

CAESAREAN SECTION RATES AT THE STANDERTON HOSPITAL:

2004 – 2007

NELSON MANDELA SCHOOL OF MEDICINE

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ABSTRACT

Introduction

Increased use of caesarean section (CS) as a mode of delivery is of concern for maternal and child health in many countries. The World Health Organization (WHO) has set guideline of population caesarean section rate between 5% - 15% for CS deliveries. Accordingly the South African National Department of Health (NDOH) has set a national target for district hospitals, that no more than 10% of all deliveries should be by CS. Standerton District Hospital experienced a sudden increase in the caesarean section rate (CSR), from 17.5% in 2004 to 30.8% in 2007. The reasons for this increase are not known.

Purpose of the study

This study aims to investigate factors which contributed to the sudden increase of CSR from 17.5% in 2004 to 30.8% in 2007 at Standerton District Hospital, Gert Sibande District Mpumalanga.

Method

A retrospective record review of 790 women who delivered at Standerton District Hospital by caesarean section from January 2004 to December 2007 was done. Fifty percent of the total number of records for each year was retrieved and to achieve this every second record was selected from the maternity and theatre registers for patients who have undergone CS. Systematic sampling selection of records of all women who have undergone CS was conducted during the identified period.

Data on patient demographics, the reasons for the CS, the maternal and neonatal outcomes achieved, antenatal care profile, the employment status and the responsible medical practitioner were extracted from existing records maintained by the hospital. Analysis ascertained factors associated with increased CSR.

Results

The Caesarean section rate at Standerton District Hospital has increased annually since 2004. The factors contributed to the increase include medical indications, clients who are primigravida and the less experienced community service doctors who performed the CS. There was no evidence that education, high income clients, or maternal request contributed to the increase of Caesarean Section rate (CSR). The outcome of mother and baby were positive except for 1% of babies who were not alive. Robson's group classification (classification system which defines 10 groups of women according to obstetric record, category of pregnancy, the presence of previous uterine scar, the course of labour, delivery and gestational age), revealed that groups two and four played a major role.

Conclusion

CSR has increased over the years and strategies need to be developed to reduce this by having experienced doctors supervising community service doctors, training of professionals working in maternity and monitoring of labour by midwives.

Recommendation

Standerton District Hospital management should intensify recruitment and retention of experienced medical officers, train additional midwives on advanced courses, intensify ante natal care, establish a high risk clinic at the hospital, review hospital policies on maternal care and monitoring of compliance to mother and baby's national and provincial policies.

DECLARATION

I, Sibongile Margaret Dlamini declare that:

- (i) The research reported in this dissertation, except where otherwise indicated, is my original research.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain any other person's data, pictures, graphs histogram or other information, unless specifically acknowledged as being sourced from other persons.
- (iv) This dissertation does not contain another person's writing, unless specifically acknowledged as being sourced from other researchers.
Where other written sources been quoted, then:
 - a) their words have been re-written but the general information attributed to them has been referenced;
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ACRONYMS AND ABBREVIATIONS

ANC	-	Ante Natal Care
CPD	-	Cephalopelvic disproportion
CHIPP		Child Problem Identification Programme
CS	-	Caesarean Section
CSR	-	Caesarean Section Rate
DHIS	-	District Health Information System
DOH	-	Department of Health
FHR	-	Foetal heart rate
MTCT	-	Mother-to-child transmission
PHC	-	Primary Health Care
PET	-	Pre eclampsia
PPIP	-	Perinatal Problem Identification Programme
SA	-	South Africa
UK	-	United Kingdom
USA	-	United States of America
WHO	-	World Health Organization

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CHAPTER 1

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

The World Health Organization (WHO) has set a norm of a population caesarean section rate between 5%- 15% for CS deliveries. In South Africa the National Department of Health (NDOH) has set a Caesarean Section Rate (CSR) target for district hospitals at a maximum of 10% (Anderson 2004,p.696).

From 2000-2004 the CSR at Standerton District Hospital ranged from 10.7% - 17.5%. In 2005 it was 23.9% and in 2006 there was an increase to 24%, and in 2007 it was 30.8%.

The study investigated the factors which contributed to the sudden increase in CSR at Standerton District Hospital between 2004 and 2007, which will assist with effective management of the obstetrics service, thus contributing to improved maternal health care.

Standerton District Hospital is one of eight public sector district hospitals in Gert Sibande District, Mpumalanga. The hospital together with nine surrounding clinics and two community health centers, serves two local municipalities Lekwa and Dipaleseng with a total population of 145113. There are a number of private medical practices and one twelve-bedded private hospital, which does not perform caesarean sections (CS).

The hospital has 219 approved and 189 used beds. The obstetric service has seven professional nurses working two per shift. The operating theatre has three professional nurses and three staff nurses. The hospital was served by ten community service medical officers and maximum of four permanent medical officers. In addition, fourteen private medical practitioners do sessional work at the hospital.

1.2 BACKGROUND TO THE RESEARCH

1.2.1 What is the problem?

Worldwide CSR has increased, and managers and policy makers in public health are concerned about this rise, hence studies are needed to identify factors which contribute to the increase, since performing CS is a technique to save lives of mother and baby.

According to Hildingsson et al 2002,p.618 increasing CS has been attributed to the demand from women themselves. These women were often described as educated, urban, in control, capable of making independent decisions and focused on their professional careers. The study revealed that women who wish for CS were above 35 years, single, staying in small towns, with a history of previous CS, stillbirth or abortion and previous negative birth experience.

According to Flamm et al 1998,p.121 there was a failure of reducing CS because of fear of malpractice, litigation because medical practitioners were sued.

Wei . Wei et al 1998,p.779 stated that many studies indicated that socioeconomic status and health insurance contribute to the increasing CS. In China increasing CS was associated with government health insurance which covers all costs, compared to patients who had to pay for themselves. Physicians in China receive higher payment for CS compared to a vaginal delivery with payment coming from the patient and hospital, resulting in perverse incentives . unrelated to clinical indicators for CS.

Some women believe that requesting CS would assist their babies to be more intelligent and that it is more modern (Wei . Wei et al. 1998,p.780).

Women who fear childbirth during third trimester of pregnancy may also increase the risk of subsequent emergency CS (Ryding et al. 1998,p.542).

Paterson . Brown et al 2001,p.15 showed that obstetricians were more prepared to agree to maternal requests for CS without any obstetric indication e.g. patient pressure and fear of litigations.

Further, CS performed in developing countries face enormous problems and greater risks of complications due to lack of skilled human resources, transportation, efficient referral systems, equipment such as monitors, ventilators and modern anaesthetic machines.

Societies and obstetricians believed in the formula of once a CS always a CS. However, developments in technology have led to better operational anaesthetic machines in order to save the lives of both mother and baby, and professionally the technique of CS improved, so that the time of the operation was reduced tremendously (Kwawukume 2001,p.166).

CSR in developing countries has increased to 29%, 25% in developed countries and 69% in the private sector (Goldberg 2004,p.102). Indications for CS have varied over the years and common ones include repeat CS, foetal distress, obstructed labour and maternal request due to socio economic factors, including improved medical aid schemes, and maternal education.

Costs have increased with the rising CSR e.g. human resources, advanced medical equipment. It has also been noted that elective CS gives less intra and post operative complications with a high rate of survival compared with emergency CS (Goldberg 2004,p.103).

From the above review the main factors associated with the high CSR may be classified as clinical, health professional and patient related.

1.2.2 What needs to be investigated?

Factors contributed to the increase in CSR seen at Standerton District Hospital, Gert Sibande District, Mpumalanga, from 2004 to 2007.

Comparison of the CSR in Standerton District Hospital with the other hospitals serving the same population.

Recommendations for hospital managers, clinicians of Standerton District Hospital, district and provincial policy makers in order to take remedial action to reduce CSR.

1.2.3 Why is it important

Although the global trend towards increased use of CS may represent an improvement in access to an essential emergency obstetric service, it may also represent the over-medicalisation of delivery and increased exposure to a potentially risky surgical procedure which is unwarranted. The situation in South African district hospitals may represent a mixture of both scenarios, which would make application of the national target difficult. A better understanding of the current situation is required for future planning.

1.2.4 How will the study address this as a management challenge

It will identify the factors associated with the observed increase in CS in a district hospital setting, resource needs, costs and allow for reconsideration (if necessary) of the national target. It will also identify possible areas for remedial action at local level to enable management to plan accordingly.

1.3 PURPOSE OF THE STUDY

What factors contributed to the sudden increase in CSR at Standerton District Hospital between 2004 and 2007?

A sudden increase in CSR from 17.5% in 2004 to 30.8% in 2007 at Standerton District Hospital has exceeded the national target for CSR for district hospitals which are set at 10% (South African National Department of Health national targets (2006)).

1.4 SPECIFIC OBJECTIVES OF THE RESEARCH

The specific objectives of the study are:

- a) To determine the demographic, and socio economic status of women who have undergone CS at Standerton District Hospital during 2004 . 2007.
- b) To establish the ANC profile of women who have undergone CS
 - To determine if the women attended ANC or not
 - To investigate gestational age when CS was performed
 - To determine reproductive factors
- c) To establish all factors which influenced the decision to undertake CS including whether CS was an emergency or elective procedure?
- d) With respect to the actual CS procedure to ascertain who prescribed & performed CS since this may differ (community medical officer, permanent hospital medical officer or private practitioners) the time and day of the week when CS was performed.
- e) To use the Robson ten group classification of caesarean section indicators to analyse those indicators that are higher than expected.
- f) To establish the clinical / obstetrical outcomes including the morbidity and mortality of both mother and baby post CS.
- g) To describe the trend of monthly CS rates during the study period.
- h) To compare the CSR in Standerton District Hospital with the other hospitals serving the same population.

