.8%)	44 (31.9%	14 (48.3%)	0.0400
Substandard	22 (17.2%)	28 (20.3%)	9 (31.0%)	
Not done	50 (39.1%)	66 (47.8%)	6 (20.7%)	

The table below shows that in 35.9% of NVDs age was not recorded in the partogram, in the CSs 44.9% had no age recorded and in the VADs 17.2% had no age recorded. A high percentage of VADs and NVDs had age recorded according to standard as compared to CSs.

Table 3.7 Recording of age on partogram by mode of delivery (N=295)

Recording age	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	82 (64.1%)	76 (55.1%)	24 (82.8%)	0.0157
Substandard	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Not done	46 (35.9%)	62 (44.9%)	5 (17.2%)	

* Fisher Exact test conducted

In Table 3.8, it is noted that there was a statistically significant association between recording of the fetal heart and mode of delivery. In the NVDs 32.0% of the partograms had no fetal heart recorded, in 50.8% it was not recorded according to standard and in 17.2% it was recorded according to standard. In 39.9% of CSs the fetal heart was not recorded in the partogram and in 47.8% it was not recorded according to standard and in only 12.3% it was recorded according to standard. In the VADs 13.8% of the partograms had no fetal heart recorded, in 41.4% it was not recorded according to standard and in 44.8% it was recorded according to standard.

Table 3.8 Monitoring the fetal heart on the partogram by mode of delivery (N=295)

Monitoring fetal heart	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	22 (17.2%)	17 (12.3%)	13 (44.8%)	0.0005
Substandard	65 (50.8%)	66 (47.8%)	12 (41.4%)	
Not done	41 (32.0%)	55 (39.9%)	4 (13.8%)	

* Fisher Exact test conducted

The association between monitoring contractions on the partogram and the mode of delivery is presented in Table 3.9. It was found that in 58.7% of CSs the monitoring of contractions were not recorded in the partogram, in the NVDs 46.1% of the partograms had no monitoring of contractions recorded, and in the VADs 20.7% of the partograms had no contractions recorded.

Table 3.9 Monitoring contractions on the partogram by mode of delivery (N=295)

Monitoring contractions	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	24 (18.8%)	16 (11.6%)	12 (41.4%)	0.0004
Substandard	45 (35.2%)	41 (29.7%)	11 (37.9%)	
Not done	59 (46.1%)	81 (58.7%)	6 (20.7%)	

In Table 3.10 it is noted that there is a statistically significant difference in the monitoring of cervical dilatation recorded and the mode of delivery. In 38.4% of CSs the cervical dilatation was not recorded in the partogram and in 39.12% it was not recorded according to standard and in 22.5% it was recorded according to standard. In the NVDs 30.5% of the partograms had no cervical dilatation recorded, in 39.8% it was not recorded according to standard and in 29.7% it was recorded according to standard. In the VADs 13.8% of the partograms had no cervical dilatation recorded, in 37.9% it was not recorded according to standard and in 48.3% it was recorded according to standard.

Table 3.10 Recording of monitoring of cervical dilatation on the partogram by mode of delivery (N=295)

Monitoring cervical dilatation	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	38 (29.7%)	31 (22.5%)	14 (48.3%)	0.0308
Substandard	51 (39.8%)	54 (39.1%)	11 (37.9%)	
Not done	39 (30.5%)	53 (38.4%)	4 (13.8%)	

* Fisher Exact test conducted

The table below (Table 3.11) shows that in 51.6% of NVDs, problems identified were not recorded in the partogram, with the CSs 62.3% of the partograms had no identified problems recorded, and in the VADs 20.7% of the partograms had no problems identified recorded.

Table 3.11 Recording of identified problems on the partogram by mode of delivery (N=295)

Recording problems identified	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	25 (19.5%)	20 (14.5%)	11 (37.9%)	0.0013
Substandard	37 (28.9%)	32 (23.2%)	12 (41.4%)	
Not done	66 (51.6%)	86 (62.3%)	6 (20.7%)	

In table 3.12 it is noted that there is a statistically significant difference in the recording of the management plan across the modes of delivery. A greater percentage of normal vaginal deliveries (53.1%) and caesarean section deliveries (61.6%) did not have a management plan recorded, compared to 20.7% of vacuum-assisted deliveries.

Table 3.12 Recording of the management plan on the partogram by mode of delivery (N=295)

Recording management plan	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	24 (18.8%)	21 (15.2%)	11 (37.9%)	0.0019
Substandard	36 (28.1%)	32 (23.2%)	12 (41.4%)	
Not done	68 (53.1%)	85 (61.6%)	6 (20.7%)	

According to the p-value in the 8 tables above (table 3.5 to 3.12) there is a significant association between the recording of the risk factors, parity, age, monitoring of the fetal heart, contractions, cervical dilatation, problems identified and the management plan on the partogram and the mode of delivery.

The p-value in the following 6 tables indicate that there is no significant association between the recording of pelvis adequacy, the risk level, fetal heart decelerations, cervical dilatation, descend of the head, action line crossed and assessment time on the partogram and the mode of delivery.

Table 3.13 below shows no significant difference in the recording of pelvis adequacy across the different modes of delivery. In just over fifty percent (55.5%) of NVDs the pelvis adequacy was recorded on the partogram, while in 46.4% of CSs and 65.5% of VADs it was recorded in the partograms.

Table 3.13 Recording of pelvis adequacy on partogram by mode of delivery (N=295)

Recording pelvis	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	71 (55.5%)	64 (46.4%)	19 (65.5%)	0.1062
Substandard	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Not done	57 (44.5%)	74 (53.6%)	10 (34.5%)	

* Fisher Exact test conducted

In Table 3.14 it is noted that in 69.6% of CSs the risk level was not recorded in the partogram and in 30.4% it was recorded according to standard. In the NVDs 68.8% of the partograms had no risk level recorded, in 31.3% it was recorded according to standard. In the VADs 48.3% of the partograms had no risk level recorded, in 51.7% it was recorded according to standard.

Table 3.14 Recording of the risk level on partogram by mode of delivery (N=295)

Recording low/high risk	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	40 (31.3%)	42 (30.4%)	15 (51.7%)	0.0745
Substandard	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Not done	88 (68.8%)	96 (69.6%)	14 (48.3%)	

* Fisher Exact test conducted

The table below (Table 3.15) shows that in 96.4% of CSs the monitoring of fetal heart decelerations were not recorded in the partogram, in 91.4% of the NVDs no fetal heart deceleration's monitoring was recorded, and in VADs all of the 29 (100%) partograms had no fetal heart decelerations recorded.

Table 3.15 Recording of the monitoring of fetal heart decelerations on the partogram by mode of delivery (N=295)

Monitoring decelerations	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	2 (1.6%)	1 (0.7%)	0 (0%)	0.2822
Substandard	9 (7.0%)	4 (2.9%)	0 (0%)	
Not done	117 (91.4%)	133 (96.4%)	29 (100.0%)	

* Fisher Exact test conducted

In Table 3.16 it is noted that in 74.6% of CSs the descend of the head was not recorded in the partogram and in 75.0% of the partograms from NVDs had no descend of the head recorded, while in the VADs 72.4% of the partograms had no descend of the head recorded.

