CLINICAL PROCEDURES IN THE MATERNITY UNIT OF A DISTRICT HOSPITAL

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Public Health in the field of Hospital Management

July, 2014

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DECLARATION

I, Lydia Lebohang Perseverance Msiza, declare that this research report is my own work. It is being submitted for the degree of Master Public Health in the field of Hospital Management at the University of the Witwatersrand, Johannesburg. It has not been submitted before any degree or for any examination at this or any other University.

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Johannesburg

DEDICATION

This research is dedicated to my family, my parents and my kids who supported me during the time I was at school. A special dedication to my parents Mrs Hilda and Mr Frans Msiza, my Brother Thabo and sisters Nthabiseng and Ntshadi Msiza for their support. I thank God who made this Research to be completed against all odds.

ACKNOWLEDGEMENT

Sincere thanks are extended to all my colleagues in the Heidelberg Hospital, who contributed to the successful completion of this study. The assistance of the following deserves a special acknowledgement:

- My Supervisors Dr D. Basu and Dr Jayati Basu
- The Head of Department of Health-Gauteng Department of Health for allowing me to conduct the study;
- Operational Manager of Maternity: Heidelberg Hospital,
  Ms Mandisa Adoons for providing me with information from the maternity unit

ABSTRACT

BACKGROUND: The World Health Organization (WHO) has acknowledged the importance of maternal care and listed it as part of its Millennium Development Goals (MDGs). The 5th goal is focused on improving maternal health by reducing the maternal mortality rate by 75% by 2015. South Africa has aligned itself with the MDGs. The Gauteng Department of Health and Social Development has also embraced the MDGs and decided to improve its maternal health services. It has decided to target Intra-partum period for interventions to improve maternal health because intra-partum period is associated with a high rate of perinatal death from intra-partum hypoxia (4.8 per 1000 births) (National Department of Health, 2000), as well as a significant number of maternal death (8.7%) (NCCEMD, 2007). This study was planned to systematically study the clinical procedure performed during the intra-partum period at the Heidelberg Hospital (a semi - rural district hospital in the Lesedi Sub – district of Sedibeng District in Gauteng Province).

AIM: To describe the clinical procedures and factors related to these procedures and maternal and neonatal health outcomes for the mothers admitted and delivered in the Maternity unit at Heidelberg hospital during one year period (1st April 2010 to 31st March 2011)

METHODOLOGY: The setting of this study was the Maternity unit of the Heidelberg Hospital. A cross sectional study design was used based on retrospective review of routinely collected data for 12 months (2010 April 1st to 2011 March 31st). No intervention was done as a part of this study. The study variables included different clinical procedures (such as normal vaginal delivery, assisted vaginal delivery, caesarean section, evacuation of uterus, caesarean hysterectomy), socio-demographic profile of patients (such as age, gender, ethnicity, medical aid), clinical profile (such antenatal diseases, booking status, intra-partum complications, postpartum complications) and maternal and perinatal outcomes.

RESULTS: The study found highest number of deliveries (78.6%) were normal vertex deliveries and a very few (1%) assisted and breech deliveries. The

caesarean section rate was high (20.4%) as compared to the normal national target (12, 5%). Fetal distress and CPD was the main indications for caesarean section. The majority of women who delivered at Heidelberg Hospital maternity came from poor socio-economic class, mostly single, teenagers, and unemployed. They were the most vulnerable group in the Society.

The majority of women were booked and referred from PHC clinic where they were booked for antenatal check-up. Pregnancy induced hypertension was the commonest obstetric problem encountered during antenatal period. Most women who delivered at Heidelberg hospital during the period were discharged without complications, no maternal deaths were reported. There were 8.1% preterm deliveries but a relatively high still birth rate which is of concern.

CONCLUSION: The study was the first of its kind to be done at Heidelberg Hospital and the Sedibeng Health District. The study systematically analysed routinely collected data and identified high risk patients, who would require special attention. This study would hopefully assist the Hospital Management to realise the high rate of CS and to develop appropriate measures to reduce unnecessary C/S being done, and to strengthen referral systems. In addition, further study is necessary at clinic level in the sub-district to identify work-loads in the feeder clinics.

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GLOSSARY OF TERMS

Antenatal care: Antenatal care is care of a pregnant woman during the time in the
Maternity cycle that begins with conception and ends with the onset of labour.

Booked mother: A woman who has attended at least two antenatal clinics at least two weeks before giving birth at which booking bloods have been taken (WHO, 2009).

Born Before Delivery: Delivery of an infant before reaching the hospital maternity unit

Booking bloods: Routine screening of blood tests done on all mothers attending antenatal clinics. These include the haemoglobin level, serological investigation for syphilis (reactive plasma reagent). Rhesus typing and an HIV rapid test (with the mother's permission) (WHO, 2009)

Caesarean Section: A procedure in which an infant is extracted o removed from the uterus. Section refers to division of tissue. The abdominal wall of the mother and the uterine wall are divided in order to extract the baby.

Clinical procedure: Procedures used for diagnosing and care

District Hospital: A level one hospital offering primary health care services.

Early Neonatal Death: Death of a Neonate within first 28 days of life

Forceps delivery: A delivery method by using smooth metal instruments that resembles a spoon or tongs. They are curved to fit around the baby's head. These instruments are

carefully positioned around the baby's head and joined together at the handles. With every contraction and mother's effort of pushing, the obstetrician gently pulls the head down to deliver the baby.

Fresh Stillbirth: Birth after the 28th week of pregnancy in which the baby does not breathe or show any other signs of life after being completely expelled from the mother.

Macerated stillbirth: Occurs when the fetus in utero has been dead for 12 to 24 hours, and it is brought about by aseptic autolysis

Maternal mortality rate: Maternal deaths per 100,000 live births. (HST, 2009)

Maternity ward: A ward or unit designed for pregnant women for the management of Antenatal care and all stages of labour till discharge.

Normal vertex delivery: Normal delivery through the vaginal canal

Semi-Rural hospital: A hospital situated within the semi-rural communities, having municipal infrastructure (waste removal and bulk water supply).

Un-booked mother: A mother who did not attend or attend less than two antenatal clinics within stipulated period (WHO, 2009).

LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
CHC	Community Health Centre
CS	Caesarean section
DHS	District Health System
DHIS	District Health Information System
END	Early Neonatal Death
FSB	Fresh Stillbirth
GP	General Practitioner
HH	Heidelberg Hospital
HOD	Head of the Department
MMR	Maternal Mortality Rate
MOU	Midwifery Obstetric Unit
MSB	Macerated Stillbirth
NND	Neonatal death
NSH	Natalspruit Hospital
PHC	Primary Health Care
T/F	Transfer
WHO	World Health Organization

CHAPTER 1
INTRODUCTION

The purpose of this study was to describe the clinical procedures in the maternity unit at a district hospital in the Gauteng Province This introductory chapter will cover the background to the study, statement of the problem, its aims and objectives and an outline of subsequent chapters.

1.1 INTRODUCTION

Maternal health has recently been receiving increasing attention of National and Provincial Departments of Health in South Africa. The Ten-point plan of the National Department of Health identified 'Maternal health' as one of the key priority areas (National Department of Health, 2009), which is reiterated in the 'national service delivery agreement' as a part of the South African Government's vision for 'A long and health life for all South Africans' (National Department of Health, 2010). The Gauteng Department of Health also prioritized maternal health as one of its strategic objectives to improve maternal health services and to decrease maternal and perinatal mortality and morbidity in the Province (Gauteng Department of Health and Social Development, 2009). This study is planned in a public health facility in the Gauteng Province in that setting in line with the strategic goals and objectives of the Departments of Health.

1.2 JUSTIFICATION OF THIS STUDY

Heidelberg Hospital is a semi- rural district hospital in the Lesedi Sub-District in the Sedibeng District of Gauteng Province where maternity data was routinely collected through District Heath Information System (DHIS) but never systematically analyzed. Therefore, the researcher would like to systematically analyze these data from the DHIS to describe the clinical procedures and factors

related to these procedures in the maternity unit of this Hospital. The study would hopefully provide the hospital and provincial management with input in relation to these clinical procedures and maternal and neonatal health outcomes.

1.3 RESEARCH QUESTION

What are the types of clinical procedures undertaken in the Maternity unit of the Heidelberg Hospital? What are the profiles of patients undergoing these procedures?

1.4 STUDY OBJECTIVES

1.5.1 BROAD OBJECTIVE

To describe the clinical procedures and factors related to these procedures and maternal and neonatal health outcomes for the mothers admitted and delivered in the Maternity unit at Heidelberg hospital during one year period (1st April 2010 to 31st March 2011)

1.5.2 SPECIFIC OBJECTIVES

1. To describe the clinical procedures performed for mothers delivered in the Maternity Unit during the study period
2. To describe their profiles such as Socio-demographic profiles, Obstetric profiles, and Booking status and final health outcomes for mothers and neonates

1.5 SUBSEQUENT CHAPTERS

So far, the background to the research has been discussed. Then, research question and objectives were defined in this first chapter. A brief outline of

following chapters is described below.

Chapter Two: Literature Review: The purpose of the literature review is to review pertinent literature and to describe the clinical procedures in the maternity unit at the Heidelberg District Hospital.

Chapter Three: Research Methodology: The chapter describes the research methodology, study design, setting and scope and data management techniques used in this study.

Chapter Four: Presentation of Results: This chapter deals with an analysis of the data collected for this study relating to its aims and objectives.

Chapter Five: Discussion: The findings from the review of the literature are incorporated in this chapter with the results obtained from the analysis in order to address the aims and objectives of the study.

Chapter Six: Conclusions and Recommendations: This constitutes the last chapter of the report and derives conclusions from the research related to the objectives of this study, makes recommendations and advocates areas for future research in the field of describing the clinical procedures in the maternity unit at the Heidelberg District Hospital.

CHAPTER 2
LITERATURE REVIEW

In this chapter, relevant literatures into describing the clinical procedures in the maternity unit at the Heidelberg District Hospital are discussed. In addition to published literature, information from various unpublished sources is also reviewed.

2.1 INTRODUCTION

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. While motherhood is often a positive and fulfilling experience, for too many women it is often associated with suffering, ill-health and even death. The World Health Organization (WHO) has acknowledged the importance of maternal care and listed it as part of its Millennium Development Goals (MDGs). South Africa has aligned itself with the MDGs. The 5th goal is focused on improving maternal health by reducing the maternal mortality rate by 75% by 2015 (United Nations Development Programme, 2006).

2.2 MATERNAL HEALTH SERVICES

Approximately 529,000 women die each year in pregnancy and childbirth (400 maternal deaths per 100 000 live births). Most of them die because they had no access to skilled routine and emergency care. Since 1990, some countries in Asia and Northern Africa have more than halved maternal mortality. There has also been progress in sub-Saharan Africa. Increasing numbers of women are now seeking care during childbirth in health facilities. Still a woman's life time risk of dying during or following pregnancy is 1 in 31 in sub-Saharan Africa in comparison to extremely low risk in the developed world (1 in 4300) (WHO,

2005). Haemorrhage and hypertensive disorders are major contributors to maternal deaths in developing countries (Khan, Wojdyla, Say, et al, 2006).

Some 215 million women who would prefer to delay or avoid pregnancy still lack access to safe and effective contraception. It is estimated that satisfying the unmet need for family planning alone could cut the number of maternal deaths by almost a third. The UN Secretary-General's Global Strategy for Women's and Children's Health aims to prevent 33 million unwanted pregnancies between 2011 and 2015 and to save the lives of women who are at risk of dying of complications during pregnancy and childbirth, including unsafe abortion. (WHO, 2002)

Since 1990s, the South African National strategic Health Plan and other Government programmes (such as Reconstruction and Development programme) have prioritised the delivery of maternal and child health services in South Africa (Wilkinson, Cutts, Ntuli, et al, 1997) However, quality of care both in terms of technical and human quality of care remained a serious problems in maternal health care services in South Africa (Blaauw and Penn-Kekana, 2010). Estimated maternal death in South Africa was 153 maternal deaths per 100 000 live births in the period 2005-2007. In 2011, the Health data Advisory and coordination committee reviewed the data and estimated the maternal mortality rate as 310 per 100000 live births (National Department of Health, 2011; National Department of Health , 2012). The major direct causes of maternal morbidity and mortality in South Africa include haemorrhage, infection, high blood pressure, unsafe abortion, and obstructed labour (NCCEMD, 2007).