1.5 ORGANISATION OF THE REPORT

This report is organised into chapters.

Chapter 1 gives an introduction and general overview of the study and focuses mainly on the research problem, the importance of the study and the background.

Chapter 2 assessed a detailed literature review and covers the history of caesarean sections, indications for CS, internal (SA) and global situation, costs of CS, elective and emergency CS, maternal mortality and morbidity associated with CS, likely complication of foetus and mother, rationale for reducing the CSR.

Chapter 3 describes the research methodology, the study design and method of data collection. It sets out the sampling framework, data analysis and covers the issues of ethical clearance.

Chapter 4 presents the results of the study in terms of the objectives and reports on the findings.

Chapter 5 contains the discussion of the results in chapter 4.

Chapter 6 discusses the conclusions drawn from the results of this study and provides recommendations on how to reduce the CS rate.

This is followed by the references and appendices

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

There are many published articles and studies done which have described research which has been conducted regarding indications for CS internally and globally, the costs, mortality and morbidity and its increased rate.

2.2 History: Why CS was performed

Historically CS was performed on dead woman to save the baby's life. As years went by it was performed on living women to increase the population of the country. It was learnt that CS could be performed at an earlier stage when labour fails which increased the survival chances of both the mother and the baby (National Library of Medicine 1998, Part 1 of 5).

With increased urbanization, the number of hospitals increased and CS was performed routinely. In the twentieth century CSR rose due to technological, religious, cultural, legal and professional developments which influenced medical practice e.g. growth in malpractice suits promoted surgical intervention. Continued studies indicated that CS saves lives of mothers and babies, and prevents disabilities . reasons which communities also believe - thus CSR continued to increase (National Library of Medicine 1998, Part 1- 4).

In the United States CSR is at a record level and rising due to medical, legal, social and financial factors including %defensive medicine+and changing attitudes of caregivers and pregnant women. The levels reached 29,1% in 2004, an increase of 40% since 1996, one reason being the decline of women who deliver vaginally after CS deliveries (Rubin 2005,p.1).

Nationally (USA in 2004), 28% of deliveries were CS and 26% in 2003 and a number of them were multiple birth deliveries. (Annual National Obstetric information system (NOIS) Report, 2004).

In 2005 the Health Foundation (Kwawukume 2001,p.167) reported that a CSR higher than 15% indicates potential over-utilisation of the procedure for other than life-saving reasons, incurring unnecessary risk that is associated with any major surgical operation. Indications might be the same for both developing and developed countries, but it might be technically more difficult in developing countries. According to the study conducted, there might be lack of resources in developing countries which might lead to high maternal mortality rate (Kwawukume 2001,p.166).

The CSR in developed countries increased up to 25%, whilst in developing countries it has risen up to 29% (National Institutes of Health,1998).

2.3 Indication for CS

The widespread increase in CSR has become a concern, especially noting the trend and its relationship to the factors contributing to the increase. Culturally society expects and believes that both mother and baby are safer after CS. Medical practitioners also fear litigation, this then influences them to decide to perform CS. In Ireland the CS has increased in spite of the reduced number of births. One of the reasons suggested is an increased tendency among patients to resort to litigation (Condon 2001,p.2).

International /global situation

Kalaichandrian (2003,p.1-2) has classified the increased CSR as due to advances in anaesthesia, antibiotic prophylaxis and transfusion medicine, quality survival of the baby and mothers demand for CS. Elective CS is performed for malpresentations e.g breech, multiple pregnancies. Emergency CS is performed for antepartum haemorrhage and failure to progress due to cephalopelvic disproportion.

According to Kalaichadrian (2003,p.1-3) obstetric indications include .

Cephalopelvic disproportion (CPD)	<ul style="list-style-type: none"> - Breech presentation - Difficult labour or dystocia - Antepartum haemorrhage
Medical indications	<ul style="list-style-type: none"> - Hypertensive disorders - Diabetes - Cervical malignancy
Foetal indications	<ul style="list-style-type: none"> - Foetal distress - Premature foetus - Delivery of twins, triplets or more - Cord prolapse - Foetal condition e.g foetal abnormalities

According to Gomes at al. 1999,p.687 clinical factors only cannot contribute to an increase in CSR, but also the following does:

Socio economic factors	<ul style="list-style-type: none"> - Maternal education - Medical aid scheme - Urban and Rural residents - Status e.g. married women above age of 20 years - Working in more qualified occupation - High family income - Marital status e.g. married women above age of 20 years at the gestational age of 32 weeks and above
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One of the most frequent indications is the repeat CS where doctors feared a ruptured scar if the woman is in labour or failure to progress resulting in a formula+ which states that %once a CS, always a CS+(Women's Health News,2005,p.1-2).

Studies conducted in Australia in 2003 showed that 81.4% of women who had CS performed, had had a previous CS. It was common for babies with breech presentations at birth (Women's Health News,2005,p.1-2).

CS has been and is performed on maternal request without any obstetrical indication, with doctors justifying that CS is safer and because women fear vaginal delivery (Hildingsson et al. 2002,p.618).

Studies indicated that often women who requested to be delivered by CS were older than 35 years, single, living in small town or cities with negative previous birth experiences, and women who were depressed during pregnancy (Hildingsson et al. 2002,p.619).

In some Arab countries there is a high correlation between the caesarean section rate and female literacy, infant mortality rate, and urban residence (Khawaja et al. 2004,p.101).

Medical practices which indicated that delivery in private hospitals, versus delivery in non-teaching hospitals and recently graduated medical officials, private practice deliveries in the afternoons, evenings and over the weekend increase CSR (Paterson . Brown BMJ 1998:317:,p.462 - 465).

Situation in South Africa

In South Africa, CS rates for the public health sector range between 10-20% and in the private health sector it is above 50%. Usually only clinical reasons are stated, and obstetricians usually give reasons that it is for the safety of the mother and baby. Maternal and perinatal risk factors have and will continue to be justifiable reasons for performing CS. There are more maternal deaths with CS (9/100 000) than with normal vaginal birth (2/100 000). Elective CS has less complication compared with emergency CS. CS has an impact on future pregnancies such as having complications with next CS (Goldberg 2004,p. 101 - 102).

According to Goldberg (2004,p.101) other factors which are associated with increased CSR are the following:

Socio economic factors	<ul style="list-style-type: none"> - High income - Private insurance - Urban residence
Demographic and reproductive factors	<ul style="list-style-type: none"> - Older women - First pregnancy - Previous stillbirth - Low or high weight
Health service factors	<ul style="list-style-type: none"> - Recently graduated physician - Request by patient (maternal choice) - Medico . legal considerations
Maternal	<ul style="list-style-type: none"> - Failure of labour to progress
Foetal indications	<ul style="list-style-type: none"> - Foetal distress - Breech presentation

2.4 Costs of CS

It is believed that CS is more expensive than other modes of delivery. The extra costs are incurred through personnel, length of hospital stay and the procurement of technological medical equipment which promote better performance. This has an influence on the strategic planning of the institution and budget increases when there are limited resources. Further there are medical aid schemes which cover all costs of CS and the hospital collects more revenue in such cases from these clients (Petrou et al. 2001,p.146).

Studies conducted in USA, UK and Canada indicated that cost of labour and delivery depend upon the duration of labour, the staff, and the material inputs. An increased number of staff is needed in CS compared with spontaneous delivery, since more hospital equipment, medical and surgical supplies are used in CS. The cost of post CS care is higher for the prescribed treatment and length of hospital stay, and if there are complications then the cost increases compared with post vaginal deliveries (Petrou et al. 2001,p.146).

2.5 Elective and emergency CS

Studies have revealed that there are indications for planned CS e.g. maternal request, obstructed labour, multiple pregnancy, breech presentation, and repeat CS (Kalaichandrian 2003,p.1-3). Emergency CS has been performed for indications like foetal distress and CPD in labour (Kalaichandrian 2003,p.1-3) as stated in 2.3.

It has been noted that elective CS gives less intra and post operative complications with high rate of survival compared with emergency CS which carries the greatest risks to mortality and complications. It has been noted that most CS are performed in primiparous women and they present most of the emergency CS (Goldberg 2004,p.102).

2.6 Maternal mortality and morbidity associated with CS

The dramatic rise of CS poses a risk of maternal mortality, intra and post operative complications. Examples are post partum haemorrhage and ruptured uterus (Van Ham et al. 1997,p.6).

Studies indicate that elective CS showed reduced intra- and postoperative complications and emergency CS was compromised with more complications like excessive blood loss (Van Ham et al. 1997,p.6).

Studies show that CS has a higher chance of post-operative complications in HIV-infected women who are related to the severity of infection (Vimercati et al. 2000,p. 73-76).