Table 3.16 Recording of the monitoring of the descend of the head on partogram by mode of delivery (N=295)

Monitoring descend of the head	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	14 (10.9%)	14 (10.1%)	7 (24.1%	0.1568
Substandard	18 (14.1%)	21 (15.2%)	1 (3.4%)	
Not done	96 (75.0%)	103 (74.6%)	21 (72.4%)	

* Fisher Exact test conducted

The table below (Table 3.17) shows that in 81.2% of CSs the crossing of the action line was not recorded in the partogram, in the NVDs 80.5% of the partograms had no crossing of the action line recorded, and in the VADs 65.5% of the partograms had no crossing of the action line recorded.

Table 3.17 Recording whether the action line is crossed on partogram by mode of delivery (N=295)

Action line crossed	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	17 (13.3%)	21 (15.2%)	8 (27.6%)	0.2861
Substandard	8 (6.3%)	5 (3.6%)	2 (6.9%)	
Not done	103 (80.5%)	112 (81.2%)	19 (65.5%)	

* Fisher Exact test conducted

The table below (Table 3.18) shows that there was a marginally significant association between recording the assessment time on the partogram and mode of delivery. In the NVDs 32.8% of the partograms had no assessment time recorded, in 24.2% it was not recorded according to standard and in 43.0% it was recorded according to standard. In 39.1% of the CSs the assessment time was not recorded in the partogram and in 29.0% it was not recorded according to standard, while in 31.9% it was recorded according to standard. In the VADs 13.8% of the partograms had no assessment time recorded, in 34.5% it was not recorded according to standard and in 51.7% it was recorded according to standard.

Table 3.18 Recording of the assessment time on partogram by mode of delivery (N=295)

Recording assessment time	NVD (N=128)	C/S (N=138)	VAD (N=29)	p value
Standard	55 (43.0%)	44 (31.9%)	15 (51.7%)	0.0545
Substandard	31 (24.2%)	40 (29.0%)	10 (34.5%)	
Not done	42 (32.8%)	54 (39.1%)	4 (13.8%)	

* Fisher Exact test conducted

The results from Table 3.5 to 3.18 are summarised in Figure 3.1. The aspects of the partogram that were completed according to standard by the mode of deliveries are presented in the figure.

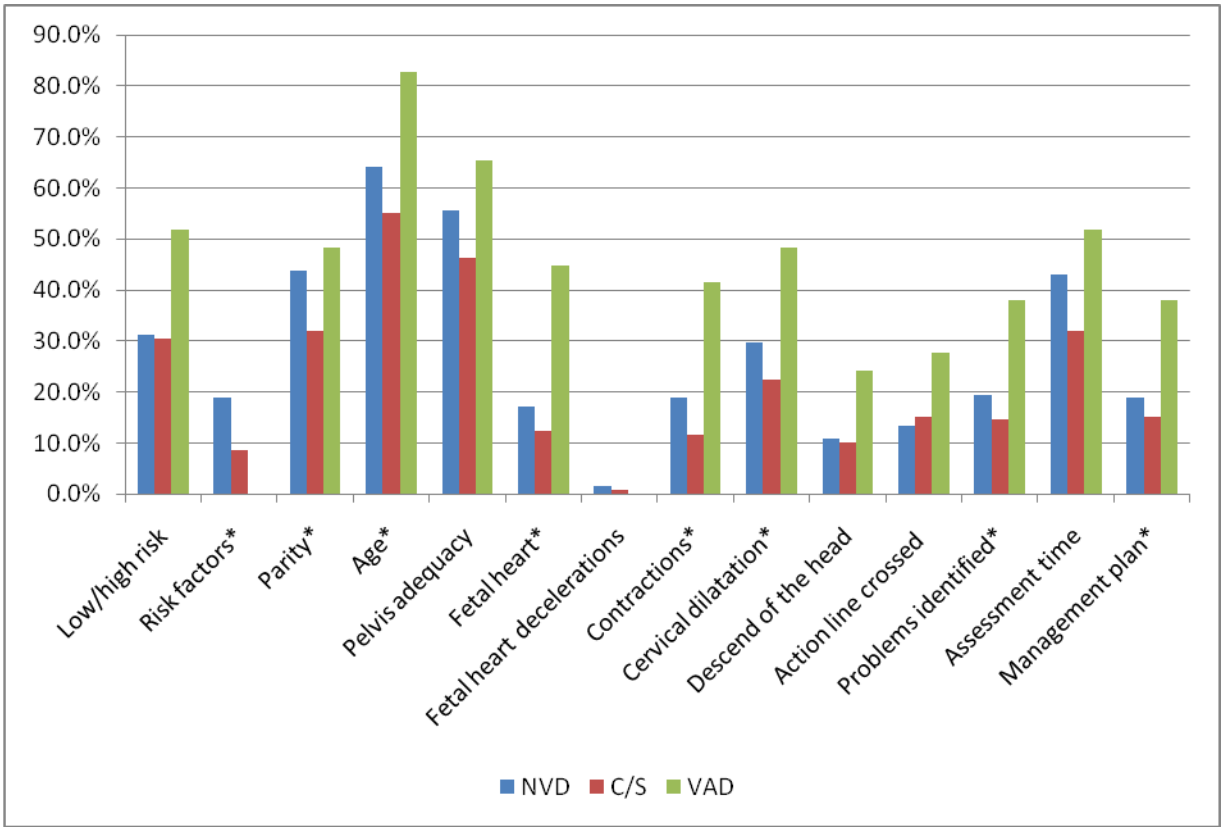


Figure 3.1 Aspects of the partograms completed according to standard for normal vaginal deliveries, caesarean section deliveries and vacuum-assisted deliveries (N=295)

(* indicates statistically significantly difference at p value of 0.05)

3.6. ASSOCIATION BETWEEN PARTOGRAM RECORDING AND PERINATAL OUTCOMES

The completeness of the partograms of perinatal deaths are described in tables 3.19 to 3.29. The intention of these tables is to establish the association between completeness of the partogram and perinatal deaths. A review of the records found that there were 41 perinatal deaths and all of these records were reviewed and compared to partograms that were selected for review based on the sampling strategy presented earlier.

To determine the association between partogram recording and perinatal outcomes the focus will be on the following eleven components (variables) as they are the important determinants of the perinatal outcomes: risk factors, risk level (low/high

risk), pelvic adequacy, fetal heart, decelerations, cervical dilatation, descend of the head, contractions, crossing of the action line, problems identified and management plan.

Table 3.19 indicates that there was no significant association in the recording of risk factors by perinatal outcome. The table below shows that in 86.6% of the live born babies, risk factors were not recorded in the partogram and in 12.5% it was recorded according to standard. For the perinatal deaths, 90.2% of the partograms had no risk factors recorded and in 9.8% it was recorded according to standard.

Table 3.19 Recording of risk factors on the partogram by perinatal outcome (N=295)

Recording risk factors	Alive (N=254)	Perinatal death (N=41)	p value
Standard	32 (12.6%)	4 (9.8%)	0.7372
Substandard	2 (0.8%)	0 (0.0%)	
Not done	220 (86.6%)	37 (90.2%)	

* Fisher Exact test conducted

In Table 3.20 it is noted that there is a significant association between the recording of risk level and perinatal outcome. In 62.6% of the live born babies the risk level was not recorded in the partogram and in 37.3% it was recorded according to standard. In the perinatal deaths, 95.1% of the partograms had no risk level recorded and in 4.9% it was recorded according to standard.

