# NON-ELECTIVE CAESAREAN SECTIONS IN THE KHOMAS REGION, NAMIBIA: IMPLICATIONS FOR MIDWIFERY PRACTICE.

**BY**

**HILMA INOUKAPO TAUKONDJELE SHIKWAMBI**

**STUDENT NUMBER: SHKHIL002**

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**Supervisor: Associate Prof Sheila Clow**

**Division of Nursing and Midwifery, University of Cape Town**

**Co-supervisor: Prof Sue Fawcus**

**Department of Obstetrics and Gynaecology, University of Cape Town**

# Declaration

I, **Hilma Inoukapo Taukondjele Shikwambi**, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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## Abstract

Women who undergo caesarean section (CS) are likely to have a repeat CS in a subsequent pregnancy, thus increasing the CS rate in the country, which is not ideal in a resource constrained setting. The occurrence of high maternal mortality among women who have non-elective CS is usually due to indications for prior CS such as fetal distress, obstructed labour and eclampsia. In developing countries, there is a high rate of maternal deaths associated with major operative complications.

This study was a retrospective, descriptive quantitative, clinical audit. The purpose was to identify the reasons for non-elective CS in two hospitals namely, the Windhoek Central hospital and Intermediate Katutura hospital, and the implications for Midwifery clinical practice. The research question was: What are the indications and intrapartum care factors for non-elective CS in the two hospitals, and what are the implications for Midwifery practice? The population consisted of records of women who had given birth by CS between 1st January 2012 and 30th June 2012 in the two hospitals. All available records of women who had non-elective CS during the study period were reviewed. Data was collected with individual data collection sheets and analysed using Statistica 11 software.

A total of 838 records were reviewed. The CS rate was 1264/5296 (23.9%), the rate of non-elective CSs was 912/5296 (17.2%), and the proportion of non-elective CS was 912/1264 (72.2%). A total of 171/838 (20.4%) women were HIV positive. Seventy per cent (634/838) women had a CS for the first time, of which 290/634 (45.7%) were multigravida. Records were grouped according to Robson's classification, a mutually exclusive and totally inclusive classification of CS. The Robson group making the largest contribution was nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation in spontaneous labour (group 1) with 213/838=25.4%. Problems with the progress of labour were the most common reason why women had non-elective CSs during the study period.

The study findings highlighted a high number of primary CS in low risk women with poor assessment of maternal wellbeing and progress of labour. Limited documentation of Midwifery intervention and care was noted suggesting inadequate Midwifery care. Training is required to render evidence based care.

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# List of abbreviations

| | |
|---|---|
| ANC | Ante Natal Clinic |
| CPD | Cephalo-Pelvic Disproportion |
| CS | Caesarean Section |
| DHS | Demographic Health Survey |
| EmOC | Emergency Obstetric Care |
| FHR | Fetal Heart Rate |
| HIV | Human Immunodeficiency Virus |
| IKH | Intermediate Katutura Hospital |
| LMIC | Low-Middle Income Country |
| MDG | Millennium Development Goal |
| MMR | Maternal Mortality Ratio |
| MoHSS | Ministry of Health and Social Services |
| SSA | Sub-Sahara Africa |
| VBAC | Vaginal Birth After Caesarean section |
| WHO | World Health Organization |

# Chapter 1: Overview of the study

## 1.1 Introduction

Caesarean section (CS) as a lifesaving procedure is often performed as a medical intervention when a fetus or mother's life or health is a risk. The use of caesarean section follows the health care inequality patterns of the world whereby it is under-used in low income settings and adequate or even unnecessarily high in middle and high income settings (Gibbons et al, 2010).

This study, which describes the non-elective CS was conducted in the Khomas region, Namibia. Located in Southern Africa, Namibia shares borders with Angola, Zambia, Botswana and South Africa, with the Atlantic Ocean in the west. The Namibian economy largely depends on agriculture, tourism and mining. With a total population of 2.3 million, the country has a land area of 824 292 $km^2$ and is ranked as the 34$^{th}$ largest country in the world. With the arid Namib Desert occupying a large area in the west, Namibia is one of the least densely populated countries in the world. Namibia is divided into 14 regions: the Kavango East and West, Kunene, Omusati, Ohangwena, Oshana, Oshikoto and Zambezi regions in the north, Erongo in the west, Omaheke in the east, Otjozozupa and Khomas in the central part of the country, and the Hardap and !Karas regions in the south.

Location of Namibia.