Studies conducted in 1996 showed that elective CS reduced the risk of mother to child transmission of HIV (Shaefer et al.1996,p.161).Combination of antiretroviral with elective CS showed effectiveness and safety in the pilot study conducted in India and morbidity was similar to the general population (Shyamprasaad et al. 2002,p.1).

LIKELY COMPLICATIONS FOR FOETUS	LIKELY COMPLICATIONS FOR MOTHER
Injury during delivery	Haemorrhage
Respiratory Distress Syndrome	Pulmonary collapse
Asphyxia neonatorum	Thrombo . embolism from phlebitis
Prematurity due to incorrect dates	Infection
Wet Lung Syndrome	Psychological and emotional problems
Death (intra-uterine, mortality) (Sellers 2003,p.1572)	Bladder and ureter injuries, retention of urine (Sellers. 2003,p. 1572)

2.9 REDUCING THE CSR

In a meta-analysis of studies, Chaillet and Dumont (2007, p.53 - 64) found that audit and feedback, quality improvement, and multifaceted strategies were effective in reducing the CSR. They also found that studies that identified barriers to change were more effective than other interventions for reducing the CSR. They reported that the CSR can be safely reduced by interventions that involve health workers in analysing and modifying their practice, based on audit and detailed feedback.

Robson, Scudamore and Walsh (1996,p.199 - 205) used a retrospective medical audit of all deliveries over a four year period to identify groups of women contributing most to the overall CSR.

The Robson Classification of Caesarean Section distinguishes between previous obstetric record, course category of the pregnancy and the gestation (Robson 2001,p.23 -29). The Robson ten group classification of caesarean section was developed and allows the comparison of CSR over time in one unit and between different units in order to improve peri-natal care (Flamm et al. 2006,p.120).

The classification includes the previous obstetric record (nulliparous, multiparous without a scar or multiparous with a scar), course (spontaneous labour, induced labour, CS before labour), category of pregnancy (single cephalic, single breech, multiple pregnancy, transverse or oblique) and gestation (number of completed weeks of labour) (Robson 2001,p.23 -29). This classification identifies groups with the highest CS rates with a focus on clinical practice.

Robson 10 group classification

ROBSONS 10 GROUP CLASSIFICATION
GROUP 1: PG, singleton, cephalic, term, spontaneous labour
GROUP 2: PG, singleton, cephalic, term, induced or elective CS
GROUP 3: MG, singleton, cephalic, term, spontaneous labour
GROUP 4: MG, singleton, cephalic, term, induced or elective CS
GROUP 5: Previous CS, singleton, cephalic, term
GROUP 6: PG, singleton, breech
GROUP 7: MG, singleton, breech
GROUP 8: Multiple pregnancy
GROUP 9: presentations other than cephalic or breech
GROUP 10: singleton, cephalic, preterm

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The research methodology is presented in this chapter. This includes the study design, study setting, target and study population, inclusion and exclusion criteria, sampling, data source, measurement instrument, data collection, statistical analysis and other aspects as discussed in this chapter.

The researcher obtained consent from the Biomedical Research Ethics Committee of the Nelson R Mandela Medical School, the Head office of the Mpumalanga Provincial Department of Health, district manager from Gert Sibande District Mpumalanga, Standerton hospital executive management. (Appendix B, C, D and E).

The study on CS has been chosen because of the increasing rate since 2004. However, at Standerton District Hospital annually the turnover of hospital medical practitioners is high due to changes in community service medical practitioners.

The researcher conducted a retrospective record review of 790 women who delivered by CS at Standerton District Hospital from January 2004 to December 2007.

3.2 Study Design

A retrospective chart analysis of all women who delivered by caesarean section at Standerton District Hospital during the study period was undertaken. It was a cross-sectional study.

3.3 Study Setting

Standerton District Hospital, Gert Sibande District in Mpumalanga Province. The hospital together with nine surrounding clinics and two community health centers, serves two local municipalities Lekwa and Depaliseng with a total population of **145113**. There are a number of private medical practices and one twelve bedded private hospital, which does not perform caesarean sections.

3.4 Target & Study Population

All clients who delivered by caesarean section at Standerton District Hospital.

3.5 Inclusion criteria

Pregnant women who delivered by CS at Standerton District Hospital in 2004 - 2007.

3.6 Exclusion criteria

The number of pregnant women transferred from Standerton District Hospital to another hospital and delivered by CS. Admitted pregnant women booked for CS but delivered through another method. Inadequate notes of patients.

3.7 Sampling

3.7.1 Method of selecting sample

Fifty percent of the total number of records for each year was retrieved and to achieve this every second record was selected from the maternity and theatre registers for patients who have undergone CS. Systematic sampling selection of records of all women who have undergone CS was conducted during the identified period.

3.7.2 Size of sample

Clients records for 2004 is 290 . 50% = 145

Clients records for 2005 is 247 . 50% = 124

Clients records for 2006 is 466 . 50% = 233

Clients records for 2007 is 575 . 50% = 288

The total of 790 records was for four years of women who have undergone CS.

3.8 Data sources

The maternity and theatre registers were reviewed to identify all patients who have undergone CS at Standerton District Hospital during 2004-2007.

3.9 Measurement instruments

A standardised data capturing sheet (see appendix) was developed and used to retrieve data from clients records.

3.10 Reduction of bias

A total of 790 clients records of those who underwent CS at Standerton District Hospital during 2004 . 2007 were retrieved and reviewed. Intensive training was conducted for persons who assisted the principal investigator to collect data through the use of developed data capturing tool. The principal investigator was responsible for quality control.

3.11 List of variables

Demographic and socioeconomic status	ANC Profile
Residential area	Height
Ethnic group	Weight
Age	Antenatal care
Marital status	Prenatal visits
Education level	Parity
Occupational group	Gestational age
Mode of payment	Previous pregnancies: CS Stillbirths Live births Abortion

Reproductive factors	Outcome
Emergency CS	Clinical / Obstetrical
Elective CS	Morbidity and Mortality of both mother and baby
Indication(s) for caesarean section	Managerial
Time of the CS	
Day of the week	
Birth weight	
Medical doctor who requested CS	
Medical doctor who performed CS - / private /public /community medical practitioners	

3.12 Confidentiality

The personal identity of the women who had caesarean section at Standerton District Hospital was not recorded. Only their hospital numbers were used in order to ensure confidentiality and avoid duplication in counting.

3.13 Data collection

To reduce bias, the data collectors were persons with a health background, who understand issues of confidentiality, and the principal investigator trained and supervised them to collect the data. The principal investigator monitored the data collection and capturing, undertaking regular spot checks.

Data was collected from the clientsq records and recorded on the designed data capturing tool by the people who had been trained. The compiled data capturing tools and data were collected and kept by the researcher in a locked cupboard.

3.14 Data handling

All data capturing tools . completed and incomplete were kept and stored by the researcher. Data was captured by trained person on computer. The researcher was overseeing the process. The assistance of the statistician was used for the analysis of data.

3.15 List of associations to be measured

- Socio economic status of pregnant women versus CS.
- Reproductive factors versus CS
- Level of clinicians with CSR
- Outcome . morbidity and mortality of mother and child - of CS with CSR.
- CSR with existing policies.

3.16 Limitations to the study

The study is limited to Standerton District Hospital because its CSR was previously within WHO recommended limits and there was a sudden high increase with more than 15%. The study was limited to pregnant women who have undergone CS only at Standerton District Hospital during 2004 . 2007. The clients record was used to collect data and the quality of the data may have been a limiting factor.

3.17 Summary

A retrospective record review of 790 women who delivered at Standerton District Hospital by caesarean section from January 2004 to December 2007 was done. Data on patient demographics, the reasons for the CS, the maternal and neonatal outcomes achieved, antenatal care profile, the employment status and the responsible medical practitioner were extracted from existing records through the data capturing tool.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

The results of the study are discussed in this chapter. The results provide socio-demographic information about the CS cases and their obstetric history, description of monthly trend of CS rates, describe the reasons for CS in terms of Robson's classification, and the outcomes resulting from the CS, in order to determine why the caesarean section rate increased over the years.

4.2 Demographic information about CS cases at Standerton District Hospital

Age of clients who delivered by CS at Standerton District Hospital (2004 – 2007)

The age of all Caesarean Section performed was between 14 and 45 years. The mean age was 26.1 years (SD 6.63) and the median was 25 years. Most women who delivered through CS were between 20 and 25 years (276 cases) followed by 26 . 30 years (179 cases) then 14 . 19 years (145 cases), 31 . 35 years (108 cases) and the least were between 36 - 40 years (68 cases) and 41 . 45 years (14 cases).

Table 1 Summary of race groups for clients who delivered by CS at Standerton District Hospital from 2004 - 2007

Race Group	Number of CS patients	Percent
B	703	89
C	13	1.8
I	2	.2
W	72	9.0
Total	790	100.0

The race groups served by the hospital are Africans (B), Coloureds (C), Indians (I) and Whites (W). Seven hundred and three (**89%**) of the study population were Africans or black, followed by the White population which was seventy two (**9%**) and Coloureds thirteen (**1.8%**). The Indians who delivered through CS were only two (0.2%).

This reflects the demographics of South Africa as the bulk of the race group served by the hospital is Africans (black).