Table 3.20 Recording of risk level on the partogram by perinatal outcome (N=295)

Recording low/high risk	Alive (N=254)	Perinatal death (N=41)	p value
Standard	95 (37.4%)	2 (4.9%)	0.0000
Substandard	0 (0.0%)	0 (0.0%)	
Not done	159 (62.6%)	39 (95.1%)	

* Fisher Exact test conducted

Table 3.21 shows that there were fewer partograms that had pelvis adequacy recorded according to standard in perinatal deaths compared to cases where babies were born alive but this association was not statistically significant. In 45.7% of the live born babies, pelvic adequacy was not recorded in the partogram and in 54.3% it was recorded according to standard. In the perinatal deaths, 61.0% of the partograms had no pelvic adequacy recorded and in 39.0% it was recorded according to standard.

Table 3.21 Recording of pelvic adequacy on partogram by perinatal outcome (N=295)

Recording pelvis	Alive (N=254)	Perinatal death (N=41)	p value
Standard	138 (54.3%)	16 (39.0%)	0.0687
Substandard	0 (0.0%)	0 (0.0%)	
Not done	116 (45.7%)	25 (61.0%)	

* Fisher Exact test conducted

The table below (Table 3.22) shows that in 31.9% of the live born babies monitoring of the fetal heart was not recorded in the partogram, in 48.8% it was not recorded according to standard and in 19.3% it was recorded according to standard. In the perinatal deaths 46.3% of the partograms had no monitoring of the fetal heart recorded, in 46.3% it was not recorded according to standard and in 7.3% it was recorded according to standard. This finding was however, not found to be significant at a p value of 0.05.

Table 3.22 Recording of monitoring of the fetal heart on the partogram by perinatal outcome (N=295)

Monitoring fetal heart	Alive (N=254)	Perinatal death (N=41)	p value
Standard	49 (19.3%)	3 (7.3%)	0.0784
Substandard	124 (48.8%)	19 (46.3%)	
Not done	81 (31.9%)	19 (46.3%)	

* Fisher Exact test conducted

The table below shows that in 94.5% of the live born babies monitoring of the fetal heart decelerations were not recorded in the partogram, in 4.36% it was not recorded according to standard and in 1.2% it was recorded according to standard. In the perinatal deaths 95.1% of the partograms had no monitoring of the fetal heart decelerations recorded, in 4.9% it was not recorded according to standard and none were recorded according to standard. This association was not found to be significant.

Table 3.23 Recording of monitoring of the fetal heart decelerations on the partogram by perinatal outcome (N=295)

Monitoring decelerations	Alive (N=254)	Perinatal death (N=41)	p value
Standard	3 (1.2%)	0 (0.0%)	0.7750
Substandard	11 (4.3%)	2 (4.9%)	
Not done	240 (94.5%)	39 (95.1%)	

* Fisher Exact test conducted

The recording of monitoring of contractions by perinatal outcome is presented in Table 3.24. The table shows that in 45.6% of the live born babies contractions were not recorded in the partogram, while in the perinatal deaths 61.0% of the partograms had no contractions recorded.

Table 3.24 Recording of monitoring of contractions on the partogram by perinatal outcome (N=295)

Monitoring contractions	Alive (N=254)	Perinatal death (N=41)	p value
Standard	48 (18.9%)	4 (9.8%)	0.2089
Substandard	85 (33.5%)	12 (29.3%)	
Not done	121 (47.6%)	25 (61.0%)	

* Fisher Exact test conducted

Table 3.25 indicates that there was a significant association between recording the monitoring of cervical dilatation and perinatal outcome. In 30.3% of the live born babies cervical dilatation was not recorded in the partogram, in 39.0% it was not recorded according to standard and in 30.7% it was recorded according to standard. In the perinatal deaths 46.3% of the partograms had no cervical dilatation recorded, in 41.5% it was not recorded according to standard and in 12.2% it was recorded according to standard.

Table 3.25 Recording of monitoring of cervical dilatation on the partogram by perinatal outcome (N=295)

Monitoring cervical dilatation	Alive (N=254)	Perinatal death (N=41)	p value
Standard	78 (30.7%)	5 (12.2%)	0.0281
Substandard	99 (39.0%)	17 (41.5%)	
Not done	77 (30.3%)	19 (46.3%)	

A significant association was also found between recording of monitoring of descend of the fetal head and perinatal outcome (Table 3.26). The table below shows that in 74.4% of the live born babies, descend of the head was not recorded on the partogram, in 12.2% it was not recorded according to standard and in 13.4% it was recorded according to standard. In the perinatal deaths, 75.6% of the partograms had no descend of the head recorded, in 22.0% it was not recorded according to standard and in 2.4% it was recorded according to standard.

Table 3.26 Recording of monitoring of descend of the fetal head on the partogram by perinatal outcome (N=295)

Monitoring descend of the head	Alive (N=254)	Perinatal death (N=41)	p value
Standard	34 (13.4%)	1 (2.4%)	0.0487
Substandard	31 (12.2%)	9 (22.0%)	
Not done	189 (74.4%)	31(75.6%)	

* Fisher Exact test conducted

The table below (Table 3.27) shows that in 78.8% of the live born babies crossing the action line was not recorded in the partogram, in 3.1% it was not recorded according to standard and in 18.0% it was recorded according to standard. In the perinatal deaths 82.9% of the partograms had no crossing of the action line recorded, in 17.1% it was not recorded according to standard and none was recorded according to standard. This association was found to be statistically significant.

Table 3.27 Recording of action line crossing on the partogram by perinatal outcome (N=295)

Action line crossed	Alive (N=254)	Perinatal death (N=41)	p value
Standard	46 (18.1%)	0 (0.0%)	0.0000
Substandard	8 (3.1%)	7 (17.1%)	
Not done	200 (78.7%)	34 (82.9%)	

* Fisher Exact test conducted

Table 3.28 shows that in 53.9% of the live born babies the problems identified were not recorded in the partogram, in 25.2% they were not recorded according to standard and in 20.9% they were recorded according to standard. In the perinatal deaths 51.2% of the partograms had no problems identified recorded, in 41.5% they were not recorded according to standard and in 7.3% they were recorded according to standard. This association was found to be statistically significant.

Table 3.28 Recording of problems identified on the partogram by perinatal outcome (N=295)

Recording problems identified	Alive (N=254)	Perinatal death (N=41)	p value
Standard	53 (20.9%)	3 (7.3%)	0.0323
Substandard	64 (25.2%)	17 (41.5%)	
Not done	137 (53.9%)	21 (51.2%)	

* Fisher Exact test conducted

The table below shows that in 54.3% of the live born babies the management plan was not recorded in the partogram, in 24.8% it was not recorded according to standard and in 20.9% it was recorded according to standard. In the perinatal deaths 51.2% of the partograms had no management plan recorded, in 41.5% it was not recorded according to standard and in 7.3% it was recorded according to standard. This was a statistically significant association.