WHO (2005) identified immediate and effective professional care during and after labour and delivery as the most important intervention that could make the difference between life and death for both women and their newborns which was also highlighted among the key recommendations of the NCCEMD (NCCEMD, 2007). A systematic study of the clinical procedures performed during the intra-

partum period at a health facility level would be key to improve maternal health services. This would assist the health facilities to identify factors associated with challenges of performing clinical procedures and to develop remedial measures based on the findings.

2.3 CLINICAL PROCEDURES

Maternity services are part of the comprehensive primary health care (PHC) package delivered by all the maternity units under level I Services in South Africa. The specified procedures practiced in maternity units of level 1 hospital are listed in the Table 2.1 below. In addition to these procedures, complex procedures such as caesarean hysterectomy that require specialist interventions are usually performed in regional hospitals (National Department of Health. 2002). The Heidelberg Hospital provides all the services listed in Table 2.1.

Table 2.1 List of procedures

Procedure
Normal Deliveries
Caesarean Section
Vacuum Extraction
Forceps Delivery
Removal of retained placenta

Source: National Department of Health. 2002

Clinical indications (such as abnormal fetal position, obstructed and prolonged labour, and pre-existing diseases) of a patient are probably the most important factor associated with clinical procedures used in maternity. However, other factors such as booking status, age, patients' choice, health provider's preference; may also play important role (Fraser and Cooper, 2009).

2.3.1 NORMAL DELIVERIES

Normal delivery is the most common mode of delivery across the world (WHO, 1999; WHO, 2005). The proportion of normal delivery depends on levels of care, geographical location, type of health facilities (such as public or private). For example, a primary health care facility in South Africa reported 57% normal deliveries, 3% born before arrival (BBA) and remaining patients transferred to hospitals (Bromberg and Rees, 1993).

Episiotomy is performed as an additional procedure to expedite normal deliveries (Fraser and Cooper, 2009). Some experts believe that an episiotomy speeds up the birthing process, making it easier for the baby to be delivered and thereby reducing intra-partum hypoxia (Fraser and Cooper, 2009). Restrictive episiotomy policies appeared to give a number of benefits compared to routine episiotomy. With restrictive episiotomies, women experienced less post-partum complications (such as perineal trauma) with no difference in occurrence of pain, urinary incontinence, painful sex or severe vaginal/perineal trauma after birth. Both restrictive compared with routine medio-lateral episiotomy and restrictive compared with midline episiotomy showed similar results (Carroli and Mignini, 2009).

2.3.2 CAESAREAN SECTION

The reported benefits of planned caesarean section include greater safety for the baby, reduced pelvic floor trauma for the mother, avoidance of labour pain and convenience (Lavender, 2009). Caesarean section rates are progressively rising in many parts of the world. Caesarean section may be an elective or emergency operation. The rate of caesarean section varies between country to country and even within a country (Fraser and Cooper, 2009). Caesarean section is currently performed in approximately 30% deliveries and is the most common operative

procedure performed in the United States of America (Mac Dorman, Menacker, Declercq, 2008). In South Africa, the estimated caesarean section rate is 20.6% (WHO, 2008).

Although there are clear clinical indications for caesarean section (such as placenta praevia, HIV infection, contracted pelvis and, arguably, breech presentation or previous caesarean section), there are other factors such as patients' choice also play an important role (House of Commons Health Committee, 2003). Dumont, de Bernis, Bouvier-oll, et al (2001) reported six main reasons for CS in sub-Saharan Africa namely, protracted labour, abruptio placenta, previous caesarean section, Eclampsia, placenta praevia, and malpresentation.

Benefits of elective caesarean section include safety for the baby, reduced pelvic floor trauma, avoidance of labour pain and convenience (Fraser and Cooper, 2009). This implies that that various non-clinical factors can be associated with the caesarean section procedure. It is also assumed that most of the clinicians see this as the most convenient procedure for them as it saves time and reduces the risk of adverse events. Lavender, Hofmeyr, Neilson, et al (2009) reviewed non-medical indications for CS and reported lack of evidence from randomised controlled trials, upon which to base any practice recommendations regarding planned CS for non-medical reasons at term. Place of residence (urban vs. rural) and economic conditions also play a role. For example, reported CS rate is higher in urban (23.7%) than rural areas (14.8%) in South Africa (WHO, 2008). Haas, Udvarhelyi, Epstein (1993) found membership of medical aid had a significant influence on the rate of CS in the USA. However, the caesarean sections are resource incentive and often associated complications in a resource poor setting.

2.3.3 FORCEPS DELIVERIES

Although forceps has been replaced by vacuum extraction, it is a procedure still undertaken in many developing countries, where vacuum extraction is not yet in wide use. Indications for forceps delivery are maternal distress and conditions associated with a threat to maternal health (such as cardiac disease, pulmonary tuberculosis, thyroid disease, eclampsia, pregnancy induced hypertension, seizures in mother, prolonged second stage of labour and severe anaemia) Fetal conditions include fetal distress, fetal asphyxia as in cord prolapsed at full cervical dilatation (Fraser and Cooper, 2009). There are, however, a number of risks associated with the use of forceps. About one-third of women who undergo a forceps delivery develop tears in the area between their vagina and anus. There is also an increased risk of episiotomy. In rare situations, forceps can cause injuries to the newborn baby's face or skull (Cook, Sankaran, Wasunna, 1991; Johanson and Menon, 2007).

2.3.4 VACUUM EXTRACTION

Vacuum delivery is used as an alternative to forceps delivery. It is indicated mainly in cases of delayed labour with an incompletely dilated cervix and at low foetal vertex. Vacuum delivery is contra-indicated in acute fetal distress or prematurity (WHO, 1991). The use of vacuum extraction has increased in recent years because of its relative safety and ease of use. Studies have shown that vacuum extraction is safer for the mother than forceps (Johanson and Menon, 2007). Tears in the vaginal and anal area can occur, but they are less frequent than with forceps. In the newborn baby, facial cuts are uncommon and minor. However, because of the pressure of the vacuum on the baby's head, bleeding can occur under the baby's scalp in that area (WHO, 1991). Johanson and Menon (2007) reported that the use of the vacuum extractor rather than forceps for assisted delivery appears to reduce maternal morbidity. They found that

reduction in cephalhaematoma and retinal haemorrhages seen with forceps may be a compensatory benefit for vacuum extraction.

2.4 SUMMARY

This chapter reviewed the maternal health status in developed and developing countries with particular reference in South Africa. In addition, it reviewed the different clinical procedures performed in the maternity unit of a district hospital which is the focus of this study.