Geographic location of clients who delivered by CS at Standerton District Hospital in 2004-2007

Table 2 Summary of the physical address (by municipality, district and province) of the clients who delivered by CS at Standerton District Hospital in 2004 - 2007

Place	Lekwa	Dipaleseng	Other municipalities in district	Other districts	Gauteng	Other Provinces
No:	721	33	23	3	4	6
%	91.3%	4.1%	2.9%	0.4%	0.5%	0.8%

Seven hundred and twenty one (91.3%) of the population who had undergone CS were from Lekwa and thirty three (4.1%) were from Dipaleseng municipality which the hospital serve.

Three other municipalities from Gert Sibande district which have hospitals were also catered for by Standerton District Hospital. Twenty three (2.9%) of these clients were from these municipalities. There were also clients who came from Gauteng who were four (0.5%), from other provinces were six (0.8%) and from other districts in Mpumalanga province were three (0.4%).

These clients coming from other areas to deliver at Standerton District Hospital raises questions why they came in to deliver at Standerton District Hospital.

Employment status of clients who delivered by CS at Standerton District Hospital in 2004 - 2007

Six hundred and ninety eight (88.4%) of the clients who delivered by CS were unemployed and ninety two (11.6%) were employed. It is evident that the largest percentage was unemployed which indicates that the socio economic status of women who had CS between 2004 . 2007 is low.

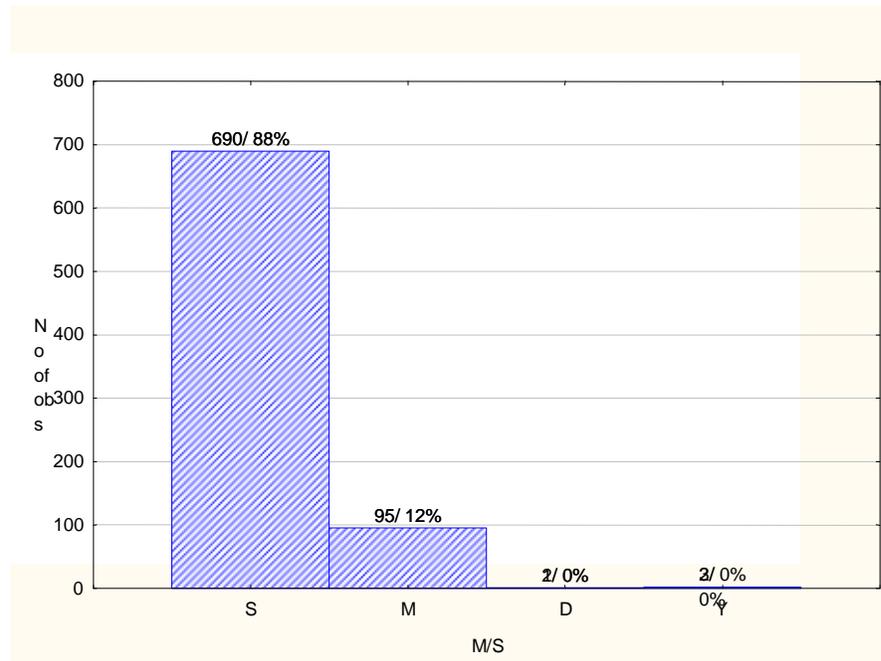
Mode of Payment of clients who delivered by CS at Standerton District Hospital from 2004-2007

Table 3 Mode of payment of CS at Standerton District Hospital between 2004 - 2007

Mode of Payment	Frequency	Percent
No payment	640	81
Private request	93	12
Medical aid	57	7
Total	790	100.0

Six hundred and forty (81%) of the study population received free services of CS. Fifty seven (7%) of that study group paid through a medical aid scheme and ninety three (12%) could afford to pay private practitioners.

Marital status of clients who delivered by CS at Standerton District Hospital from 2004-2007



Codes: S=single, M=married, D=divorced, Y= Widow

Figure 1. Marital status of clients who had CS at Standerton District Hospital from 2004 - 2007

The majority of the clients were unmarried. Six hundred and ninety (88%) of all women who had CS were single and ninety five (12%) were married and two (0%) were divorced and three (0%) were widowers.

4.3 Antenatal attendance of clients who delivered by CS at Standerton District Hospital from 2004 – 2007

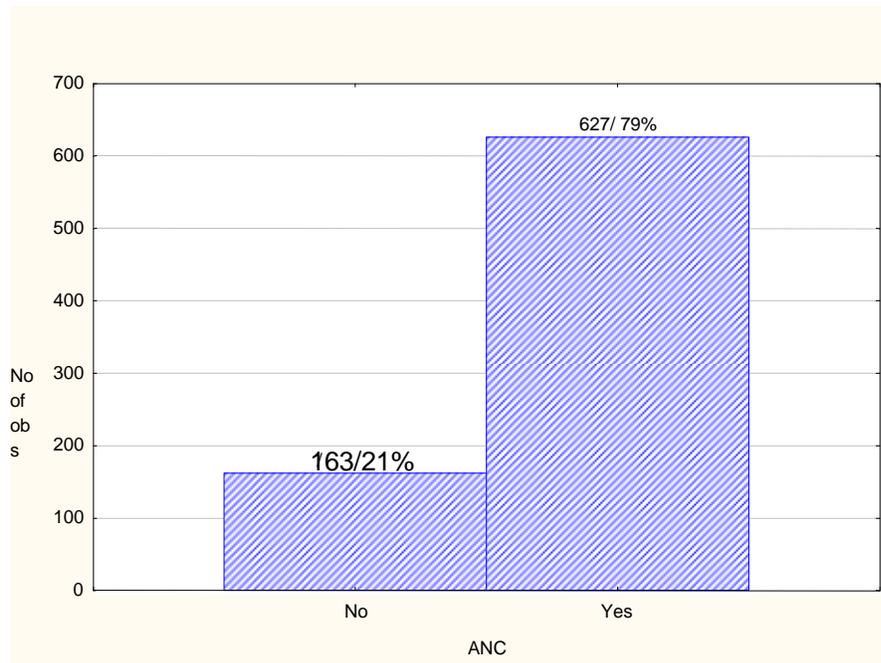


Figure 2. Attendance of the Ante natal care by clients who delivered by CS at Standerton District Hospital from 2004 – 2007

Six hundred and twenty seven (79%) of the study population booked for ante natal care and one hundred and sixty three (21%) did not attend ANC. All clients who attended ante natal care went to the primary health care facilities in the areas where they were staying.

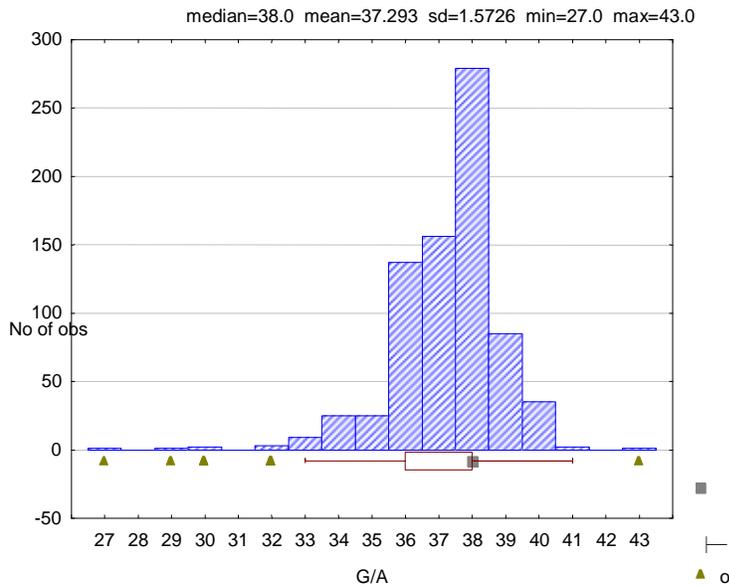


Figure 3. Gestational age of clients who delivered by CS at Standerton District Hospital from 2004 – 2007

The gestational age of clients who had CS was between 27 and 42 weeks. The mean gestational age was 37.3 (SD 1.57) and median was 38.0 weeks. Clients who delivered at 38 weeks through CS were 270, at 37 weeks (151 cases), at 36 weeks (136 cases), at 39 weeks (85 cases), 27 - 35 weeks (100 cases) and 40 - 42 weeks (48 cases).

Previous pregnancies of clients who had CS at Standerton District Hospital between 2004 – 2007

Table 4 Number of previous pregnancies for clients who had CS at Standerton District Hospital between 2004 -2007

No. of previous pregnancies	0	1	2	3	4	5	6	7
Total no.	343	285	106	35	15	2	2	2
%	43.4%	36%	13.4%	4.4%	1.9%	0.3%	0.3%	0.3%

Out of 790 selected clients who had CS between 2004 . 2007, two hundred and eight five (36%) delivered once, hundred and six (13.4%) delivered twice, thirty five (4.4%) delivered thrice, fifteen (1.9%) four times, two (0.3%) delivered five times (0.3%), two for six times and two seven times (0.3%) prior to CS. Three hundred and forty three (43.4%) were pregnant for the first time.