Source: www.worldatlas.com

This study was conducted in order to identify and discuss intrapartum care factors related to the number of non-elective caesarean sections recorded during the study period, and to establish baseline information regarding factors contributing to the current rate of non-elective caesarean section in Namibia. This minor dissertation is structured as follows:

**Chapter 1:** The first chapter introduces the study to the reader. It describes the background of caesarean section, the research problem, and the purpose of this study, the significance of the study, the research question, and the research objectives. It also outlines the setting of the study, and terminologies used in this study are defined.

**Chapter 2:** This chapter presents the literature review. It explains the search strategy employed by the researcher and provides a summary of the information obtained from the reviewed literature. This chapter also presents the Midwifery Model of Care which is the conceptual framework used in the analysis of the implications of this study for Midwifery practice.

**Chapter 3:** In this chapter the researcher describes the study design, the motivation for the method chosen, the population studied, sample size and sampling method, detailed information regarding instrument development, reliability and validity, data collection and data management as well as ethical issues applied to this study.

**Chapter 4:** This chapter presents the results of the study.

**Chapter 5:** This chapter provides the interpretation, analysis and discussion of the research data. It also compares the results with existing literature, identifying differences, and describes the limitations of this study. Implications for Midwifery practice and recommendations will also be discussed.

**Chapter 6:** This chapter presents a conclusion of the study, and provided answers to the research question and discussing how the objectives have been met.

## 1.2 Setting of the study

This study was conducted in the Khomas region of Namibia, one of the 14 regions in the country. The population of the Khomas region is 342 141 (Namibia Statistics Agency, 2012). Namibia has one national hospital, the Windhoek Central hospital, which is located in this region. This is a referral hospital for the whole country and it has a maternity department with 59 beds. The Windhoek Central hospital's maternity department consists of an antenatal clinic, an antenatal ward, one postnatal ward and a neonatal unit. The antenatal ward is equipped with two sonar machines, one of which is located in the antenatal clinic and the other one in the antenatal ward, about seven cardiotocograph machines and five fetoscopes as well as one Doppler. The neonatal unit is the only public service neonatal unit in Namibia that has specialised equipment for management of neonates with severe birth complications. Apart from the antenatal clinic, the wards in this department cater for both state and private patients.

The intermediate Katutura hospital is also located in Windhoek. This is one of three intermediate hospitals in Namibia. In the absence of a district hospital in this region, most births in the Khomas region takes place here, and this hospital also receives referrals from district hospitals in regions where there is no intermediate hospital. This hospital has a maternity department with a 79 bed capacity, which is equipped with two sonar machines, one in the antenatal/labour ward and the other in the antenatal clinic. The antenatal/labour ward has six cardiotocograph machines and five fetoscopes.

The maternity departments in both the Windhoek Central and the intermediate Katutura hospitals have an antenatal clinic, and 11 other antenatal clinics are situated in satellite clinics within the Khomas region. There are no facilities for women to give birth in the clinics therefore all women use these two maternity departments. There were no differences in the scopes of the two referral hospitals during the study period, and women were referred to either hospital based on the monthly allocation of receiving referrals. The two referral hospitals provide tertiary care, and due to the unavailability of specialised equipment to handle high risk pregnancies in the maternity sections of other regions, these two hospitals also receive referrals of high risk pregnancies from other hospitals.

## 1.3 Developments and trends in caesarean section

Caesarean section (CS) is 'an operative procedure, which is carried out under anaesthesia whereby the fetus, placenta and membranes are delivered through an incision in the abdominal wall and the uterus' (Fraser & Cooper, 2009:614). It is a lifesaving procedure when performed appropriately following a medical indication (Souza et al, 2010). An increase in the performance of CS is observed in some developed countries, while there is a low rate of this procedure in several developing countries where access to emergency obstetric care is limited (Ronsmans, Holtz & Stanton, 2006).

The history of CS dates back to ancient times where it was performed on dead or dying women as an attempt to save the fetus (Todman, 2007). Through time, the indications for CS have changed. In the beginning, the indications for CS were burial procedures related to cultural and religious beliefs, and sporadic cases of caesarean section were done and babies were saved (Lurie, 2005). CS became relatively safe in the 19$^{th}$ and 20$^{th}$ centuries due to the improvement in surgical methods, improved anaesthesia and advances in perinatal care (Todman, 2007). These improvements brought the shifts towards the modern practice of CS. According to Lurie (2005), the indications for CS were directed to the safety and health of both mother and baby and by the beginning of the 21$^{st}$ century the concern with caesarean section was not only about the safety and health of the mother and the baby, but also with the mother's desire and preference.