CHAPTER 3
METHODOLOGY

The methodology for this study was selected on the basis of its aims and objectives. In this chapter the following were discussed: setting, scope, and study design and research tools.

3.1 STUDY DESIGN

This was a cross-sectional study based on a retrospective record review conducted at a district hospital in the Gauteng Province.

3.2 STUDY SETTING

The study setting was the Maternity Unit of the Heidelberg Hospital (HH), situated in Lesedi Sub-District of Sedibeng District in the Southern part of Gauteng Province.

Sedibeng District

Sedibeng District is situated in the southern part of the Gauteng Province. The District is further divided into three sub-districts namely, Emfuleni, Midvaal, and Lesedi. The population of these three Sub-districts is 764,513, 83,426 and 75,975 respectively. There are three hospitals in the district, namely, Sebokeng, Kopanong and Heidelberg Hospitals. Heidelberg hospital falls under Lesedi Sub-district and is the only hospital in the sub-district.

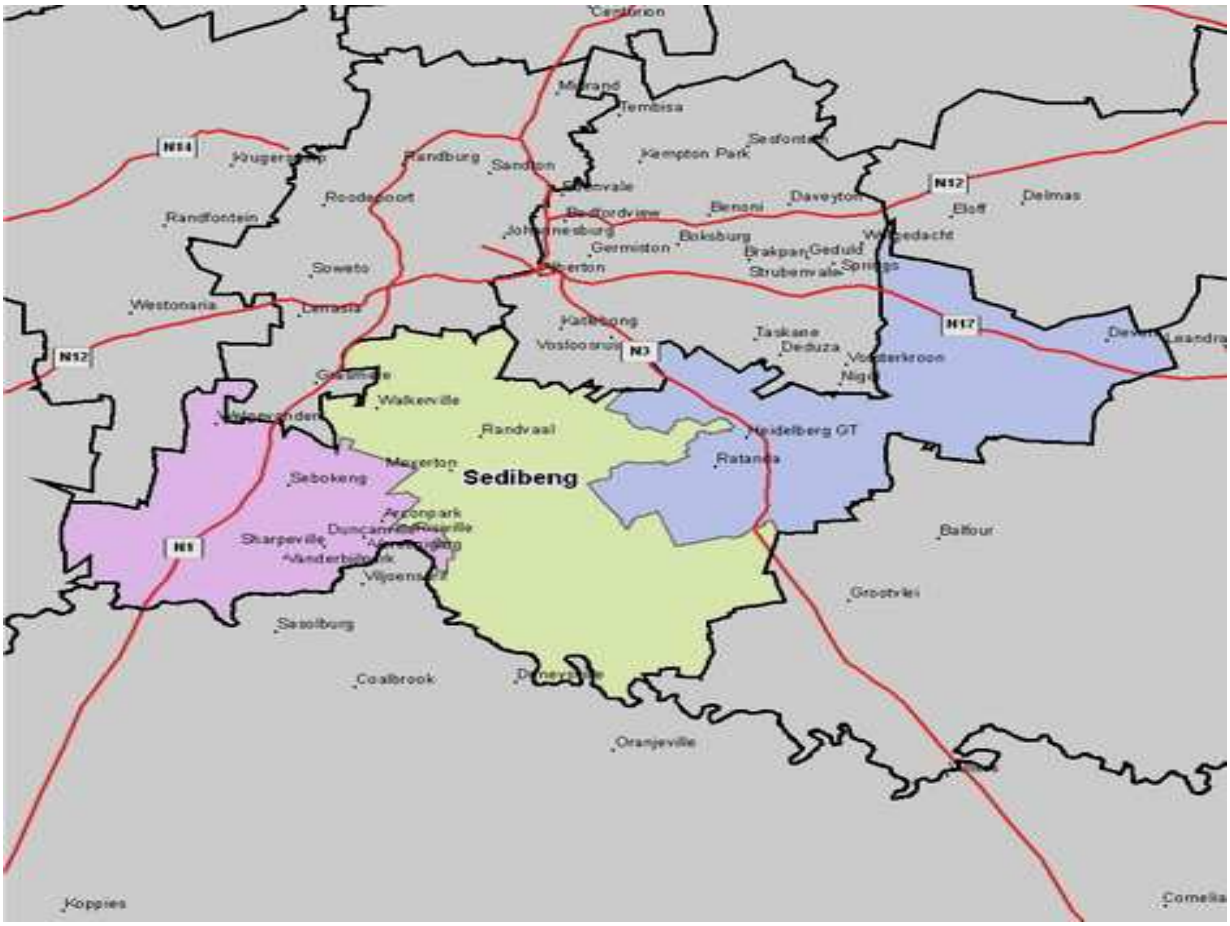

Figure 3.1 Sedibeng District

<u>Heidelberg hospital</u>

Heidelberg hospital is a provincial public hospital in Gauteng and is situated in Lesedi Sub-district at Sedibeng District. It is a 126 bedded Level 1 District hospital and refers patients to Natalspruit Hospital (regional hospital) and Chris Hani Baragwanath Hospital (central hospital). The Hospital has seven medical doctors (general practitioners) and 148 nurses.

The Hospital offers in-patients, casualty, out-patient services and other support services such as X-rays, physiotherapy, speech therapy, occupational therapy, dietetics, social work services and administration and support services. In the

maternity unit, the Hospital provides 24-hour Inpatient care (ante-partum, intra-partum and post-partum), Labour ward and Theatre services as well as Antenatal Clinics for its patients.

There are seven clinics, one mobile unit and a satellite clinic in the Sub-district that refer maternity patients to this Hospital. There is no Community health centre in Lesedi sub-district. Therefore, this Hospital is the only public health facility that provides intra-partum services (deliveries) to the pregnant women in the Sub-district.

3.3 STUDY SCOPE

The study involved review of data collected routinely in the Maternity Unit of the Heidelberg Hospital.

3.4 STUDY PERIOD

The study period was twelve Months (1st April 2010 to 31st March 2011).

3.5 STUDY POPULATION AND SAMPLE

The study population included the records of all women who delivered at Heidelberg Hospital during the study period.

3.6 DATA MANAGEMENT

3.6.1 DATA COLLECTION

Data from the District Health Information System (DHIS) were extracted using the MS Excel based data collection tool. In addition, Labour ward and Theatre registers were used to collect missing data.

3.6.2 STUDY INSTRUMENT

A MS Excel based study instrument was designed for the study to extract data from the DHIS.