Life-birth experiences of women who had CS at Standerton District Hospital

Table 5 Summary of preceding life-births prior to CS at Standerton District Hospital from 2004 - 2007

CS cases subjects with the following number of preceding life births	Number of CS cases	%
0	343	43%
1	240	30%
2	101	13%
3	31	4%
4	17	2%
5	3	0.1%
Still births		
1	48	6%
2	4	1%
3	3	0.1%
Total	790	100%

Previous CS performed to clients prior to CS at Standerton District Hospital from 2004 - 2007

Out of 790 cases clients who had one previous CS were likely to undergo the second CS, they were at hundred and fifty eight (20%) between 2004 . 2007, and twenty five (3.3%) for second previous CS and three at (0.4%) for the third previous CS, two (0.3%) for the forth CS. Six hundred and two (76%) never delivered by CS.

Seven hundred and sixty five (97%) of clients who were selected had one foetus in their womb and twenty five (3%) carried two or more foetus.

Table 6 Total number of foetal presentations of cases who had CS at Standerton District Hospital from 2004 - 2007

Presentation	No.	%
Cephalic	734	93
Breech	46	6
Transverse	2	0.2
Face	2	0.2
Twins (breech & transverse, breech & cephalic)	6	0.6

Out of 790 randomly selected clients seven hundred and thirty four (93%) had cephalic presentation, forty six (6%) were breech, two of them (0.2%) had transverse lie, two (0.2%) presented with face and others were twins (0.6%) presented with breech and transverse and breech and cephalic.

Table 7 Total number of excluded clients who were transferred from Standerton District Hospital and delivered by CS, admitted and booked for CS but delivered through another method from 2004 - 2007

Excluded number of clients:

2004	25
2005	20
2006	27
2007	22

Total number 94

The total number (94) of pregnant women transferred from Standerton District Hospital to another hospital and delivered by CS. Admitted pregnant women who booked for CS but delivered through another method were not part of the 790 cases selected for the study.

4.4 Medical officers who performed CS at Standerton District Hospital

Table 8 Medical officers who performed CS at Standerton District Hospital during 2004 – 2007

Category of Medical Practitioner	Number of CS operations performed	%
Public	633	81%
Private	157	19%
Total	790	100%

Six hundred and thirty three (81%) of CS were performed by the hospital doctors and only one hundred and fifty seven (19%) were performed by private practitioners.

Table 9 Number of cases performed by private doctors, permanent hospital doctors and community service doctors at Standerton District Hospital in 2004 - 2007

Private Dr's	Permanent hospital Dr's	Community service doctors
157	241	392
19.9%	30.5%	49.6%

Three hundred and ninety two cases (49.6%) were performed by the community service doctors which forms majority of the cases, two hundred and forty one (30.5%) were performed by permanent hospital doctors and one hundred and fifty seven (19.9%) were done by private doctors.

Table 10 Community service doctors in Gert Sibande District Hospitals in relation to experienced doctors from 2004 - 2007

Hospitals	2004		2005	
	Permanent doctors	Community service doctor	Permanent doctors	Community service doctor
Amajuba	Information not available			
Bethal	13	6	13	8
Carolina	3	0	5	0
Elsie Ballot	1	0	3	0
Embhuleni	4	4	10	4
Evander	Information not available			
Piet Retief	3	4	6	2
Standerton	1	10	1	9

Hospitals	2006		2007	
	Permanent doctors	Community service doctors	Permanent doctors	Community service doctors
Amajuba	Information not available			
Bethal	8	4	9	9
Carolina	5	0	5	2
Elsie Ballot	1	0	2	0
Embhuleni	8	0	10	4
Evander	Information not available			
Piet Retief	8	4	16	0
Standerton	3	7	4	9

Standerton District Hospital since 2004 . 2007 the number of community service doctors exceeded experienced supervising doctors e.g. 2004 ten versus one permanent doctor, 2007 nine versus four permanent doctors. At Carolina hospital with CSR ranging between 9.3% to 17% they had no community service doctors from 2004 . 2006 and only two in 2007.

4.5 Indications for CS performed in 2004 - 2007

Table 11 Indications for CS performed at Standerton District Hospital during 2004 - 2007

Indications for CS	Number	Percent
CPD & poor progress	267	34%
Foetal distress	142	18%
Previous CS x 1	95	12%
Breech	57	7%
Twin pregnancy	30	4%
Prolonged labour	29	4%
Failed induction	23	3%
Previous CS x 2	23	3%
Abruptio placentae	15	2%
Others	23	3%
	704	90%
Elective CS	86	10%
Grand Total	790	100%

The leading indication for the CS performed was cephalopelvic disproportion and poor progress at 267(34%), followed by foetal distress at 142 (18%), previous CS times one (PCS x1) 95 cases (12%), elective CS 86 (10%), breech presentation 57 (7%), twin pregnancy 30 (4%), prolonged labour 29 (4%), failed induction 23 (3%) previous CS x 2 23 (3%), abruptio placentae were fifteen (2%) and others 23 (3%). Elective CS were performed for 86 cases (10%).

Table 12 Indications for elective and emergency CS performed at Standerton District Hospital from 2004 - 2007

ELECTIVE CS	EMERGENCY CS
Previous CS x1, or 2 or 3 or 4	Previous CS and placenta abruptio
Previous CS and big baby	Previous CS and foetal distress
Previous CS and breech presentation	Previous CS and poor progress
Previous CS and post date	Previous CS, CPD and foetal distress
Previous CS and PET	Eclampsia
Multiple pregnancy x 2,3,& 4, breech and transverse lie	Multiple pregnancy with CPD, foetal distress and footling
Elderly primigravida	Cord prolapse
Request by patient	Footling presentation
	Placenta praevia

Table illustrates CS performed for elective e.g. previous CS with other indications like breech presentation and multiple pregnancies.

Emergency CS were performed for previous CS with other indications e.g placenta abruptio, foetal distress, eclampsia, cord prolapse and placenta praevia.

Table 13 Total number of elective and emergency CS performed at Standerton District Hospital from 2004 – 2007

ELECTIVE CS		EMERGENCY CS	
No.	%	No.	%
86	10	704	90

Out of 790 cases selected eighty six (10%) elective CS was performed, seven hundred and four (90%) were performed as an emergency CS.

Table 14 CSR monthly trends at Standerton District Hospital in 2004 - 2007

Month	2004 Total CS	Total deliveries	CS rate	Month	2005 Total CS	Total deliveries	CS rate
January	22	136	14	January	35	136	26
February	18	114	17	February	40	141	28
March	26	137	19	March	42	150	28
April	18	142	13	April	38	168	23
May	32	147	23	May	37	163	37
June	28	138	20	June	38	167	23
July	20	139	15	July	35	169	21
August	15	169	9	August	32	160	20
September	23	142	14	September	43	149	29
October	39	147	27	October	30	166	18
November	22	136	16	November	35	152	23
December	33	153	22	December	44	151	29
Total	296	1700	17.5	Total	449	1872	23.9

Table 14 CSR monthly trends at Standerton District Hospital in 2004 - 2007

Month	2006 Total CS	Total deliveries	CS rate	Month	2007 Total CS	Total deliveries	CS Rate
January	45	178	25	January	40	143	28
February	35	150	23	February	32	137	23
March	41	153	27	March	38	146	26
April	40	159	25	April	51	150	34
May	36	174	21	May	34	155	22
June	35	147	24	June	45	160	28
July	32	138	23	July	52	173	30
August	47	164	29	August	60	154	39
September	43	158	27	September	63	158	40
October	31	135	23	October	58	152	38
November	33	179	18	November	49	164	30
December	34	143	24	December	54	176	31
Total	452	1878	24	Total	576	1868	30.8

In 2004 CSR monthly trends increased from 9% to 27%, in 2005 from 18% - 37%, in 2006 from 18% - 29 and in 2007 increased from 22% - 40%.

Table15 Comparison of maternal mortality rate with other hospitals in the Gert Sibande District from 2004 - 2007

Hospitals	2004			2005		
	Maternal deaths	Total number of deliveries	Rate	Maternal deaths	Total number of deliveries	Rate
Amajuba	3	1000	0.3	1	919	0.1
Bethal	1	1563	0.06	3	1569	0.2
Carolina	0	600	0	0	650	0
Elsie Ballot	0	400	0	0	468	0
Embhuleni	1	2600	0.04	4	2750	0.1
Evander	7	1950	0.4	5	2075	0.2
Piet Retief	7	2540	0.3	3	2440	0.1
Standerton	3	1700	0.2	4	1872	0.2
Hospitals	2006			2007		
	Maternal deaths	Total number of deliveries	Rate	Maternal deaths	Total number of deliveries	Rate
Amajuba	2	850	0.2	1	887	0.1
Bethal	0	1411	0	3	1318	0.2
Carolina	0	669	0	0	765	0
Elsie Ballot	4	507	0.8	0	549	0
Embhuleni	0	2700	0	0	2700	0
Evander	17	2010	0.8	12	1870	0.6
Piet Retief	6	2544	0.2	5	2350	0.2
Standerton	7	1878	0.4	4	1868	0.2

Maternal mortality rate was ranging between 0, 2 . 0, 8% of Gert Sibande District hospitals versus the national figure of 41.8% within the study period (Saving Mothers 2005 . 2007,p.38).

Comparison with other hospitals, Evander hospital had the highest ranging between 0, 4 . 0, 8%, other hospitals were almost similar to Standerton District Hospital which was ranging between 0, 2% - 0, 4%.

Sample sizes of the hospitals are different. Standard measure of p-value is 0,05 (5%). Embhuleni hospital was statistical significant in 2004 and in 2005, 2006, 2007 with the other hospitals in the district, it was not statistical significant because it was greater than 0,05.