In 1991, the United Nations (UN) developed six process indicators (Appendix A) to monitor obstetric services. These indicators were directed at an estimated number of 15% of women in developing countries with potentially life threatening direct obstetric complications (Paxton, Maine & Hijab, 2003). Two of these indicators measure the availability of emergency obstetric care (EmOC) services available, three measure the utilisation of these services, while one addresses the quality of care provided (Paxton, Maine & Hijab, 2003). The use of the six process indicators provides a clear indication if obstetric services are available to women in sufficient quantity and if women who most need these services are using them (Paxton, Maine & Hijab, 2003). Access to caesarean section is one of the process indictors. It is therefore essential that women with obstetric complications have access to emergency care in order to save their lives.

Complications associated with caesarean section, namely infection, haemorrhage and thrombo-embolic disorders are the main direct leading causes of maternal deaths (Fraser, Cooper & Nolte, 2006). Studies done in Sub-Saharan African (SSA) countries indicate that the most common indications for caesarean section were prolonged labour, abruptio placentae, previous caesarean section, eclampsia, placenta praevia and malpresentation (Dumont et al, 2001). An analysis of data recorded on the demographic health system (DHS) in eight SSA countries showed that access to CS in SSA is not improving and might be worsening, thus indicating a need for better access to CS (Buekens, Curtis & Alayon, 2003).

## 1.4 Research problem

The rationale for this study originated from the researcher's interest as a midwife to investigate the high proportion of non-elective CS in the Khomas region. The aim was to address implications for Midwifery practice by making recommendations for interventions aimed at improving Midwifery care, because women who undergo CS are more likely to have a repeat CS in a subsequent pregnancy, thus increasing the need for CS. This is not ideal in a resource-constrained country like Namibia.

In Namibia, all births are meant to take place either in hospitals or in clinics. The Demographic Health Survey (DHS) of 2006/07 indicated that in Namibia 80.9% of women gave birth in health facilities (Ministry of Health and Social Services, 2008). In the Khomas region, 95.3% of women gave birth in hospitals (Ministry of Health and Social Services, 2008). The global statistics (WHO, 2012) indicated that between 2005 and 2010 Namibia had a 13% caesarean section rate. No in-depth study has been done in Namibia to determine the reasons for CS and factors associated with CS. In addition, even though the CS rate for Namibia is in the appropriate range (10–15%) according to WHO (2009) recommendations, the demographic health survey data for 2006-07 found that Khomas region recorded the highest delivery by CS 26% which is three times of that of the Zambezi region 2.2% (Zere et al, 2010). The high rate of CS in the Khomas region is not only connected with inequities in access to basic maternal health interventions but also due to the fact that these hospitals cover referrals from other regions. There is a lack of literature regarding the antenatal care and labour management of women who have undergone non-elective caesarean sections in the Namibian context. A study done on caesarean section in a semi-rural hospital in the Oshikoto region in northern Namibia concluded that there is a need for the introduction of an obstetric

audit in order to create awareness which may help in reducing unnecessary caesarean sections (Van Dillen, 2007). Such an audit is needed to assist in the process of a critical analysis of current practice and the identification of substandard care factors. Despite this study by van Dillen, no literature was found on a CS audit having been carried out in Namibia.

A clinical audit of non-elective CS in Windhoek Central hospital (WCH) and Intermediate Katutura hospital (IKH) is worthy of an investigation as there is no baseline information data that describes the factors contributing to the current rate on non-elective caesarean sections in Namibia. A clinical audit into non-elective caesarean section could help to identify the magnitude of this problem in the Khomas region and provide a picture for the country as this is the most populous region and host the capital city in the country and it will also give detailed information on areas where improvement could be made. Exploring the incidence and the contributing factors to non-elective caesarean section in Namibia will provide a baseline from which intervention strategies could be developed to address the high proportion of non-elective CS.

## 1.5 Purpose of study

The purpose of this study is to identify the reasons for non-elective caesarean section in the two referral hospitals in Khomas region, and the implications for Midwifery clinical practice.

## 1.6 Research question

What are the indications for and intrapartum care factors contributing to non-elective caesarean sections in the two referral hospitals in the Khomas region in Namibia, and what are the implications for Midwifery practice?

## 1.7 Objectives of the study

1. To determine the non-elective caesarean section rate in the two named hospitals for the period 1 January 2012 to 30 June 2012.
2. To describe non-elective caesarean sections according to Robson's classification.
3. To describe the profile of records.
4. To describe antepartum factors and labour management in women who had non-elective caesarean sections.

## 1.8 Significance of the study

Primarily, midwives are the care providers of women during antenatal, perinatal and postnatal periods or phases in Namibia. The significance of this study is that:

- It aims to contribute to the understanding of the current intrapartum management of women and to serve as a baseline for future quality improvement studies.
- Identifying people eligible for elective CS early before labour as well as improved observation and action during labour will minimize avoidable problems that might result in an unnecessary CS.
- This in turn can contribute to the reduction of the cost of health care because of the reduction in unnecessary CS, implications for post CS recovery, delivery options for subsequent pregnancies and the rate of CS through better clinical management.