3.6.3 VARIABLES

The variables used in the study are listed in Table 3.1.

Table 3.1 Objectives and study variables

Objective	Variables	
1	Types of clinical procedures	Normal deliveries, Born before arrivals, assisted deliveries (forceps and vacuum) and caesarean section, Episiotomy (yes/ no)
2	Socio – demographic profile	Age (in years), Marital status, Ethnicity (African/Asians/Others), Employment(Employed/ Unemployed), Medical aid, Referral Unit,
	Booking Status	Booked/ Unbooked
	Obstetric profile: Ante-partum	Gravidity, Past obstetric history, Ante partum diseases Gestational age at first booking (weeks), Number of admissions
	Intra-partum	Gestational age at delivery (weeks), Induction (Yes/ No), Complications at delivery (Yes/ No) Intra-partum complications
	Post-partum	Post-partum complications (Yes/No),
	Neonatal profile	Birth weight (in grams), Apgar score
3	Final outcome	Mother (discharge/ refer/ death) Neonate (discharge/ refer/ death)

3.6.4 DATA ANALYSIS

Data were extracted from the DHIS to MS Excel and were analyzed with NCSS

software. Data were presented in Tables and graphs. Descriptive and analytical statistics were used.

Following descriptive statics were used:

- Continuous variable with normal distribution (such as age): mean and standard deviation
- Continuous variable without normal distribution: median and interquartile range
- Categorical variables: count and proportion

3.7 PILOT STUDY

No pilot study was done as data to be used for this study is routinely collected for the District Health Information System.

3.8 ETHICAL CONSIDERATIONS

Information were extracted from the DHIS using the data tools developed for each objective. Study numbers in place of patient's name and registration number were used. Raw data was only available to the researcher and information was also collected anonymously. Permission to conduct the research at Heidelberg hospital has been obtained from the Head of department for maternity. In addition, the study was also approved by the University of the Witwatersrand Human Research Ethics Committee (Medical).

CHAPTER 4
RESULTS OF THE STUDY

This chapter deals with an analysis of the data collected for this study relating to its aims and objectives. The results obtained from the analysis of data were described in this chapter.

4.1 STUDY POPULATION

There were 997 deliveries during the study period. The majority of them (n=794, 79.6%) had vaginal deliveries and 20.4% (n=203) of them had caesarean section.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS

4.2.1 AGE

The description of deliveries by age is described in Figure 4.1). The median age was 24 years (IQR 20 years -29 years). The age range was from 14 years to 47 years (Table 4.1).

Table 4.1 Age of the subjects

Age (years)	**Total**	**Vaginal delivery**	**CS**
Median	24	24	25
IQR	20-29	20-29	21-30
Minimum	14	14	15
Maximum	47	47	40

There was no significant differences between the Vaginal delivery and CS groups in terms of maternal age (Mann Whitney's U test, p=0.25)

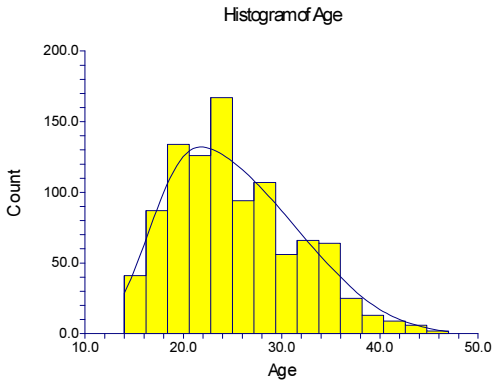

Figure 4.1 Age distribution of the subjects

Among the patients, the teenagers (less than 20 years age group) had the 200 (20.1%) deliveries recorded during the study period (Table 4.2).

Table 4.2 Age distribution of the subjects

Age group	**Total**	**Vaginal delivery**	**CS**
Early<14	0 (0%)	0	0
Mid 14-16	41 (4.1%)	36 (4.5%)	5 (2.5%)
Late 17-19	159 (15.9%)	130 (16.4%)	29 (14.3%)
Subtotal (Teenagers)	**200 (20.1%)**	**166 (20.9%)**	**34 (16.8%)**
20-34	707 (70.9%)	555 (69.9%)	152 (74.9%)
Elderly >= 35	90 (9%)	73 (9.2%)	17 (8.4%)
TOTAL	**997 (100%)**	**794 (100%)**	**203 (100%)**

4.2.2 ETHNICITY

A total of four ethnic groups were considered in the study (Table 4.3). African women had the highest number (n=903, 90.57%) of the deliveries recorded followed by White women with (n=59, 92%) deliveries. Coloured and Indian women had the least number of deliveries during this period.

Table 4.3 Ethnicity of the subjects

Race	Total	Vaginal delivery	CS
Africans	903 (90.6%)	720 (90.7%)	183 (90.1%)
Coloured	29 (2.9%)	23 (2.9%)	6 (3.0%)
Indians	6 (0.6%)	5 (0.6%)	1 (0.5%)
Whites	59 (5.9%)	46 (5.8%)	13 (6.4%)
Total	**997**	**794 (100%)**	**203 (100%)**

There was no significant differences between the Vaginal delivery and CS groups in terms of ethnicity (chi-square test, p=0.12)

4.2.3 MARITAL STATUS

The marital status of patients was tabulated in Table 4.4. The frequency is significantly high among those who are single (n=723, 72.48%) than those who are married (n=247, 27.48%).

Table 4.4 Marital status of the subjects

Marital status	Total	Vaginal delivery	CS
Married	274 (27.5%)	213 (26.8%)	61 (30%)
Single	723 (72.5%)	581 (73.2%)	142 (70%)
Total	**997 (100%)**	**794 (100%)**	**203 (100%)**

There was no significant differences between the Vaginal delivery and CS groups in terms of marital status (chi-square test, p=0.35)

4.2.4 MEDICAL AID AND HOSPITAL CLASSIFICATION

The majority of women (n=996, 99.9%) were classifies as Ho meaning free patient for maternity and only one patient had a medical aid (0.1%).

4.2.5 EMPLOYMENT

The majority of the maternity patients attending the selected hospitals were unemployed (869, 87.2%). One hundred and twenty eight (12.8%) were minor.

4.2.6 REFERRAL UNIT

Table 4.5 outlines the frequency distribution of women who were referred to Heidelberg hospital during the study period. It can be observed that the majority (n=972, 97.49%) of women were referred by the clinics while only few (n=25, 2.51%) were self-referred.