Table 16 Comparison of perinatal and neonatal mortality rate with other hospitals in Gert Sibande District from 2004 – 2007 (DHIS)

Hospitals	2004 Perinatal Mortality rate	Neonatal Mortality rate	2005 Perinatal Mortality rate	Neonatal Mortality rate
Amajuba	Information not available			
Bethal	40.3	16.9	37.2	14.1
Carolina	71.9	39.9	55.4	17.5
Elsie Ballot	Information not available			
Embhuleni	50.4	23.7	37.6	14.7
Evander	53.2	15.4	34.2	6.9
Piet Retief	Information not available			
Standerton	34.3	10	32.6	11.5

Hospitals	2006		2007	
	Perinatal Mortality rate	Neonatal Mortality rate	Perinatal Mortality rate	Neonatal Mortality rate
Amajuba	Information not available			
Bethal	34.9	11.9	43.0	6
Carolina	59.8	24.8	57.5	29.5
Elsie Ballot	Information not available			
Embhuleni	37.7	15.7	36.5	13.1
Evander	46.6	11	50.3	16.6
Piet Retief	53.8	18.1	51.2	20.3
Standerton	39.4	12.6	40.1	17

Perinatal mortality rate is ranging between 32.6 . 40.1% at Standerton District Hospital, compared with other hospitals which are above 35.5% e.g Carolina at 71.9% and CS is within national norm. Neonatal mortality is between 10 . 17% compared with other hospitals which are above 10% e.g. Carolina was between 17.5 . 39.9%.

Quantities of the hospitals are not the same. Standard measure of p-value is 0,05 (5%). All hospitals in the district are not statistically significant because the p-values are greater than 5%.

Table 17 Birth weight of CS performed at Standerton District Hospital in 2004 – 2007

Birth weight	Number of cases	%
1-1999kg	37	5
2-2.5kg	48	6
2.5-2.99kg	188	24
3-3.5kg	319	40
3.5-3.999kg	128	16
4-4.5kg	31	4
4.5-4.99kg	3	0.4
5kg	1	0.1

TWINS

Birth weight	Number of cases	%
1-1999 kg	5	0.6
2-2.5 kg	17	2
2.5-2.99 kg	5	0.6
3-3.5 kg	5	0.6
3.6 kg	3	0.4

Birth weight of three hundred and nineteen (40%) between 3-3.5 kg, hundred and eighty eight (24%) were between 2-2.999 kg.

Birth weight for CS performed for twins, seventeen (2%) were between 2-2.5 kg.

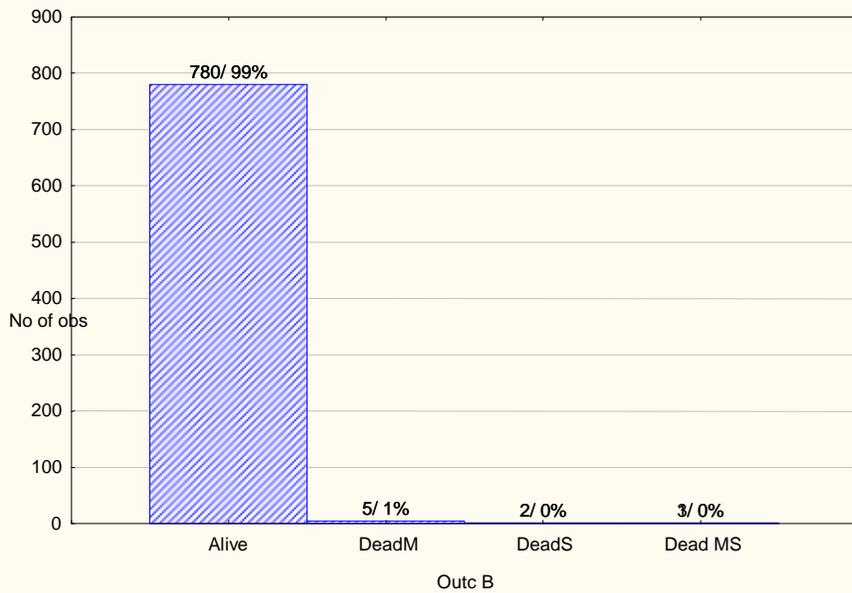


Figure 4 Outcome of babies after CS was performed at Standerton District Hospital in 2004 - 2007

Ninety nine percent (99%) of babies were alive, one percent (1%) dead, macerated and stillbirths due to multiple abnormalities and placenta abruptio.

Table 18 Length of stay post operatively at Standerton District Hospital during 2004 - 2007

		Number	Percent
Valid	1 day	19	2.3
	2 days	18	2.2
	3 days	748	95
	4 days	1	.1
	5 days	2	.2
	6 days	2	.2
	Total	790	100.0

Seven hundred and forty eighty (95%) of mothers and babies stayed for 3 days, eighteen (2.2%) stayed for two days, other nineteen (2.3%) had one day and the remaining (0.5%) stayed for 4- 6 days.

**Table 19 Robson 10 group classification results of Standerton District
Hospital from 2004 - 2007**

Group	Number of Cases	Percent
Group 2	333	42.1
Group 4	243	31
Group 5	137	17.3
Group 6	20	2.5
Group 7	22	2.7
Group 8	24	3
Group 9	1	0.1
Group 10	10	1.3
Total	790	100.0

Three hundred and thirty three (42.1%) group 2 according to Robson's classification was leading amongst the cases which were studied, group 4 with two hundred and forty three (31%) then group 5 at one hundred and thirty seven (17.3%) then the rest of the groups were below 10 %.

Table 20 Gert Sibande District Hospital's CSR from 2004 – 2007

Hospitals	2004			2005		
	Total number of CS	Total number of deliveries	C/S Rate	Total number	Total number of deliveries	C/S Rate
Amajuba	148	1000	14.8	121	919	13
Bethal	202	1563	12.9	149	1569	9.4
Carolina	103	600	17	61	650	9.3
Elsie Ballot	0	400	0	38	468	8
Embhuleni	268	2600	10	297	2750	10.8
Evander	579	1950	29.6	530	2075	25.5
Piet Retief	211	2540	8.3	260	2440	10.6
Standerton	296	1700	17.5	449	1872	23.9

Hospitals	2006			2007		
	Total number of CS	Total number of deliveries	C/S Rate	Total number	Total number of deliveries	C/S Rate
Amajuba	137	850	16	139	887	15.6
Bethal	178	1411	12.6	161	1318	12
Carolina	83	669	12.4	87	767	11.3
Elsie Ballot	10	507	1.9	0	549	0
Embhuleni	275	2700	10	291	2700	10.7
Evander	540	2010	26.8	428	1870	22.8
Piet Retief	349	2544	13.7	315	2350	13.4
Standerton	452	1878	24	576	1868	30.8

Caesarean Section Rate at Standerton District Hospital compared with other 7 hospitals in the district (as per table above). Four hospitals are well within national norm of 15% and Amajuba hospital at 15.6%. Evander and Standerton District Hospitals are far above the norm, almost double the norm at 29.6 to 30.8% (District Health Information System).

Total numbers of CS and deliveries are different for the hospitals. Standard measure of p-value is 0,05 (5%). All hospitals in the district are not statistically significant because their values are greater than 5% except Elsie Ballot in 2004 which did not perform CS.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

Caesarean Section is the best mode of delivery where indicated but complications cannot be underestimated. The study confirmed institutional trend of the increasing number of Caesarean Section rate as reviewed in literature (Goldberg 2004, p.101-110). South Africa is facing a huge challenge of teenage pregnancy which is a high risk on its own (Goldberg 2004, p.101-110).

The purpose of the study was to investigate factors which contributed to the sudden increase of CSR from 17.5% to 30.8% at Standerton District Hospital. The norm of CS at district hospitals is 10% (South African National Department of Health National Targets).

The study determined the demographic and socio economic status of women who had undergone CS, their ANC profile, indications for CS, monthly trend of CS rate, clinicians who performed CS, and the outcomes of the CS. Lastly the use of Robson's ten group classification of CS indicators was used to analyse those indicators that were higher than expected.

5.2 DEMOGRAPHICS AND SOCIO ECONOMIC STATUS OF WOMEN

The lower the age of the mother the higher the likelihood that the client would undergo Caesarean Section (See 4.2). It is noted that teenage pregnancy contributes to the performance of caesarean section (See 4.2). Studies revealed that women who requested CS were older than 35 years (Hildingsson et al.2002,p.620) but this study indicates that the majority of clients were between 20 and 25 years of age (276 cases).

Eighty nine percent (89%) of clients were Africans which resembles the population of Lekwa municipality, where the majority of the community members are Africans. Eighty eight percent (88.4%) of the clients were unemployed and literature review states that high income and private insurance contributes to increased Caesarean Section rate (Golberg2004,p.101-110). CS is fast becoming a surgical procedure indicated by request (Golberg,p.2004:101-110).

Marital status does not contribute to the performance of Caesarean Section because 88% of clients were single, where literature review indicates that married women are more likely to undergo caesarean section (Gomes et al,p.1999:690). The study revealed an unusual norm of high CSR at lower maternal age, poor socio-economic conditions and low literacy rate is probably based on the characteristics of the general population of the area served by the hospital.