## 1.9 Conclusion

In this chapter, the study was introduced to the reader. The background of caesarean section, the research problem, and the purpose of this study, the research question, the research objectives and the significance of the study was described. This chapter also provided an outline of how this study is presented and a brief explanation of the study setting.

# Chapter 2: Literature review

## 2.1 Introduction

This chapter provides an overview of literature reviewed for this study. It explains the search strategy employed by the researcher and gives a summary of the information obtained from the reviewed literature. The following topics are presented: caesarean section as a global phenomenon, the rates of caesarean section in different parts of the world, indications of CS, CS on maternal and neonatal mortality, and morbidity and the classification of CS. This chapter also provides a description of the Midwifery Model of Care which is the conceptual framework that has guided the study.

## 2.2 Search strategy

The literature reviewed for this study was obtained from different databases. The Cochrane Library of systematic reviews was searched, limited to reviews published between 2008 and 2013. Other databases searched were MEDLINE, PubMed and Google Scholar from 2002 to date. EBSCO host academic full text databases (academic search premier, Africa wide information, CINAHL, health sources: nursing/academic edition and MEDLINE) was also used in search for literature. The search for literature was not limited to study type or language but only English language articles were consulted. The key search words used were: caesarean section, caesarean section rate, caesarean section in sub-Saharan Africa, non-elective caesarean section, emergency caesarean section, caesarean section outcome, intrapartum care, emergency obstetric care, indications for caesarean section, maternal care in sub-Saharan Africa, clinical audit, Robson classification, Midwifery Model of Care, and maternal and neonatal mortality in Africa. References in the articles found on these databases were also used to find other related articles. Furthermore, relevant books found in the University of Cape Town's Health Sciences library containing information related to Midwifery and obstetric care were also used.

## 2.3 Caesarean section

Caesarean section is a lifesaving procedure when it is performed appropriately following a medical indication (Souza et al, 2010). Caesarean section is the most frequently performed surgical operation in the world today, and there has been an increase in the CS rate in both

developed and developing countries, with a bigger increase observed in developed countries compared to developing countries (Ronsmans, Holtz & Stanton, 2006).

### 2.3.1 Rates of caesarean section in different parts of the world

A 2007 analysis of global, regional and national estimates showed that the rates of caesarean section were unevenly distributed, with South East Asia having a caesarean section rate of 40.5%, Central America 31%, South America 29.3%, Southern Europe 24% and Australia/New Zealand 21.6%. It reported a low rate of caesarean section in Africa with 14.5% in southern Africa, 7.6% in northern Africa and 1.9% in West Africa (Betrán et al, 2007). A global survey on maternal and perinatal health in Latin America on CS delivery rates and pregnancy outcome noted that a high rate of CS does not necessarily indicate good quality care but is rather associated with harm (Villar et al, 2006).

Findings from a retrospective analysis of the link between socio-economic status and CS rates in developing countries reported that there is a large segment of the population in SSA that has almost no access to potentially lifesaving CS, while in some mid-income countries the rates exceed the medical need (Ronsmans, Holtz & Stanton, 2006). A CS rate below 5% is reported in SSA countries such as Chad 0.28% [1996], Madagascar 0.47% [1997], Burkina Faso 0.66% [2003], Zambia 1.98% [2001], and Malawi 2.61% [2000] (Ronsmans, Holtz & Stanton, 2006). A similar report on a cross-sectional survey examined the trends in CS rates by country and wealth quartile in Southern Asia and SSA. Of the SSA countries surveyed, low rates of CS were reported in Madagascar 1.42% [2009], Ethiopia 1.44% [2011], Zambia 2.82% [2007], Zimbabwe 4.44% [2010], and Malawi 4.53% [2010] (Cavallaro et al, 2013). In Namibia in 1992, the CS rate was reported as 6.42% (Ronsmans, Holtz & Stanton, 2006), and between 2005 and 2010 it was reported as being 13% (WHO 2012).

### 2.3.2 Rising caesarean section rates: a global phenomenon

Rising CS rates have been observed worldwide in recent decades (Litorp et al, 2013). In 1985, the WHO developed a guideline recommending that the CS rate should not exceed 15% of all births. This was recommended by the WHO with the aim of curbing the growth of CS, notably high in most developed regions at that time (Lauer et al, 2010). According to Ronsmans, Holtz and Stanton (2006), reasons for high rates of CS include non-medical determinants such as financial incentives, the effects of malpractice litigation, convenience of

the clinician, and women's choice. Economic factors are also a determinant because wealthy countries can provide access to CS even in rural areas that are likely to be underserved (Ronsmans, Holtz & Stanton, 2006).