Table 3.29 Recording of management plan on the partogram by perinatal outcome (N=295)

Recording management plan	Alive (N=254)	Perinatal death (N=41)	p value
Standard	53 (20.9%)	3 (7.3%)	0.0289
Substandard	63 (24.8%)	17 (41.5%)	
Not done	138 (54.3%)	21 (51.2%)	

* Fisher Exact test conducted

The findings presented in Table 3.19 to 3.29 are summarised in Figure 3.2. The aspects of the partogram that were completed according to standard by the perinatal outcome are presented in the figure. Recording keeping was very poor, ranging from 0% completion to 54% at best.

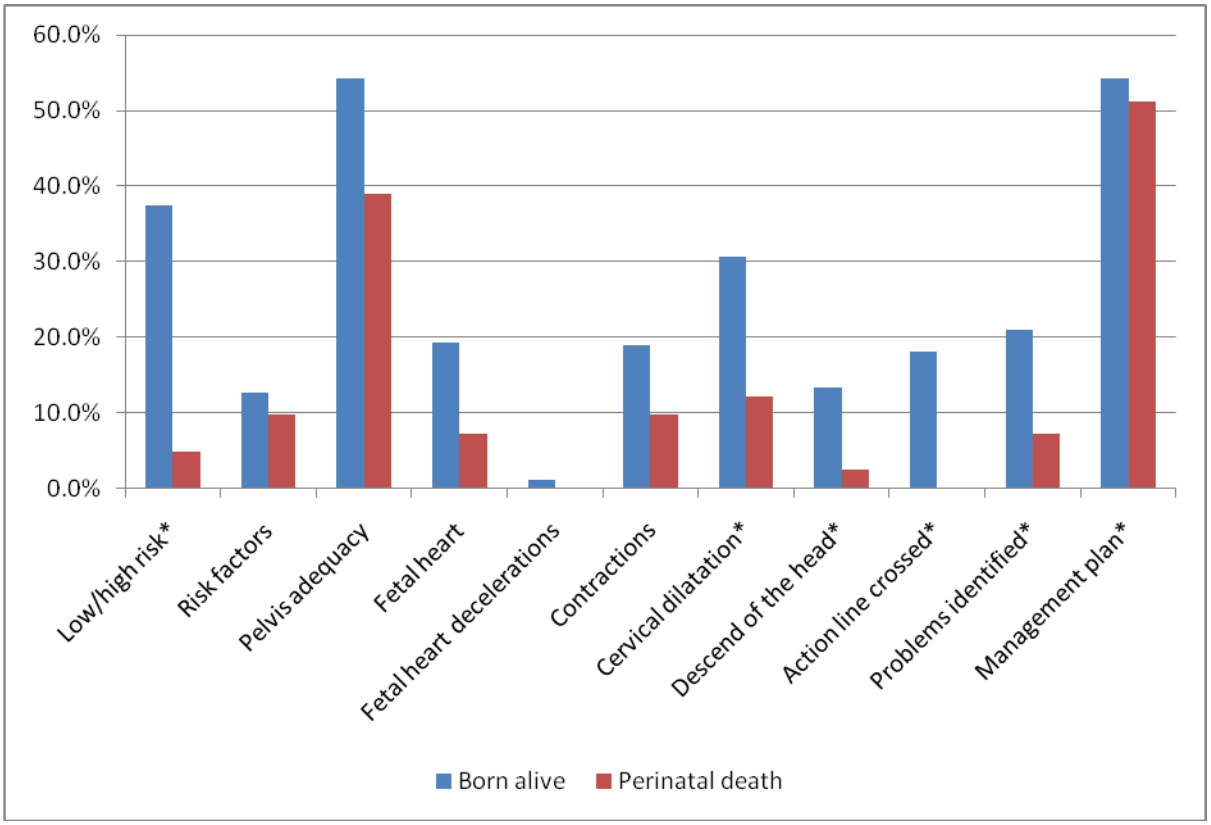


Figure 3.2 Aspects of the partograms completed according to standard for babies who were born alive and perinatal deaths (N=295)

(* indicates statistically significantly association at p value of 0.05)

3.7. ASSOCIATION BETWEEN MODE OF DELIVERY AND PERINATAL DEATHS

According to Table 3.30 below, 87.8% of perinatal deaths were born by normal vaginal delivery while 7.3% were born by CS and 4.9% by VAD. In cases where babies were born alive, 36.2% were born by normal vaginal delivery, 53.1% by CS delivery and 10.6% by VAD. The association between mode of delivery and perinatal outcome was found to be statistically significant. All of the fresh stillbirths (100%) and 90% (n=18) of the macerated stillbirths were born by normal vaginal delivery.

Table 3.30 Association between mode of delivery and perinatal outcome (N=295)

	NVD	CS	VAD	p value
Alive (N=254)	92 (36.2%)	135 (53.1%)	27(10.6%)	0.0000
Perinatal death (N=41)	36 (87.8%)	3 (7.3%)	2 (4.9%)	
Fresh stillbirth (N=16)	16 (100.0%)	0 (0.0%)	0 (0.0%)	
Macerated stillbirth (N=20)	18 (90.0%)	0 (0.0%)	2 (10.0%)	
Early neonatal death (N=5)	2 (40.0%)	3 (40.0%)	0 (0.0%)	

3.8. PPIP AND MMR MEETINGS

For the period under study one MMR meeting was conducted where one fresh stillbirth incident was analysed. The meeting was attended by the Chief Executive Officer, Clinical Manager and the Nursing Manager. None of the midwives working in the maternity unit attended the meeting. In the meeting, problems that lead to the delivery of a premature stillbirth were discussed and action was taken to prevent a reoccurrence. The Clinical Manager and a Professional Nurse delegated to coordinate PPIP reports worked together to analyse perinatal deaths using the software provided and submitted the reports (PPIP v2.1) to the MCWH directorate at the provincial office. The reports were not discussed with the management and the maternity unit staff.

CHAPTER 4
DISCUSSION

In this chapter, the results obtained from this study are discussed and compared with those from other studies.

4.1. QUALITY OF RECORD-KEEPING

Overall, there appears to be a problem with record-keeping. The record review revealed that there were fewer CSs and VADs recorded on the DHIS than those appearing in the hospital records. In view of that discrepancy the CS rate and the VAD rate at the hospital during the study period may actually be higher. This raises questions regarding the sources of data recorded in the DHIS. It may also be a sign of the gaps in information management at the hospital. The DHIS is the only information management system recognised in the Department of Health and it is the one used for decision making, therefore wrong conclusions and decisions may be taken regarding maternity services at the hospital.

Problems were also identified with record-keeping in clinical notes but this will be discussed in detail below (section 4.4).