5.3 REPRODUCTIVE FACTORS CONTRIBUTING TO CS

All surrounding PHC facilities do not have maternity services therefore they all refer clinical / obstetric indications to the hospital except one facility which is ± 85 km in the second municipality (Depaliseng) which is also served by Standerton District Hospital has maternity services.

Antenatal Care improves care of pregnant women and more problems are identified early, and this in turn led to the high rate of Caesarean Section. For example breech vaginal delivery is no longer recommended for primigravida (Sellers 2003,p.1570), therefore if picked up early at antenatal clinic client will be booked for elective Caesarean Section.

79% of the clients who had undergone CS between 2004 to 2007 had booked for antenatal care and problems were identified early. Most women who had CS were primigravida (Sellers 2003,p.1570) as revealed in the study which was at 44%. The median gestational age was at 38 weeks.

Elective CS were performed mostly for previous CS with other indications like breech presentation. Emergency CS were performed for primary indications including previous CS with other indications e.g. placenta abruption.

Obstetric history contributed to the performance of CS where 43.4% of the clients were pregnant for the first time prior to CS. The number of clients with previous CS also played a major role in contributing to the increase since they comprised 20% of the study group. There is currently no real consensus in terms of trial of scar for previous Caesar times one (Nolte AGW,p.1998:494) with some doctors preferring to perform caesarean section straight away and avoiding complications of trial of scar like rupture of the uterus. Previous Caesar times two is definitely an indication for caesarean section (Nolte AGW,p.1998:495) and these cases formed 12 % of study population. Out of 790 cases selected eighty six (10%) elective CS was performed, seven hundred and four (90%) were performed as an emergency CS. Total number of clients who requested CS were 5 out of 790 cases selected.

Cephalic foetal presentations of 93% of the study group delivered by CS. Breech, transverse, face and twin pregnancy also contributed to the performance of CS but were below 10% of the study group which may indicate that other factors might play a role to the performance of CS.

5.4 CAESAREAN SECTIONS PERFORMED

According to the study Caesarean section has a very good outcome for both mother and baby with fewer complications. Complications are usually fatal but also very rare e.g. post partum haemorrhage. The study demonstrated that only 2 mothers died postoperatively due to complications of eclampsia.

At most public hospitals such as Standerton District Hospital, medical officers are in experienced and less skilled, in that for example 49.6% of the cases were performed by community service doctors who have recently graduated. Three hundred and ninety two cases (49.6%) were performed by the community service doctors which forms majority of the cases, two hundred and forty one (30.5%) were performed by permanent hospital doctors, as indicated in the literature review, this could have contributed to the high CSR to prevent both maternal and neonatal complications (Paterson Brown BMJ 1998;317:463).

This applies more with private medical practitioners. In this study group, all clients of private practitioners delivered via caesarean section with indication of elective surgery and most were operated in the morning. Their patients form 19% of study population. This is the process that wins the favour of medical officers in order to avoid litigation from adverse events of pregnancy as revealed in literature review (Condon2001,p.2). This raises the question: is it CS on request or clinically indicated?

Comparison with other hospitals in the District indicates that where there are more experienced doctors and less number of skilled doctors CSR is below 10%.

Private doctors have sessions at the hospital but the 157 cases were performed on their private clients.

The findings about the factors leading to Caesarean Section in this study are consistent with well documented obstetrical indications in recent literature (Kalaichadran 2003,p.1-3). Cephalopelvic disproportion is the leading cause of Caesarean Section, followed by foetal distress of which the cause is sometimes identified pre operatively. Unfortunately most records did not show any pre-operative findings of cause of foetal distress.

In some few cases Caesarean Section was performed to save the mother e.g. Abruption placenta, placenta praevia, pre-eclampsia and eclampsia. These life threatening conditions are on the increase (National Library of Medicine 1998 Part 1-4) and will result in an increase in the caesarean section rate. This suggests that there are also increasing clinical reasons for the increase in the Caesarean Section rate, and if that is the case then not much can be done to reduce the alarming rate.

Obstetrical indications contributed to the 34% increase of CSR and according to the study 90% of these cases were an emergency and 10% were elective. Elective and emergency CS do have similar indications like previous CS and multiple pregnancies associated with other factors like big baby and foetal distress.

Birth weight can contribute to high CSR as it is part of a problem in Cephalopelvic disproportion. Normally 2.5kg and 3.5kg neonates can be safely delivered vaginally. The study demonstrated that a birth weight of 3.0 - 3.5 kg (40%) put the mother at high risk of undergoing Caesarean Section. Birth weight of multiple pregnancies 2-2.5kg (2%) CS was performed during the study period.

The outcome of the study revealed that 99% of both mother and baby were alive after CS with 1% mortality for babies which suggest that CSs were necessary to be performed. Owing to its good outcomes for both lives, it is highly unlikely to be under utilized. Ninety five (95%) of women stayed three days post operatively.

Monthly trends of CSR at Standerton District Hospital varied over four year period but increased tremendously from 9% in 2004 to 40% in September 2007 which raised eyebrows to the hospital management.

The study revealed that maternal mortality rate was ranging between 0,2 - 0,8% of Gert Sibande District hospitals versus the national figure of 41.8% within the study period.

Comparison with other hospitals, Evander hospital had the highest ranging between 0,4 - 0,8%, other hospitals were almost similar to Standerton District Hospital which was ranging between 0,2% - 0,4%.

Perinatal mortality rate is ranging between 32.6 . 40.1% at Standerton District Hospital, compared with other two hospitals which are above 35.5% e.g. Carolina at 71.9%, Piet Retief hospital at 53.8% and CS was within national norm. Neonatal mortality is between 10-17% compared with other hospitals which above 10% e.g. Carolina was between 17.5 . 39.9%, Embhuleni was between 13.1 . 23.7% also CS was within national norm.

5.5 ROBSON'S 10 GROUP CLASSIFICATION

According to Robson's ten point Caesarean Section classifications, the more previous pregnancies the lesser the likelihood to undergo Caesarean section. Group 2 and 4 classifications are leading contributors of increased Caesarean Section with 41% and 31% respectively.

This is in line with recent studies conducted in Brazil that have shown that group 2 and 4 are becoming larger and larger contributors to the overall CSR followed by group 5 which is also a big contributor to overall CSR. In this study it accounted for 17% of all the Caesarean Section (Costa et al.2010p.1-8).

Caesarean Section is on the increase and it reduces the need for hours and hours of monitoring, and if all goes well it is fine and as demonstrated has good outcomes. This procedure however, cannot be adopted in the hospitals where resources are constrained. The caesarean section is very costly in terms of human resources since more personnel, and material resources are utilized and there is increased length of stay post operatively, but this in turn helps in the collection of revenue for the hospital from those who can afford to pay as private clients.

Clinical obstetric indications of Caesarean sections will always be justified. The South African government (Department of Health) has quality improvement projects aiming at saving the babies and the mother. Nevertheless modifiable factors need to be modified to decrease unnecessary Caesarean Section.

The study confirmed the institutional trend of increasing Caesarean Section rate and has identified factors that contributed e.g. high income and good outcome. A limitation to this study was that this could not be tested for statistical significance due to lack of control group in the study this is the task for follow up studies.

CHAPTER 6

RECOMMENDATIONS AND CONCLUSIONS

6.1 INTRODUCTION

The aim of the study was to identify factors contributing to increased Caesarean Section rate. The following recommendations will be made to Standerton District Hospital management and Department of health Mpumalanga.

- 6.1.1 Caesarean Section should always be clinically indicated at all times and reduce caesarean section on request.
- 6.1.2 Good monitoring during ANC should be intensified because problems are identified and dealt with as soon as possible through intersectoral meetings e.g. PHC personnel.
- 6.1.3 Training should be provided for all health professionals working in maternity units and especially for advanced midwifery.
- 6.1.4 Recruitment and retention especially experienced doctors and midwives to render quality obstetric care must be prioritised.
- 6.1.5 Health promotions efforts should be intensified. People should plan pregnancy well to prevent teenage pregnancy, get full medical examination before and during pregnancy.
- 6.1.6 Revive and manage high risk ante natal care clinic to monitor all risks in pregnancy e.g. teenage pregnancy. The caesarean section is very costly in terms of human resource since more personnel, material resources are utilized in performing CS.

- 6.1.7 Continuous professional development on standard protocols and guidelines must be provided for all health professional at levels of care to be able to identify primary and secondary indications.
- 6.1.8 Intensify mortality and morbidity meetings e.g. Perinatal Problem Identification Programme and CHIPP which will enable all health workers to be involved in analysis of maternal and neonatal problems. This results in healthy mother and safe child.
- 6.1.9 Clinical audits of cases of caesarean sections must be instituted.
- 6.1.10 Benchmark in other district hospitals e.g. Bethal, Carolina, Embhuleni & Piet Retief on how do they maintain CSR below 15%.
- 6.1.11 Introduce Robson's classifications to analyse indications that are higher than expected e.g. group 2, 4 & 5 which showed an increase in the study group.
- 6.1.12 Adequate and accurate clinical records must be maintained at all times and at all of health care to ensure the validity of clinical/obstetric indications for CS.
- 6.1.13 Intensify monitoring systems in maternity e.g. monthly trends of CS, primary and secondary indications.

6.2 CONCLUSION

This study investigated the factors which contributed to CSR at a district hospital in Mpumalanga during 2004 . 2007.