Caesarean section rates vary in different parts of the world with the lowest caesarean rate reported in low to middle income countries (LMIC) and in SSA. The low rate coverage of CS in the developing world was also considered in the WHO guidelines for CS rates. Stanton and Holtz (2006) compiled an estimate of national CS birth rates for individual countries and noted with concern that most SSA countries have rates below the WHO minimum. In 1994, the WHO revised the guideline by stating that a rate lower than 5% reflects lack of access to life-saving care (Gibbons et al, 2010). After the publication of the WHO guidelines for CS rates it was difficult to establish an ideal CS rate in the absence of data on the indications for CS (Ronsmans et al, 2002). It is therefore important to know the indications for CS before addressing the rate.

According to the WHO, the CS rate is one of the health service coverage indicators (WHO, 2009). Caesarean section rates are one of the essential process indicators for evaluating safe motherhood programmes promoted by various United Nations agencies (Singh & Nath Trivedi, 2011). In 1991, the United Nations (UN) developed six process indicators to monitor obstetric services directed at an estimated number of 15% of women in developed countries with potentially life threatening obstetric complications, with the aim of reducing maternal deaths (Paxton, Maine & Hijab, 2003). These indicators are:

- the number of emergency obstetric care (EmOC) services available
- the geographical distribution of EmOC facilities
- the proportion of all births in EmOC facilities
- met need for EmOC services
- CS as a percentage of all births in the population, and
- case fatality rate.

In developing countries where maternal mortality remains high, improving the quality of obstetric care is an urgent priority (Graham, 2009). The increases in the number of caesarean sections in some parts of the world as well as the low coverage of CS in some developing countries have led to audits of CS. Audit and feedback are widely used as a strategy to

improve professional practice (Ivers et al, 2012). An audit of trends of the CS rate among a variety of obstetric groups at the university hospital in Tanzania identified a high CS rate among low risk groups (Litorp et al, 2013).

A systematic review done by Brown et al (2008) compared low risk women who received active management of labour with women who received routine care to determine whether active management of labour reduces CS rate in low risk woman and improve satisfaction. This review found that strict diagnosis of labour, routine amniotomy and administration of oxytocin for slow progress, and a one-on-one support in labour reduces the number of caesarean section. They considered the risk factors that caesarean section could bring such as maternal risk and the effects on a subsequent pregnancy. They suggested, however, that further research is required in determining the acceptability of active management. Singh and Nath Trivedi (2011) suggested some factors that can be considered to help in bringing down the rate of caesarean section in low risk women. They suggested the implementation of External Cephalic Version where a breech fetus at term is rotated into a cephalic presentation, the trial of scar where a woman is given a chance to go into labour and attempt to deliver normally, and the one-on-one support during labour whereby one midwife or doctor is allocated to the woman throughout the delivery process. However, these procedures can be challenging and the skills and availability of specialists need to be considered.

### 2.3.3 Indications for caesarean section

Caesarean section is 'medically indicated when a significant risk of an adverse outcome for mother or fetus is present if the operation is not performed at a given time' (Penna & Arulkumaran, 2003). After a noticeable increase in CS rates in Norway, a prospective survey was conducted to investigate the indications for CS in 24 maternity units. Findings from this study indicated that fetal distress and failure to progress were the leading indications for CS (Kolås et al, 2003). In contrast, psychosocial reasons as indications for elective CS were reported as leading indications in a retrospective cohort study in a tertiary hospital in Sweden in the 1990s and mid 2000s (Stjernholm, Petersson & Eneroth, 2010).

For the 2004-2008 WHO global survey on the maternal and perinatal health, a facility based study was conducted to investigate the relationship between CS without medical indication and severe maternal outcomes (Souza et al, 2010). This investigation reported an association

between CS and an increased risk of severe maternal outcome and therefore suggested that CS should be performed 'when a clear benefit is anticipated, a benefit that might compensate for the higher cost and additional risks in the context of the specific setting where the operation is taking place' (Souza et al, 2010). It is noted that the use of caesarean section for non-medical reasons are on the increase in resource-rich countries, they are convenient and planned; and peer group pressure and fetal risk are among the reasons why CS is made a choice of delivering a baby (Penna & Arulkumaran, 2003).