4.2. MODE OF DELIVERY

The rate of CSs performed at the hospital during the study period was found to be 16%, which is above the national norm of 11% for district hospitals according to the DHIS Core Manual (KwaZulu-Natal Department of Health, 2010.). Although very unevenly distributed, 15% of births worldwide, occur by CS. Latin America and the Caribbean show the highest rate (29.2%), and Africa show the lowest (3.5%) (Betrán, Merialdi, Lauer, et al., 2007). In Africa, South Africa has the highest rate of CS at 15.4% (Betrán, Merialdi, Lauer, et al., 2007). Shah, Fawole, M'imunya, et al. (2009) concluded from the results of their study that although usually lifesaving, caesarean section delivery increases maternal and newborn risks and costs. The results of their study showed that increased emergency caesarean delivery rates

were associated with fresh stillbirths, neonatal deaths, and severe neonatal morbidity (Shah, Fawole, M'imunya, et al., 2009). According to a study conducted by Chaillet & Dumont (2007) the CS rate can be safely reduced by complex interventions that involve health professionals analysing and modifying their practice. Their results suggest that multifaceted strategies, based on audit and feedback, are advised to improve clinical practice and effectively reduce the CS rate (Chaillet & Dumont, 2007).

The rate of VADs was found to be 3%, however no norm is set for this indicator, nor is it collected on the DHIS.

4.3. PERINATAL AND MATERNAL OUTCOMES

The perinatal mortality rate in a health district is a key health status indicator (Wilkinson, 1997). The perinatal mortality rate at the hospital during the study period is high at 56 per 1000 live births. According to the Saving Babies 2006-2007 report the national perinatal mortality rate was 35/1000 live births (for births 500g and above) (Pattinson RC, 2011).

Avoidable perinatal deaths occur within the health system and it is important to recognise this and understand the reasons why, and to intervene to minimize the magnitude of the problem (Wilkinson, 1997). In 1991, a study conducted by Wilkinson showed that a third of all perinatal deaths in Jane Furse Hospital in Limpopo were judged to be due to simple errors or omissions in basic care, and that when simple interventions were introduced perinatal mortality fell significantly (Wilkinson, 1991). Although dated, more recent literature such as the Saving Babies Reports, have still found substantial avoidable factors related to health service delivery (Pattinson RC, 2011).

The findings of the Saving Babies report show that the avoidable mortality rate for health care providers is second highest in district hospitals (6.57/1000 births), of which intrapartum asphyxia and birth trauma is the most common cause (Pattinson RC, 2011). The findings also show that avoidable mortality rate of administrative

problems is again second highest in district hospitals (2.93/1000 births) and relate mostly to intrapartum asphyxia, birth trauma and spontaneous preterm birth (Pattinson RC, 2011). This data from the Saving Babies report indicates that the quality of care at district hospitals is poor (Pattinson RC, 2011). The causes for the fresh stillbirths and early neonatal deaths (n=21, 51.2%) needs to be further investigated as these may be as a result of poor intrapartum and postpartum care provided in the hospital.

The high number of macerated stillbirths (n=20, 48.8%) during the study period could possibly be related to problems with antenatal care. Similarly, unexplained deaths (22%) formed a large part of perinatal deaths during the 2008 – 2009 Saving Babies survey. The majority of these were macerated stillbirths and babies who were dead on admission to the health institution (Pattinson RC, 2009). The quality of antenatal care provided is very important in this regard (Pattinson RC, 2009).

One of the problems directly related to the patient identified in the Saving Babies Report is not attending antenatal care and this could potentially account for some of the macerated stillbirths. In a study conducted by Gaunt (2010) on improving perinatal outcomes in a deeply rural district hospital (Zithulele Hospital, Mqanduli District, Eastern Cape) in South Africa, avoidable factors associated with perinatal deaths clearly pointed to the fact that accessing care timeously was a major problem. Lack of transport from home to hospital and delay in presenting during labour are both invariably consequences of third-world income and infrastructure (Gaunt, 2010). Similarly with Schweizer-Reneke Hospital, lack of transport from home to the institution was identified in the PPIP analyses to be associated with some perinatal deaths.

Estimates of the population based maternal mortality ratio for South Africa vary between 150/100 000 live births and 578/100 000 live births depending on the source of information (National Committee for Confidential Enquiries into Maternal Deaths, 2008). In Schweizer-Reneke Hospital no maternal deaths were reported during the study period, and therefore the relationship between maternal outcomes and clinical practices could not be established. Although there were no maternal deaths recorded at the hospital, evidence was still found of poor adherence to

clinical practices in the maternity unit of the hospital and this may result in mortality in the future. In addition, maternal morbidity and “near-misses” were not assessed and there may be cases of such incidents. Furthermore, some patients with complications may have been transferred out of the hospital before delivery, or death. Further investigation is required in this regard.

4.4. COMPLETENESS OF PARTOGRAMS

The study revealed that there was poor recording in terms of the clinical notes using the partogram. No partogram that was reviewed for the study was completed according to standard. Sections that were the least completed included monitoring decelerations (1.0%) and the descend of the fetal head (11.9%), and monitoring risk factors (12.2%), and the mother’s temperature (11.2%), pulse (12.2%) and blood pressure (12.5%). However, sadly, these findings are no different from other studies done in the country. In a study conducted by Gaunt in a rural hospital in the Eastern Cape, it was found that there were poor maternity practices including inadequate monitoring during labour, with no routine use of the partogram (Gaunt, 2010). Similar findings were reported by Basu, Hoosain, Leballo, et al. (2009) in Charlotte Maxeke Johannesburg Hospital, and the authors believed that inadequate recording of the partogram was one of the factors contributing to the high mortality and morbidity at that hospital.

Getting health professionals to use the partogram, which is a simple and basic tool that is shown to be effective, is still problematic in South Africa. The reason for this is unknown. It could potentially be related to lack of or poor training resulting in poor knowledge on the use and interpretation of the partogram. Health system factors may also play a role in that facilities are short staffed or too busy to complete documentation. However, the findings dispute this as it showed that certain aspects of partogram were well completed whereas others were not. Finally, it may be related to health professional factors, such as attitude, competence and interest in providing good quality care and using evidence-based practices.

4.5. ASSOCIATION BETWEEN PARTOGRAM RECORDING AND MODE OF DELIVERY

The incompleteness of the partograms may have led to unnecessary CSs because clinicians make decisions to perform a CS based on what is recorded on the partogram coupled with their own findings. Critical data was not recorded according to standard on the partograms of women who underwent CSs. Pelvic adequacy (53.6%), fetal heart (39.9%), fetal heart decelerations (96.4%), contractions (58.7%), cervical dilatation (38.4%), descend of the head (74.6%), contractions (58.7%) and action line crossed (81.2%) were not recorded. The non recording of this information may have lead to clinicians drawing wrong conclusions about the condition of the fetus (fetal heart and fetal heart decelerations i.e. rate of the fetal heart in relation to uterine contractions determined by the cardiotocograph, late decelerations are a definite sign of fetal distress) or the progress of labour (cervical dilatation and descend of the head), thus clinicians could make wrong decisions about an intervention to be taken.

The frequency and the strength of the contractions serve as one of the indications of whether the woman will be able to deliver normally or will need assistance. This makes the consistent monitoring and recording of contractions during labour very important. Sometimes a decision is made by clinicians that a woman is progressing slowly without a specific reason being identified. Poor recording of contractions in CSs (58.7% not recorded and 29.7% not recorded according to standard) may be one the reasons why women have CSs performed when contractions could have been augmented with intravenous medication when they are weak or infrequent instead of performing a CS. This would lead to a reduction in unnecessary CSs.