Seven hundred and ninety (790) records were systematically selected and retrieved from 2004 . 2007 for clients who had undergone CS at Standerton District Hospital.

Data was collected, analysed and recommendations were compiled for the hospital managers, health professionals and policy makers regarding high CSR.

The results of the study indicated that demographics and socio economic status of women who had undergone CS were not in line with findings in the literature review.

The clients were between 14 and 43 years of age, with high rate of unemployment, mostly Africans. Only 7% paid through the medical aid scheme and 12% of the cases were requested by the clients because they could afford to pay privately. Eighty eight percent (88%) were single and 12% married which indicates that it is not according to the marital status of women to undergo CS.

(79%) attended ante natal care which enabled the professional nurses to monitor their pregnancies, identify risk factors early and refer them to the hospital.

Prematurity was below 25% which indicated that it did not contribute to the increase of CSR. Primigravida clients (43.4%) were the most who contributed to the high CSR.

Community service medical officers contributed to the increase because 70% (49.6) of the cases were performed by them. Obstetrics and foetal indications played a major role in contributing to the increase because they included CPD, previous CS x1, poor progress and foetal distress.

Mortality for babies was only 1% due to complications like multiple abnormalities, placenta abruptio and macerated foetus. All mothers were alive post operatively except two who died after three days.

The sudden increase was due to obstetrics and foetal indications. Contributory factors included recently qualified medical officers e.g. community service doctors.

There is a high degree of dependence for service delivery on inexperienced Community Service doctors in Standerton Hospital. However, even though the percentage of full-time permanent doctors has risen from 10 to 45% over the 4-year period (2004-2007), caesarean section rates have not declined but have increased twofold over the same period. Clinical audits of cases of caesarean sections must be instituted.

Maternal Mortality rate has not declined in spite of the rising caesarean section rate over the 4-year period.

Perinatal and Neonatal mortality rates have increased over 4-year period that the caesarean section rate was rising. Furthermore, this occurred despite the fact that 73% of the caesarean section deliveries were low risk categories (Robson Classification group 2 and 4) and 80% of the birth weights were around normal range category (2.5 - 3.9kg).

Compared with other larger hospitals in the district (Embhuleni, Piet Retief and Bethal) Standerton Hospital's caesarean section is about three times as high.

Recruitment and retention of skilled and experienced midwives, medical practitioners, intensifying maternal and foetal monitoring systems will reduce CSR.

Monitoring of clinical audits in maternity would assist to identify gaps e.g. recording of observations to improve patient care.

Monthly trends showed an alarming increase which require an intervention e.g. PPIP meeting.

Robson's ten group classification indicated that group 2, 4 and 5 are the leading contributors to increased CSR which requires more attention.

Benchmarking in Gert Sibande District Hospitals with 10-15% CSR would assist Standerton District Hospital to reduce CSR.

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APPENDICES

APPENDIX 1: DATA CAPTURING TOOL

DATA CAPTURING TOOL

TITLE OF RESEARCH PROJECT

Investigation of factors associated with caesarean section rates at a district hospital in Mpumalanga during 2004 . 2007

1. Tool no . Hospital no:
 2. Race . Age (years)
 3. Physical address
 4. Education (level) Religion
 5. Employment status Occupation
 6. Mode of payment Medical Aid No
 7. Marital status: Single Married Divorced Widow.
 8. Weight . Height
 9. Attended ANC Yes / No Place . Parity Gravida
 10. An indication according to Robson ten group classification
- Previous pregnancies
1. Parity
 2. Number of live births
 3. Number of stillbirths
 4. Number of CS
- Spontaneous labour
 - Gestational age
 - Preterm
 - Number of fetus
 - Presentation
 - Type of CS: Elective Emergency Induced

11. Time of CS ..Day of the week

12. Birth weight

13. Medical doctor who performed CS Private

Public : CMO

PMO

SMO

MO

14. Number of nurses in theatre who participated: Operational manager

Professional nurse

Enrolled nurse

Enrolled auxiliary nurses

15. Outcome: Baby alive Baby dead macerated Still birth

Complication

Mother alive Mother dead

Complication

16. Length of stay post CS

ROBSONS 10 GROUP CLASSIFICATION
GROUP 1: PG, singleton, cephalic, term, spontaneous labour
GROUP 2: PG, singleton, cephalic, term, induced or elective CS
GROUP 3: MG, singleton, cephalic, term, spontaneous labour
GROUP 4: MG, singleton, cephalic, term, induced or elective CS
GROUP 5: Previous CS, singleton, cephalic, term
GROUP 6: PG, singleton, breech
GROUP 7: MG, singleton, breech
GROUP 8: Multiple pregnancy
GROUP 9: presentations other than cephalic or breech
GROUP 10: singleton, cephalic, preterm

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Department of Health

Litiko Le	Shilo	Umyango WezaMaphilo	Departement van Gesondheid
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28 May 2010**Ms Sibongile M Dlamini****P O Box 1819****EMENHLE****228****Dear Ms Sibongile M Dlamini**

APPLICATION FOR RESEARCH & ETHICS APPROVAL: INVESTIGATION OF FACTORS ASSOCIATED WITH CAESAREAN SECTION RATE AT A DISTRICT HOSPITAL IN MPUMALANGA DURING 2004-2007.

The Provincial Research and Ethics Committee has approved your research proposal in the letter format that you sent. No issues of ethical consideration were identified.

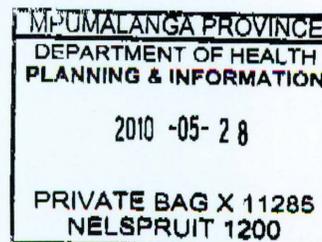
Kindly ensure that you provide us with the report once your research has been completed.

Kind regards,

M. M. Mchaba
Acting Director: Planning, Information & Research

28-05-2010

Date



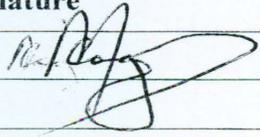
We can do it together!

Siyakheleka

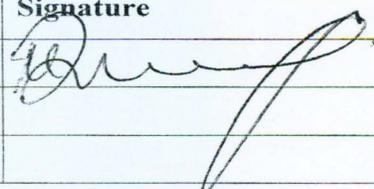
f) Supervisor/ co-supervisor (In the case of research undertaken as part of an academic requirement)

Name	Department/Institution/Facility	Signature
Prof. Jinabhai	University of KwaZulu Natal	

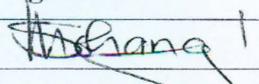
g) Medical Manager (Please obtain the approval of the Hospital Superintendent if any of your research will involve specific hospital personnel, equipment, data, etc.)

Name	Department/Institution/Facility	Signature
Dr MC Mogajane	Standerton hospital	

g.) District Manager/CEO (Please obtain the approval of the District Manager/CEO in charge of the particular district in which your research is intended to take place).

Name	District	Signature
Mr MM Zungu	Gert Sibande	

h.) Chief Director Hospital Services/ Primary Health Care.

Name	Chief Directorate	Signature
Dr S. Mohangi	Hospital services	

i.) Please list any other involved department/ institution/ facility heads involved in your research.

Name	Department/Institution/ Facility	Signature
None		

CHIEF RESEARCHER:

SURNAME: DLAMINI NAME: S.M TITLE: MISS

SIGNATURE: M. Dlamini DATE: 2010.03.04

(IF PROJECT IS FOR THE RESEARCHER'S ACADEMIC PURPOSES)

HEAD OF DEPARTMENT/ INSTITUTION/ FACILITY:

SURNAME: ZUNGU NAME: MM TITLE: MR

SIGNATURE: [Signature] DATE: 2010/03/04



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08 June 2009

Ms Sibongile Dlamini
Department of Community Health
Medical School

Dear Ms Dlamini

PROTOCOL: Investigation of factors associated with caesarean section rates at a district hospital in Mpumalanga during 2004-2007. REF: BE054/09

EXPEDITED APPLICATION

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application received 03 March 2009.

The study is given full ethics approval and may begin as from today; **08 June 2009**.

This approval is valid for one year from **08 June 2009**. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2004), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at <http://research.ukzn.ac.za/ResearchEthics11415.aspx>.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be RATIFIED at a full sitting of the Biomedical Research Ethics Committee meeting to be held on 14 July 2009.

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

Professor D R Wassenaar
Chair: Biomedical Research Ethics Committee

13 July 2009

Ms SM Dlamini
P.O. Box 1819
Embalenhle
Mpumalanga
2285

Dear Ms Dlamini

PROTOCOL: Caesarean section rates at a district hospital – reasons for delivery by this mode at Standerton Hospital, Gert Sibande District, Mpumalanga in 2004-2007. SM Dlamini, 206524537, MPH, Public Health Medicine.

The Postgraduate Education Committee considered the abovementioned application and raised various queries. These have been addressed and the protocol is given provisional approval for your MPH degree.

This decision will be ratified at a full sitting of the Committee scheduled for 11 August 2009.

Please note that the study may not begin without ethics approval.

Yours sincerely



Dr A Voce

Dean's Assistant: Coursework Programmes
Postgraduate Education Committee

CC: Professor N Jinabhai
Dept. Public Health Medicine
Dr H Maise
Dept. of Obstetrics & Gynaecology

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