A WHO global survey on maternal and perinatal health in Africa obtained data of all recorded deliveries in 7 selected African countries between 2004 and 2005 (Souza et al, 2010). The analysis of the indications for CS noted that cephalo-pelvic disproportion (CPD), dystocia, failure to progress, fetal distress and previous CS, as well as breech or other malpresentation were the leading indications. A systematic review was done on SSA countries that showed that the most prevalent indications for CS between 1970 and 2000 were CPD, malpresentation, previous CS, antepartum haemorrhage (APH) and severe hypertension (Dumont et al, 2001). In Namibia, a retrospective observational study on CS in a semi-rural hospital between January 2001 and December 2002 reported similar indications of CS. A total of 576 caesarean section cases were analysed (the CS rate for this study period was 7.9%), of which 34% were due to dystocia, 31% due to repeat caesareans, while 35% were due to other indications that included malposition, fetal distress, ante partum haemorrhage and cord prolapse (Van Dillen, 2007).

### 2.3.4 Caesarean section and maternal and neonatal mortality and morbidity

Maternal death, defined as the death of a woman during pregnancy or in the 42 days post-partum due to causes directly or indirectly associated with pregnancy is a priority area for global health (Hill et al, 2007). The Millennium Development Goal (MDG) 5 was developed with the aim to reduce maternal deaths by 75% between 1990 and 2015 (United Nations, 2000). An assessment of available data (1990-2005) of maternal mortality world-wide estimated that there were 535 900 maternal deaths recorded. The maternal mortality ratio (MMR) per 100 000 live births per region in 2005 were: developed regions 9/100 000, Africa 824/100 000, SSA 905/100 000 (Hill et al, 2007). A systematic analysis of progress towards MGD 5 for 181 countries was done for the period 1980-2008. This study estimated that 342 900 maternal deaths were reported world-wide in 2008, down from 526 300 in 1980.

The MMR in high income countries such as in South Asia was at 8/100 000, Australia 6/100 000, the Caribbean 254/100 000, central Europe 13/100 000, central SSA 586/100 000, south SSA 381/100 000, and west SSA 629/100 000 (Hogan et al, 2010). These studies indicate that the highest numbers of maternal deaths are recorded in SSA countries.

A systematic review by the WHO was carried out to determine the distribution of causes of maternal death; it reported that haemorrhage and hypertensive disorders are the major contributors of maternal deaths (Khan et al, 2006). This review indicated that in Africa haemorrhage is the cause of 33.9% of maternal deaths, while in Asia this complication accounts for 30.8%. In Latin America and the Caribbean the major causes of maternal deaths were hypertensive disorder (25.7%) and abortion (12%) (Khan et al, 2006).

Caesarean section has been investigated in relation to maternal and neonatal mortality. A prospective cohort study within the global survey on maternal and perinatal health reported that CS reduces the risks of intrapartum fetal death in breech presentation (Villar et al, 2007). A comparative cross-sectional study carried out in a Pakistan hospital investigated the association of maternal morbidity with emergency CS versus elective CS. This study noted that maternal morbidity including other post-operative complications was higher in emergency CS compared to elective CS (Raees et al, 2012).

Caesarean section is associated with complications such as thrombo-embolic disorders that can result in maternal death (Fraser, Cooper & Nolte, 2009). A prospective population-based cohort study in Norway investigated complications of CS deliveries, looking at the rates and risk factors. An increase in cervical dilatation at the time of operation was one of the identified risk factors (Häger et al, 2004). Another study of this nature is a cohort study done at Chris Hani Baragwanath hospital in Soweto, South Africa, which compared CS in the second stage of labour with CS performed for poor progress in the first stage of labour. This study noted significant intra-operative and neonatal morbidity when CS was performed in the second stage of labour (Cebekulu & Buchmann, 2006). Furthermore, CS is associated with long-term maternal morbidity through factors such as placenta accreta, increased risk of hysterectomy, fetal and neonatal complications, spontaneous abortion and ectopic pregnancy, chronic pain and pelvic adhesion, as well as repeated CS (Clark & Silver, 2011).

### 2.3.5 Classification of caesarean sections

In general, CS rates are difficult to audit due to the lack of standardisation of indications amongst obstetricians, and because often there is more than one indication for CS (Farrell & Pattinson, 2005). In order to quantify the rate of CS, a classification system is needed. To address the concern of a rising CS rate and to provide an audit and feedback tool, a ten group classification system for examination of CS within mutually exclusive groups of women with a particular obstetric characteristic was introduced by Robson (Kelly et al, 2013). Robson's classification of caesarean sections (Appendix B) provides the framework for analysing caesarean section rates and allows for more sound discussions on caesarean section to take place (Robson, 2001). Betràn et al (2009) argued that the Robson classification could easily be applied to a multi-country dataset without problems of inconsistency or misclassification, and that this classification could help health care providers to plan practical and effective actions, targeting specific groups of women, to improve maternal and perinatal care. The Robson classification has been used for comparisons in CS rates in different settings in different parts of the world. These have included Australia (McCarthy et al, 2007), Canada (Kelly et al, 2013), and Singapore (Chong, Su & Biswas, 2012). In Africa, Robson classification has been used in South Africa (Stanton and Ronsmans, 2008) and in Tanzania (Litorp et al, 2013).