The recording of the assessment time is an indication of how frequently the patient was monitored. The infrequent or inconsistent recording time may be an indication that either the patient was not properly monitored or was properly monitored but the recording was not done.

It is clear from Figure 3.1 in the results chapter that there are inconsistencies in record keeping. Some aspects of the partogram were better completed in all patients (e.g. maternal age) whereas others are poorly completed in all patients (e.g. monitoring fetal heart decelerations). It appears that recording of history was better than aspects related to the monitoring of labour. In other cases, however, a significant discrepancy is noted in the completeness of record keeping by mode of delivery, and in such cases partograms of patients that underwent VADs and NVDs were often better completed than patients who had CS deliveries. This means that providers probably complete some things but leave out others.

Finally, it should be noted that none of the aspects of the partograms were completed according to standard in all modes of deliveries. The partogram is meant to assist in the identification of poor progress of labour and fetal distress, especially in low resource settings (Lavender, Hart, et al., 2008). It appears that decisions regarding mode of delivery at Schweizer-Reneke Hospital are not based on partogram findings, considering the poor completion of partograms in general.

4.6. ASSOCIATION BETWEEN PARTOGRAM RECORDING AND PERINATAL OUTCOME

Critical data relating to perinatal outcomes was not recorded in the perinatal deaths that occurred. For example, risk factors (90.2%), risk level (95.1%), fetal heart (46.3%), decelerations (95.1%), contractions (61.0%), problems identified (51.2%) and management plan (51.2%). Some of the perinatal deaths could have been prevented if these critical data was completed according to standard. Significant associations were found between the completion of the following aspects of the partogram and mode of delivery, where partograms of mothers with perinatal deaths had been worse completed: recording of risk level, monitoring of cervical dilatation, descend of the fetal head, action line crossed and recording of identified problems.

In a study conducted by Basu, Hoosain, Leballo, et al. (2009) at Charlotte Maxeke Johannesburg Academic Hospital it was discovered that the partogram is a poorly used tool. Observations from that study showed that health professionals frequently

omitted to record the condition of the fetus and the findings on vaginal examination in the partogram. Inadequate recording of the partogram may have contributed to the perinatal mortality rate at the hospital. In all aspects of the partogram, cases with perinatal deaths were less completed than cases where babies were born alive. Of concern is that monitoring fetal heart and fetal heart decelerations were extremely poorly completed, raising the question: could some of the babies have been saved if partograms were better completed and appropriate action taken.

4.7. ASSOCIATION BETWEEN MODE OF DELIVERY AND PERINATAL DEATHS

The study found that there were significantly more perinatal deaths in women who had had normal vaginal deliveries. This would be considered to be appropriate management for an intrauterine death as one would not expect a woman to undergo a surgical procedure, such as a CS, for a child who is already deceased. Further subanalysis, however, reveals some worrying results. The study found that all of the fresh stillbirths had in actual fact been delivered by normal vaginal delivery. These are potential babies that may have been saved if action had been taken earlier. This points to potential problems in the delivery of intrapartum care at the hospital. The latest Saving Babies report indicated that about a quarter of fresh stillbirths were alive when their mothers were admitted before delivery, providing an opportunity to intervene, yet a number of health provider and administrative avoidable factors related to delay in providing care were reported (Pattinson, 2011). These included not recognising or responding to medical problems, not monitoring the fetal status, not using the partogram correctly, and theatre and anaesthetic problems (Pattinson, 2011).

4.8. PPIP AND MMR MEETINGS

Only one meeting occurred during the study period and only one case where there was a perinatal death was discussed. However, the record review indicated that there were 41 perinatal deaths in the entire year but these were never discussed, and potential avoidable factors may not have been identified or addressed. At such

meetings the cases where fresh stillbirths were delivered by normal vaginal delivery should be considered and reviewed for potential avoidable factors as this should be considered to be potential red flag indicating a mismanagement of a patient. PPIP and MMR meetings were not utilised as forums to improve clinical care at the hospital. The meetings only took place to respond to a complaint and adverse event. This study did not identify the reasons why further meetings were not held during the study period, but anecdotal evidence indicates that this may be due to staff shortages, and therefore for an inability to coordinate meetings and have staff out of services.

MMR and PPIP meetings need to be used to proactively analyse perinatal and maternal deaths, to identify problems and find solutions to those problems to prevent reoccurrence of deaths. In the study referred to earlier by Gaunt (2010) one of the measures implemented to reduce maternal and perinatal deaths was the use of PPIP supplemented with monthly perinatal mortality meetings at which each month's data were presented and every perinatal death discussed. The meetings usually included a short discussion about an obstetric clinical topic and preventive or pre-emptive factors (Gaunt, 2010). Perinatal mortality audits were also found to identify weaknesses in the delivery of maternity care in a rural district in Africa, and through this, targeted interventions were designed and then the impact of the interventions were evaluated (Wilkinson, 1997).

In a study conducted by Pattinson & Bergh (2008) on implementing recommendations arising from confidential enquiries into maternal deaths it was postulated that the effects of PPIP and MMR meetings might be greater if the health professionals were actively involved and had specific and formal responsibilities for implementing change. This needs to be considered at Schweizer-Reneke Hospital.

4.9. HEALTH SYSTEM FACTORS IN THE DELIVERY OF MATERNITY CARE

Primary Health Care, including district hospitals is an entry point for clients into the health care system therefore it forms an important part of the District Health System.

The availability of health care professionals having the right skill set is an important building block of a health care system. This is also true for the delivery of maternity care. As indicated earlier in the background of the hospital, the vacancy rate of Professional Nurses at Schweizer-Reneke Hospital is 58%. This situation affects the availability of midwives to attend PPIP and MMR meetings. Most of their time is devoted to functional patient care. Even the Unit Manager of the maternity unit is unable to attend such meetings. At times there are not even sufficient staff members to adequately deliver care. The shortage of senior nursing staff at Schweizer-Reneke Hospital may be one of the factors resulting in the poor delivery of patient care with poor clinical practices.

4.10. LIMITATIONS OF THE STUDY

The study consisted of a record review, so the quality of the data collected was dependent on what was available and recorded in the records and clinical notes. When assessing the use of the partogram, only ten records per month were looked at, this may have affected the results of the study. In addition, patients who delivered in transit, at home or in casualty, were excluded. Some perinatal deaths and maternal deaths may therefore have been missed but this was considered to be unlikely. Due to the cross-sectional study design, temporality could not be assessed, and therefore only associations were tested for. Tests for associations also did not take into consideration some potential confounders, such as maternal health.

Records of only one MMR meeting were available, and this limited the ability of the study to assess the effectiveness of these meetings in improving clinical outcomes at the hospital. Similarly, no maternal deaths were reported in the study period. CSs included a few elective CSs. In such cases no data was recorded at all in the partograms and this may have affected the findings related to completion of the partograms in CS section deliveries. Overall, some associations may not have been found to be statistically significant due to the small numbers. Finally, the results of this study may not represent all hospitals in South Africa.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the results obtained from this study were assessed in relation to the aims and objectives of this study to draw appropriate conclusions. Appropriate recommendations were made within the context of the findings of this study. Finally suggestions for future research were included.