Table 4.5 Referral of patients

Referral unit	Total	Vaginal delivery	CS
clinic	972 (97.5%)	772 (97.2%)	200 (98.5%)
self	25 (2.5%)	22 (2.8%)	3 (1.5%)
Total	**997 (100%)**	**794 (100%)**	**203 (100%)**

There was no significant differences between the Vaginal delivery and CS groups in terms of referral (chi-square test, p=0.29)

4.3 OBSTETRIC PROFILE

4.3.1 PARITY

The median parity of the patients is 1 (IQR 0-2) with a range from 0 to 8. The patients were stratified into three categories namely primiparity (Po), multiparity (1-4) and grande-multiparity (5 and more). The majority of the subjects were multi-para (60%) (Table 4.6)

Table 4.6 Parity of the subjects

Parity	Total	Vaginal delivery	CS
0	403 (40%)	320 (40.3%)	83 (40.9%)
1 to 4	585 (59%)	465 (58.6%)	120 (59.1%)
5 and more	9 (1%)	9 (1.1%)	0
Total	**997 (100%)**	**794 (100%)**	**203 (100%)**

There was no significant differences between the Vaginal delivery and CS groups in terms of parity (chi-square test, p=0.29)

4.3.2 CURRENT OBSTETRIC HISTORY

Obstetric problems during the current pregnancy ids listed in Table 4.7. Forty four patients (4.5%) had some obstetrics problem. Pregnancy induced hypertension was the commonest problem.

Table 4.7 Current obstetrics history

Obstetrics problem	Total	Vaginal delivery	CS
Antepartum Haemorrhage (APH)	6	3	3
Pregnancy induced hypertension	35	20	15
Polyhydramnios	3	1	2
Diabetes mellitus (DM)	8	3	5
UTI	1	1	0
Total	**44**	**25**	**13**

There was no significant differences between the Vaginal delivery and CS groups in terms of current obstetrics problem (chi-square test, p=0.20)

4.3.3 BOOKING STATUS

The booking status of the patients was listed in Table 4.8. The majority (n=972, 97.49%) of women were booked, whilst (n=25, 2.51%) were not booked.

Table 4.8 Booking status of the subjects

Booking status	Total	Vaginal delivery	CS
Booked	972 (97.5%)	773 (97.4%)	199 (98%)
Unbooked	25 (2.5%)	21 (2.6%)	4 (2%)
Total	**997 (100%)**	**794 (100%)**	**203 (100%)**

There was no significant differences between the Vaginal delivery and CS groups in terms of booking status (chi-square test, p=0.58)

4.3.4 GESTATIONAL AGE AT BOOKING

Among the mothers who were booked, mean gestational age at first booking was 23 weeks (± 5 weeks). There was no significant differences between the Vaginal delivery and CS groups in terms of gestational age at booking (t-test, p=0.40)

4.3.5 GESTATIONAL AGE AT DELIVERY

The GA at delivery of the patients is presented (Table 4.9). Most of the subjects (916, 91.9%) delivered at term (More than 37 weeks of gestational age).

Table 4.9 Gestational age at delivery

GA at delivery	Total	Vaginal delivery	CS
Preterm	81 (8.1%)	48 (6%)	23 (11%)
Term	916 (91.9%)	746 (94%)	170 (89%)
Total	**997 (100%)**	**794 (100%)**	**203 (100%)**

There was no significant differences between the Vaginal delivery and CS groups in terms of gestational age at delivery (t-test, p=0.20)

4.3.6 MODE OF DELIVERY

Table 4.10 describes the mode of delivery. The majority of them (n=784, 78.6%) had normal vertex deliveries, few had vaginal breech delivery (n=3, 0.3%), and

forceps delivery (n=7, 0.7%). No patient had vacuum delivery. Around 20% of them (n=203) had caesarean section,

Table 4.10 Mode of delivery of the subjects

Mode of delivery	Number	%
Normal Vertex Delivery	784	78.6
Breech	3	0.3
Forceps	7	0.7
Caesarean Section	203	20.4
Total	**997**	**100**

Among the patients who had vaginal delivery (n=794), 202 (25.25%) patients had episiotomy (Table 4.11).

Table 4.11 Number of Episiotomies performed on subjects

Episiotomy	Count	%
No	592	74.75
Yes	202	25.25
Total	**794**	**100**

4.3.7 CAESAREAN SECTION

TYPES OF CAESAREAN SECTION

More than 20% (n=203) patients had C/S. Among them, the majority (n=172, 84.73%) had emergency C/S, while few (n=31, 15.27%) had elective and scheduled C/S (Table 4.12)

Table 4.12 Type of caesarean sections performed

CS	Number	%
Elective	31	15.27
Emergency	172	84.73
Total	**203**	**100**

INDICATIONS OF CAESAREAN SECTION

Maternal indications of C/S are described in Table 4.13. The main maternal indications were CPD (n=44) and previous CS (n=23), whereas main fetal indication was fetal distress (n=157).

Table 4.13 Indications for CS

	Number
Maternal indications	
Previous CS	23
prolong labour	4
CPD	44
Fetal indications	
fetal distress	157
Breech	1
cord prolapse	1

4.3.8 POSTPARTUM COMPLICATIONS

Only one patient had post-partum haemorrhage.

4.4 MATERNAL OUTCOME

4.4.1 LENGTH OF STAY

Median length of stay was 1 day (IQR 1 day to 1 day) with a range of 1 day to 17 days. Nine hundred and sixty three patients (97%) were discharged before 3 days (Table 4.14; Figure 4.2).

Table 4.14 Length of stay

Length of stay (in days)	**Total**	**Vaginal delivery**	**CS**
Median	1	3	1
IQR	1-1	3-3	1-1
Minimum	1	1	1
Maximum	17	17	5

Length of stay was significantly longer in patients with CS than those with vaginal delivery (Mann Whitney's U test, p<0.001)

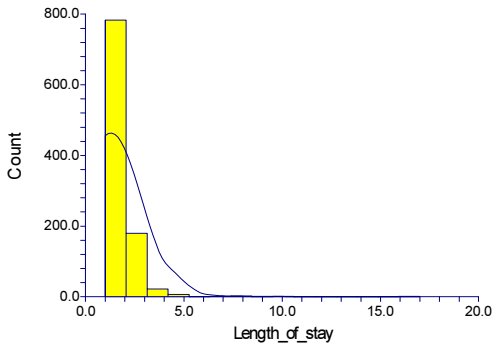

Figure 4.2 length of stay

4.4.2 MATERNAL OUTCOME

In the study the majority (n=995, 99.8%) of the women were discharged and few (n=2, 0.2%) were transferred to Natalspruit Hospital. There were no maternal deaths during this period.