Kelly et al (2013) examined aggregated data from a four year period of hospital deliveries in five Canadian provinces, using the Robson classification system. It was noted that this classification is a simple, standardized tool to identify groups that contribute significantly to the overall rate of CS. The use of the Robson classification system is also commended in a study located in the tertiary referral centre in Melbourne that addressed the increasing rate of CS. This study identified the group that contributed most to the overall CS rate. This enabled the monitoring of CS rate and also demonstrated the need to focus on care for women in this particular group (McCarthy et al, 2007). The Robson classification was also used in a university hospital in Tanzania and identified a high CS rate among obstetric low risk groups in a low income country (Litorp et al, 2013).

## 2.4 The Midwifery Model of Care

This study uses Rooks' Midwifery Model of Care to organise and analyse the implications for Midwifery practice. The Rooks' Midwifery Model of Care has particular perspectives on pregnancy and birth (Rooks, 1999). Midwifery focuses on the normalcy of pregnancy and the potential for health; birth is viewed as a natural process. The possibility of complications is not allowed to pre-empt all other values associated with a woman's experience of child bearing (Rooks, 1999). The desire to identify complications early has led to the use of a sequence of preventing and treating complications before they exist, and to a focus on conditions that are not pathologic but are associated with an increased incidence of complications (Rooks, 1999). During prenatal care, the pregnant woman and her life are the central focus of care. The interest of the midwife is on the woman's expectation and her experience of her pregnancy (Rooks, 1999).

Midwives use their own physical and emotional energy to encourage, support and comfort women during birth (Rooks, 1999). Because this model is based on respect for the intricacy of the natural physiology of childbirth and the belief that women's bodies are well designed for birth, midwives try to protect, support, and avoid interfering with the normal process and thus strives to avoid unnecessary use of obstetric interventions. This Midwifery Model recommends that midwives should wait until there is evidence that the intervention is needed (Rooks, 1999).

Midwives are the primary care providers for childbearing women and in many parts of the world midwives provide care during the antenatal, intrapartum and postnatal phases (Zander & Chamberlain, 1999). A study on women's perspectives on maternity services in Sweden used data from a national study of Swedish women. It claimed that the use of a midwife-led model of care helps in decreasing maternal mortality and morbidity rates because it aims to increase the utilisation of maternity services by midwives who can provide safe quality care which leads to maternal satisfaction (Hildingsson & Thomas, 2007). Furthermore, the Cochrane review of 11 trials that involved 12 276 women from four countries in a variety of settings that used a midwife-led model of care indicated that these women were less likely to experience antenatal hospitalisation, less likely to experience intrapartum analgesia/ anaesthesia, and more likely to experience spontaneous vaginal birth and to feel in control during birth (Hatem et al, 2009). A study conducted in Pakistan on the perception and

experiences of perinatal women who had used the midwife-led model of care revealed that women had an overall feeling of satisfaction with the service and the care provided to them and with the fact that they were involved in discussions about their care during childbirth (Anwar, 2013). In addition, a review that searched the Cochrane pregnancy and childbirth trial with a focus on continuous support given to women during childbirth reported on 22 trials reviewed involving 15 288 women, and showed that women who are allocated continuous support are likely to have spontaneous vaginal birth and are less likely to have a CS or instrumental vaginal birth (Hodnett et al, 2012).

## 2.5 Conclusion

The literature reviewed informed the current study on non-elective CS by providing an understanding of what CS is and how the CS rate has been debated in different parts of the world. The review looked at the global picture of CS rates, the rising CS rates, indications of CS, the link between CS and maternal and neonatal mortality and morbidity, and finally it explored classifications of CS.

Highlights from the review indicate that many countries face challenges in addressing the rates of caesarean section, ranging from developed countries with a high CS rate of caesarean but with fewer complications to developing countries with low CS rates of caesarean but with high reported incidences of related complications of caesarean. The reviewed literature revealed that in medium and high income countries there is no association between CS rates and maternal or neonatal mortality, whereas in low income countries, CS should be made available for high risk pregnancies which could contribute to improvements in maternal and neonatal outcomes. With 2015 nearing, the year in which countries of the world are expected to meet the MDGs, maternal mortality is not on track in SSA. There is a lack of data of the reasons for performing CS and the value of clinical audit need to be strengthened. A framework for analysing CS is needed in addressing CS and the 10 Robson classification systems is chosen for this study. The review ended with an explanation of Rooks' Midwifery Model of Care as a conceptual framework which has been employed for this study to organise and analyse the implications of the findings for Midwifery practice.