5.1. CONCLUSION

In Schweizer-Reneke Hospital the CS rate of 16% is higher than the national target of 11% (Department of Health North West Province, 2009), while the stillbirth rate (56 per 1000 live births) is high compared to the national average for South Africa in 2008/2009 which was 35.3 per 1 000 live births (Pattinson, 2011). In 1985 the World Health Organisation (WHO) stated that no region is justified in having a CS rate greater than 10 – 15% (Chaillet & Dumont, 2007; Betrán, Merialdi, Lauer, et al., 2007).

The study found that there were poor clinical practices in relation to partogram usage in the maternity unit of Schweizer-Reneke Hospital. The most important components of the partogram were poorly documented, implying a major inadequacy and lack of knowledge in understanding the importance of a partogram, particularly in a district hospital setting. Proper documentation is important as the women may be checked by different health professionals during the course of labour. Inadequate recording of the partogram could be one of the contributing factors to perinatal mortality in the hospital. The study did not investigate the reason for the poor record keeping, and this needs to be done.

Although there were no maternal deaths during the study period, the study found a high number of stillbirths at Schweizer-Reneke Hospital. The number of macerated stillbirths indicates that there could be a need to improve access to antenatal care and improve the provision of antenatal care services itself. The review of the partogram shows some significant associations between the completion of the

partogram and clinical outcomes (mode of delivery and perinatal deaths). However, as these were not consistent for all aspects of the partogram, it is possible that this does not fully explain the high caesarean section and perinatal mortality rate. Further investigation into this is warranted.

The record review revealed discrepancies in the number of CSs, VADs and perinatal deaths on the DHIS, an indication of poor data / information management. Incorrect information leads to incorrect planning and decision making. It was not possible to identify the reasons for this poor documentation, given the retrospective nature of the study. It was also found the PPIP and MMR meetings were not being conducted regularly and thus did not improve clinical practices and outcomes. These are important to review the causes and possible avoidable factors related to perinatal deaths.

5.2. RECOMMENDATIONS

5.2.1. APPLICABILITY

Within the maternity unit:

- A year plan of mortality and morbidity review meetings should be developed and strictly adhered to by all participants. The meetings should be coordinated and conducted by a senior clinician, particularly the clinical manager and be used as a continuing medical education opportunity. This should identify the causes of the perinatal deaths in the hospital and address avoidable factors that are identified.
- The development and adherence to clinical guidelines within the unit need to be ensured. Decisions on when to conduct CS and assisted deliveries should be made in accordance with the guidelines.
- Regular in service training of all health professionals on the importance of adequate partogram recording is necessary.
- Midwives should be instructed to use the partogram for every labour case, and taught how to do this accurately.
- Regular clinical audits, including record reviews need to be conducted.

- Information management, including the recording, capturing, analysis and interpretation of data needs to be strengthened.

At the facility level:

- Strategies to recruit and retain Professional Nurses need to be developed.

Within the district:

- With the high percentage of macerated stillbirths there is a need to investigate and improve antenatal care provision within the district. This needs to be addressed with the district office of the North West Department of Health and discussed with the antenatal clinics in the district.

5.2.2. FURTHER RESEARCH

A study focusing on the direct effect of inadequate recording on mortality and morbidity is necessary. Another study, including a questionnaire interview of health professionals focusing on the causes or reasons for inadequate completion of the partogram is necessary.

REFERENCES

AbouZahr C & Wardlaw T. 2001. Maternal mortality at the end of a decade: signs of progress? Bulletin of the World Health Organization, 79, 561 - 573.

Basu J & Seopela L. 2010. Accurate and consistent record-keeping using the antenatal card. African Journal of Midwifery and Women's Health, 4, 171 - 175.

Basu JK, Hoosain S, Leballo G, Leistner E, Masango D, Mercer M, Mohapi M, Petkar S, Tshiovhe NA.. 2009. The partogram: a missed opportunity. South African Medical Journal, 99, 578.

Betrán AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, Wagner M.. 2007. Rates of Caesarean section: analysis of global, regional and national estimates. Paediatric and Perinatal Epidemiology, 21, 98 - 113.

Chaillet N & Dumont A. 2007. Evidence-based strategies for reducing cesarean section rates: a meta-analysis. Birth, 34, 53 - 64.

Chopra M, Daviaud E, Pattinson R, Fonn S, Lawn JE. 2009. Saving the lives of South Africa's mothers, babies, and children: can the health system deliver? The Lancet, 374, 835 - 846.

Day C, Gray A. 2010. Health and related indicators. In: South African Health Review 2010. Durban, South Africa: Health Systems Trust.

Day, C., Monticelli, F., Barron, P., Haynes R, Smith J, Sello E. 2010. The District Health Barometer 2008/09. Durban: Health Systems Trust.

Department of Health. 2000. Guidelines for maternity care in South Africa: A manual for clinics, community health centres and district hospitals. Pretoria: National Department of Health.

Department of Health. 2006. Third Report on Confidential Enquiries into Maternal Deaths in South Africa 2002 – 2004. Pretoria: National Department of Health.

Department of Health. 2009. Primary Health Care Supervision Manual: A guide to Primary Health Care Facility Supervision. Pretoria: National Department of Health.

Department of Health. 2010a. National Department of Health Strategic Plan 2010/11-2012/13. Pretoria: National Department of Health.

Department of Health. 2010b. Negotiated Service Delivery Agreement. Pretoria: National Department of Health.

Department of Health North West Province, 2009. Annual Report 2008/09. Mmbatho: Department of Health North West Province.

Department of Health North West Province. 2010. Dr Ruth Segomotsi Mompati Health District: District Profile 2009/2010. Vryburg: Department of Health North West Province.

Dumont A, de Bernis L, Bouvier-Colle MH, Bréart G; MOMA study group. 2001. Caesarean section rate for maternal indication in sub-Saharan Africa: a systematic review. Lancet, 358, 1328-33.

Gaunt CB. 2010. Are we winning? Improving perinatal outcomes at a deeply rural district hospital in South Africa. South African Medical Journal, 100, 101 - 104.

Hook CD & Damos JR. 2008. Vacuum-Assisted Vaginal Delivery. American Family Physician, 78, 953 - 960.

KwaZulu-Natal Department of Health. 2010. Strategic Plan 2010- 2014. Durban: KwaZulu-Natal Department of Health

Lavender T. 2003. Use of the partogram in labour. NCT Evidence Based Briefing, 14 - 16. Available from:

http://www.nctpregnancyandbabycare.com/files/documents/e21c97a9dc14eb9c3fe021d0cf78195f/Useofthepartograminlabour-pdf.pdf. (Accessed 20 December 2009).

Lavender T, Hart A, Smyth RM. 2008. Effect of partogram use on outcomes for women in spontaneous labour at term. Cochrane Database of Systematic Reviews, 8, CD005461.

Mahler H. 1987. The Safe Motherhood Initiative: a call to action. Lancet, 1, 668 - 670.

Munjanja SP, Majoko F, Lindmark G. Trends in safe motherhood programs in sub-Saharan Africa. In: Studd J, Seang T, Chervenak F (Eds). 2008. Progress in Obstetrics and Gynecology. London: Churchill Livingstone.