4.5 PERINATAL PROFILE

4.5.1 BIRTH WEIGHT

Median birth weight was 2905 g (IQR 2700g to 3005 g) with a range of 300 g to 4100 g respectively. Only one baby was less than 1000 g (Table 4.15, Figure 4.3).

Table 4.15 Birth weight in g

Birth weight (g)	**Total**	**Vaginal delivery**	**CS**
Median	2905	2900	2945
IQR	2700-3005	2700-3000	2700-3025
Minimum	300	1200	300
Maximum	4100	4000	4100

Length of stay was significantly longer in patients with CS than those with vaginal delivery (Mann Whitney's U test, p<0.001)

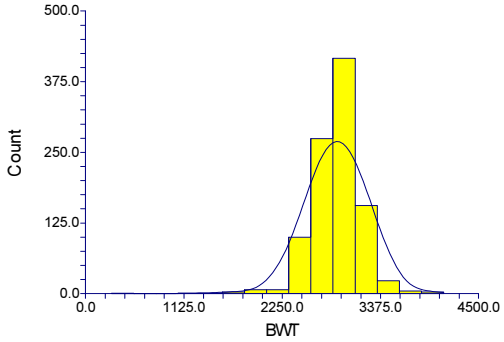

Figure 4.3: Birth weight

Birth-weight was stratified into different categories (Table 4.13).

Table 4.13 Birth weight

Birth weight categories	N (%)
>= 4000g	2 (0.2%)
> 2500g to <4000g	940 (4.3%)
1500g to 2500g	54 (5.4%)
<1500g	1 (0.1%)
Total	**997 (100%)**

4.5.2 PERINATAL OUTCOME

The perinatal outcome is listed in Table 4.14. Most of them were born alive (n=969, 96.9%). Three of them had early neonatal death (3.5 per 1000 live birth). Still birth rate was 24 per 1000 birth during this period.

Table 4.14 Perinatal outcome

Perinatal outcome	Count	%
Discharged	966	96.9%
Transferred to regional hospitals	4	0.4%
Fresh still birth	7	0.7%
Macerated still birth	17	1.7%
Early Neonatal death	3	0.3%
Total	**997**	**100%**

There is no significant association between adverse perinatal outcome and maternal age (Chi-square test, p=0.63), marital status (Chi-square test, p=0.32), employment (Chi-square test, p=0.93), parity (Chi-square test, p=0.93),

However, significant association was found with adverse perinatal outcome and self-referral (Chi-square test, p<0.001), normal vaginal delivery (Chi-square test, p<0.001), low birth-weight (Chi-square test, p<0.001).

CHAPTER 5
DISCUSSIONS

The findings from the review of the literature are incorporated in this chapter with the results obtained from the analysis in order to address the aims and objectives of the study.

5.1 INTRODUCTION

The purpose of this study was to describe the clinical procedures in the maternity unit at the Heidelberg District Hospital. This is the first study conducted at the level of a district hospital in the Sedibeng District in Gauteng Province to look at the deliveries at a District Hospital maternity unit.

The data extracted from the Maternity registers afforded a sound basis of the study to describe deliveries at maternity ward of Heidelberg hospital, Gauteng Province. Together with the hospital Information System Data source, this study managed to describe and characterise deliveries during the 1st April 2010 – 31st March 2011 study period. This study was planned in the context of Strategic Plan for maternal, newborn, child, and women's health and nutrition in South Africa (2012-2016) (National Department of Health. 2012). The study had identified profiles of mothers delivered in a district hospital and factors associated with adverse perinatal outcomes.

5.2 MODE OF DELIVERY

The study showed that highest number of deliveries were normal vaginal deliveries (78.6%) followed by CS (20.3%). There were very few instrumental deliveries (0.7%), probably due to lack of experience of clinical staff to conduct such deliveries. The caesarean section rate was comparatively low (20.4%) in comparison to other studies (Mac Dorman, Menacker, Declercq, 2008) and

comparable to the estimated caesarean section rate 20.6% (WHO, 2008). However, the current national target is 12, 5% (National Department of Health, 2012). This could be addressed by encouraging more instrumental delivery such as vacuum extraction by training health professionals to conduct such deliveries.

5.3 SOCIO-DEMOGRAPHIC PROFILE

The majority of women who delivered at Heidelberg hospital maternity unit came from poor socio-economic class, mostly unemployed and teenagers. Most of the women were single and unemployed. Therefore these women were solely dependent on public health facilities for their deliveries. Vulnerable groups such as teen-ager, single women, low educational status, and unemployment and residing in developing country have been associated with high risk of maternal mortality and morbidity (WHO, 2005). For example adolescent and teen age pregnancy is known to entail a number of risks. This study confirmed that that most deliveries at Heidelberg hospital were of adolescent and teenage.

The majority of the patients were referred from their PHC clinic, suggesting good referral system existing in the sub-district.

5.4 CLINICAL PROFILE

Although the majority of the subjects were multi-para (60%), a large number of subjects were primi-para (40%) and the majority of them are teenagers.

It was observed that majority of women in the study period were booked while only few were unbooked (2.5%), which is much higher than national average (10%) (National Department of Health, 2012). This reflects in low maternal and perinatal mortality and morbidity in this Hospital.

Pregnancy induced hypertension was the commonest obstetrics encountered during pregnancy (35, 3.5%) which is similar to the findings of the other studies (NCCEMD, 2007).

Among the patient who delivered with CS, commonest indications were fetal distress followed by CPD unlike other studies which reported protracted labour, abruptio placenta, previous caesarean section, eclampsia, placenta praevia, and malpresentation (Dumont, de Bernis, Bouvier-oll, et al, 2001). A further study is required to identify the mode of diagnosis for fetal distress and CPD (For example, if the hospital uses cardio-tochograph for diagnosis of fetal distress).

Most women who delivered at Heidelberg hospital during the period were discharged without complications, no maternal deaths were reported. This was commendable as MMR for Sedibeng district in 2008 was 150.6 per 1,00,000 live births (NCCEMD, 2011).

This study found median birth weight was 2700 g (IQR 2905 g to 3005 g). Only one baby was less than 1000 g, which showed good management during antenatal period thereby reducing premature delivery.

The study found an early neonatal death rate of 3.5 per 1000 live birth and relatively high still birth rate (24 per 1000 birth) during this period. These adverse outcomes were associated with self-referral (Chi-square test, $p<0.001$), normal vaginal delivery (Chi-square test, $p<0.001$), low birth-weight (Chi-square test, $p<0.001$).

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

This constitutes the last chapter of the report and derives conclusions from the research related to the objectives of this study, makes recommendations and advocates areas for future research in the field of describing the clinical procedures in the maternity unit at the Heidelberg District Hospital.

6.1 CONCLUSIONS RELATED TO THE AIMS OF THE STUDY

This was a descriptive study that looked at broad issues pertaining to the deliveries at the maternity unit of Heidelberg hospital, a district hospital in the Lesedi Sub–district in the Sedibeng district, Gauteng province from 1st April 2010 to 31st March 2011. Based on the objectives of the study, the following could be concluded:

6.1.1 DESCRIPTION OF THE CLINICAL PROCEDURES

The study found highest number of deliveries were normal vertex deliveries and a very few assisted and breech deliveries. The caesarean section rate was high (20.36%) as compared to the normal national target (12, 5%). Fetal distress and CPD was the main indications for caesarean section.

6.1.2 DESCRIPTION OF THEIR SOCIO-DEMOGRAPHIC PROFILES

The majority of women who delivered at Heidelberg Hospital maternity came from poor socio-economic class, mostly single, teenagers, and unemployed. They were the most vulnerable group in the Society.

6.1.3 DESCRIPTION OF THEIR OBSTETRIC PROFILE

It was observed that majority of women were booked and referred from PHC clinic where they were booked for antenatal check-up. Pregnancy induced hypertension was the commonest obstetric problem encountered during antenatal period. Most women who delivered at Heidelberg hospital during the period were discharged without complications, no maternal deaths were reported. There were very preterm deliveries but a relatively high still birth rate which is of concern. These adverse outcomes were associated with self-referral, normal vaginal delivery, and low birth-weight. These conditions would require improvement of antenatal services. Therefore, the Hospital should develop a good working relationship with the Sedibeng District to improve antenatal services in the PHC facilities.

6.2 LIMITATIONS OF THE STUDY

The main limitation of the study was possible missing records. This was addressed by verifying patients' clinical records.

6.3 RECOMMENDATIONS

6.3.1 PLANS FOR UTILIZATION AND DISSEMINATION OF RESULTS

The researcher will discuss the report with the head of the Maternity Unit and other staff members as well as senior management of the Heidelberg Hospital. This would assist the Hospital management to make a decision about the improvement of maternity services to decrease the perinatal outcomes. In addition, the report will also be forwarded to the GDoH for dissemination to other hospitals in the Province.

The Hospital will be requested to engage the primary health care facilities in the Sedibeng District to decrease self-referrals.

6.3.2 FUTURE RESEARCH

Based on the findings of this study, the researcher would like to suggest the following suture studies:

a. To do a longitudinal study to explore the cause of high CS.
b. To conduct a similar study using a qualitative method by interviewing the subjects to develop an understanding the social determinants of health
c. To evaluate the workload of the feeder clinics

6.4 SUMMARY AND FINAL CONCLUSION

The study was the first of its kind to be done at Heidelberg Hospital and the Sedibeng Health District. The study systematically analysed routinely collected data and identified high risk patients, who would require special attention. This study would hopefully assist the Hospital Management to realise the high rate of CS and to develop appropriate measures to reduce unnecessary C/S being done, and to strengthen referral systems. In addition, further study is necessary at clinic level in the sub-district to identify work-loads in the feeder clinics.

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APPENDICES

APPENDIX A: ETHICS CLEARANCE CERTIFICATE
LETTER OF APPROVAL FROM THE FACULTY OF HEALTH SCIENCES
GAUTENG DEPARTMENT OF HEALTH

APPENDIX B: DATA COLLECTION TOOL

APPENDICES

APPENDIX A: ETHICS CLEARANCE CERTIFICATE AND LETTERS OF APPROVAL FROM THE FACULTY OF HEALTH SCIENCES AND GAUTENG DEPARTMENT OF HEALTH

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

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Lydia Lebohang P Msiza

CLEARANCE CERTIFICATE	M110960
PROJECT	Clinical Procedure in the Maternity Unit of a District Hospital
INVESTIGATORS	Lydia Lebohang P Msiza.
DEPARTMENT	School of Public Health
DATE CONSIDERED	30/09/2011
M1109600DECISION OF THE COMMITTEE*	Approved unconditionally

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

DATE 20/04/2012 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Dr Debs Basu

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...

health and
social development
Department: Health and Social Development
GAUTENG PROVINCE

Ms L.P Msiza

Nursing Service Manager

Heidelberg Hospital

Persal number: 14890399

RE: Request for permission to collect data in Maternity ward

Your letter of request dated the 28th October 2011 is hereby acknowledged and permission is hereby granted. Please note that the information/data collected may only be used for the purposes of your studies (M110960) and cannot be shared with any other parties who are not directly related to your studies.

Wishing you all the best.

Dr D. Pekane

Chief Executive Officer

Heidelberg Hospital

3 November 2011

Faculty of Sciences
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Fax: (011) 717-2119
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Reference: Mrs Mathikhui Moshabesha
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11-OCT-2011
Person No: 404019
TAA

Ms Lydia Lebohang Perserverance Msiza
P.O. Box 1470
Nigel
South Africa
1490

Dear Ms Msiza

Master of Public Health (Hospital Management): Approval of change of title

We have pleasure in advising that your proposal entitled "Clinical procedures in a maternity of a district hospital". Please note that any changes to this title have to be endorsed by the Faculty's Higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

APPENDIX B: DATA COLLECTION TOOL

TOOL 1

Study no	Arrival date	booked (yes/no)	Gestational age at booking	Age	Ethnicity	Marital status	Medical aid	Hospital class	Employment status	Referral unit	Obstetric history	Parity	Gravity

TOOL 2

Study no	Gestional age at delivery	Mode of delivery	episiotomy (yes/no)	elective/ emergency	Indication for CS	Postpartum complication	Date of discharge	Length of stay	Maternal outcome	BWT	Fetal outcome