National Committee for Confidential Enquiries into Maternal Deaths. 2008. Saving Mothers 2005 – 2007: Fourth Report on Confidential Enquires into Maternal Deaths in South Africa. Pretoria: National Department of Health.

Neilson JP, Lavender T, Quenby S, Wray S. 2003. Obstructed Labour. British Medical Bulletin, 67, 191 - 204.

Patah LE, Malik AM. 2011. Models of childbirth care and cesarean rates in different countries. Revista de Saude Publica, 45, 185-94.

Pattinson R, Woods D, Greenfield D, Velaphi S. 2005. Improving survival rates of newborn infants in South Africa. Reproductive Health, 2: 1-8.

Pattinson RC (Ed.). 2011. Saving babies 2008-2009: Sixth perinatal care survey of South Africa. Pretoria, Tshepesa Press.

Pattinson RC & Bergh AM. 2008. Implementing recommendations arising from confidential enquiries into maternal deaths. Best Practice and Research. Clinical Obstetrics and Gynaecology, 22, 477 - 487.

Shah A, Fawole B, M'imunya JM, Amokrane F, Nafiou I, Wolomby J, Mugerwa K, Neves I, Nguti R, Kublickas M, Mathai M. 2009. Cesarean delivery outcomes from the WHO global survey on maternal and perinatal health in Africa. International Journal of Gynaecology and Obstetetrics, 107, 191 - 197.

Sule ST & Matawal BI. 2003. Comparison of Indications for Caesarean Section in Zaria, Nigeria: 1985 and 1995. Annals of African Medicine, 2: 77 - 79.

Thomas LS, Jina R, Tint KS, Fonn S. 2007. Making systems work: the hard part of improving maternal health services in South Africa. Reproductive Health Matters, 15, 38 - 49.

United Nations. 2000. The United Nations Millennium Declaration: Resolution A/RES/55/2. New York: United Nations. http://www.un.org/millennium/declaration/ares552e.htm (Accessed 7 December 2010).

Vacca A. 2004. Vacuum Assisted Delivery, Improving patient outcomes and protecting yourself against litigation. Supplement to OBG Management, S1-S12.

Vacca A. 2009. Vacuum Assisted Delivery, Prerequisites and Technique. Vacca Research. Available from: http://www.vaccaresearch.com/web-content/resources/HANDOUT-Prerequisites%20and%20Technique.pdf. (Accessed 20 December 2009).

Villar J, Carroli G, Zavaleta N, Donner A, Wojdyla D, Faundes A, Velazco A, Bataglia V, Langer A, Narváez A, Valladares E, Shah A, Campodónico L, Romero M, Reynoso S, de Pádua KS, Giordano D, Kublickas M, Acosta A; World Health Organization 2005 Global Survey on Maternal and Perinatal Health Research Group. 2007. Maternal and neonatal individual risks and benefits associated with caesarean delivery: multicentre prospective study. BMJ, 335, 1025.

Wilkinson D. 1991. Perinatal mortality - an intervention study. South African Medical Journal, 79, 552 - 553.

Wilkinson D. 1997. Reducing perinatal mortality in developing countries. Health Policy and Planning, 12, 161 - 165.

Woodward Z. 2009. Guidelines for Clinical Practice: Operative Vaginal Delivery. East Kent: Directorate of Women's Health (East Kent Hospitals University NHS Foundation Trust).

World Health Organization Maternal Health and Safe Motherhood Programme. 1994. World Health Organization partograph in management of labour. Lancet, 343, 1399 - 1404.

ANNEXURE A: Tool 1

SCHWEIZER-RENEKE DISTRICT HOSPITAL

Period/Month	Total Deliveries	C-sections	Vacuum-Assisted deliveries	Forceps-Assisted deliveries	Macerated stillbirths	Fresh stillbirths	Early neonatal deaths	Maternal deaths
Jan-09								
Feb-09								
Mar-09								
Apr-09								
May-09								
Jun-09								
Jul-09								
Aug-09								
Sep-09								
Oct-09								
Nov-09								
Dec-09								
TOTAL								

ANNEXURE B: Tool 2

SCHWEIZER-RENEKE DISTRICT HOSPITAL

Month:

For each of the following, record whether the information was recorded according to standard, substandard or was not done.

Patient Record No	1	2	3	4	5	6	7	8	9	10
Recording Risk Factors										
Recording parity										
Recording age										
Recording date										
Recording pelvis										
Recording low / high risk										
Monitoring fetal heart										
Monitoring decelerations										
Monitoring cervical dilatation										
Monitoring descend of the head										
Monitoring contractions										
Monitoring maternal BP										
Monitoring maternal pulse										
Monitoring maternal temp										
Action line crossed										
Recording assessment time										
Recording problems identified										
Recording management plan										

ANNEXURE C: Tool 3

SCHWEIZER-RENEKE DISTRICT HOSPITAL

Meetings	**Number of meetings**						
Type of meeting (PPIP / MMR)							
Date of meeting							
Month under review							
Minutes of meeting available							
Length of meeting							
Total number of attendants							
Number of Medical Officers							
Number of Midwives							
Number of Management Team Members							
Number of Staff Nurses							
Number of Nursing Assistants							
Number of maternal deaths reported							
Number of perinatal deaths reported							
Number of cases specifically discussed							
Problem areas identified							
Action taken							
Follow up of action taken							

ANNEXURE D: University of the Witwatersrand's Research Ethics Committee Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Mr Oupa L Moalusi

CLEARANCE CERTIFICATE	**M10252**
PROJECT	Clinical Governance in the Maternity Unit of a District Hospital
INVESTIGATORS	Mr Oupa L Moalusi.
DEPARTMENT	School of Public Health
DATE CONSIDERED	26/02/2010
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 26/02/3010 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Dr R Jina

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

ANNEXURE E: North West Province Department of Health and Social Development approval letter



Health & Soc Dev

Department:
Health & Social Development
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

DIRECTOR:
POLICY & PLANNING
08 SEP 2010
DEPARTMENT OF HEALTH
PRIVATE BAG X2068, MMABATHO, 2735

2ND Floor Tirelo Building
Dr. Albert Luthuli Drive
Mafikeng, 2745
Private Bag X2068
MMABATHO

DIRECTORATE POLICY, PLANNING AND RESEARCH

Enq -Tel: (018) 387 5757
Fax: 086 734 0956
smalakane@nwpg.gov.za

To : Mr O.Moalusi
Swelzer –Reneke Hospital
North West Department of Health and Social Development

From : Director: Policy, Planning & Research Directorate
Mr K.Rabanye

Date : 08 September 2010

Subject: Request for approval: **Clinical outcomes and practices in the maternity unit of a district hospital**

The above stated subject matter bears reference

This communiqué serves to inform your good office that permission to undertake the above mentioned study has been granted by the North West Department of Health and Social Development.

Arrangements with managers at appropriate level shall be facilitated by the researcher. We shall be delighted to receive a final report in this regard.

Yours truly

Mr K.Rabanye
Chairperson: PHRC –Health Branch
North West Department of Health and Social Development

DIRECTOR:
POLICY & PLANNING
08 SEP 2010
DEPARTMENT OF HEALTH
PRIVATE BAG X2068 MMABATHO 2735