# Chapter 3: Research method

## 3.1. Introduction

In this chapter, the research method is described. The chapter will explain the rationale for the method chosen, the population studied, inclusion and exclusion criteria, the sample size and the sampling method. It will also describe the steps followed in the development of the data collection tool and how validity and reliability were ensured. Furthermore, the chapter will provide information regarding the data collection and data analysis processes as well as the ethical considerations of this study.

## 3.2 Research design and rationale

This study is a retrospective, descriptive quantitative clinical audit that reviewed all non-elective caesarean sections that took place between January 2012 and June 2012 at Windhoek Central hospital (WCH) and Intermediate Katutura hospital (IHK) in the Khomas region, Namibia. A clinical audit "is a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change" (National Institute for Clinical Excellence, 2002). A criterion based audit methodology was used, applying the five step audit cycle that can be used in order to improve the current practice (Graham, 2009). These five audit cycle steps are: the establishment of criteria for best practice, measurement of current practice and feedback, implementation of change, and re-evaluation and feedback. It is, however, beyond the scope of this study to complete the five step audit cycle. The steps included in this study are: the establishment of criterial for best practice, measurement of current practice and feedback. In order to discuss the high number of non-elective caesarean sections and the intervention needed, a reliable baseline from which to design intervention strategies is needed; therefore a retrospective clinical audit was suitable for this study.

The performance of a clinical audit aims at identifying and addressing deficiencies to improve the quality of care provision is common in health care settings (Ronsmans, 2000). Pattinson et al (2009) conducted a systematic review of perinatal mortality in low-middle-income settings. This audit was done in order to facilitate the strengthening of health care systems particularly during birth and to examine the effects of perinatal outcome. A clinical audit conducted in two district hospitals in Ghana concluded that a criterion-based clinical

audit is a feasible and acceptable method for quality assurance as it appeared to have improved the management of life threatening obstetric complications (Wagaarachchi et al, 2001)

## 3.3 Study population

The research population consisted of records of women who had given birth by caesarean section between 1 January 2012 and 30 June 2012 in the two referral hospitals, the Windhoek Central hospital (WCH) and the Intermediate Katutura hospital (IKH) in the Khomas region, Namibia.

### 3.3.1 Inclusion criteria

All records of women who had non-elective caesarean sections during the study period in the two referral hospitals were studied.

### 3.3.2 Exclusion criteria

Maternity records for private patients were excluded because private patients are not attended to by midwives during the antenatal period. Furthermore, private obstetricians often do not apply the clinical guidelines that are in place in the public health facilities and this would influence the findings.

## 3.4 Sample

### 3.4.1 Sample size

In order to reflect the characteristics of the population and to meet the objectives of this study, all records that met the inclusion criteria were examined. A six month retrospective clinical audit was done, and data obtained from these records were sufficient for the intended analysis within the scope of this thesis. Between January and June 2012 there were 5296 deliveries in the WCH and IKH; 1264 women delivered by caesarean section of which 912 were non-elective CS.

### 3.4.2 Sampling method

All maternity records were retrieved and reviewed according to the inclusion and exclusion criteria. The data sources consulted to ensure complete identification of relevant patients were the delivery registers and the maternity theatre registers.

## 3.5 Data collection tool/instrumentation

A data collection sheet (Appendix C) designed by the researcher and based on the variables of concern was used to collect the data. The researcher could not find an existing data collection instrument that measured the variables of interest. In the absence of a data collection instrument that measures variables of interest, a new instrument was designed according to the steps outlined by LoBiondo-Wood & Haber (2002) as follows:

- Define the construct to be measured
- Formulate the items
- Assess the items for content validity
- Develop instructions for respondents and users
- Pre-test and pilot test the items
- Estimate the reliability and validity.

The researcher reviewed the literature and measurements that deal with related constructs and used this information to synthesise the available knowledge and to define the construct (LoBiondo-Wood & Haber, 2002). Related constructs identified included the Robson classification group, the profile of women, the comprehensive admission assessment, as well as the management of uncertain status of labour, the management of induction of labour, management of the latent phase, and the management of the active phase of labour. Together with LoBiondo-Wood & Haber's steps for developing a tool, the researcher used the information from Pattinson's (2012) article on *Reducing maternal deaths* and the outline of monitoring the progress of labour (Farrell & Pattinson, 2005), training modules on essential antenatal, perinatal and postpartum care (WHO, 2003), the clinical guidance on the induction of labour (NICE, 2008), instructions on care of women and their babies during birth (NICE, 2007), the use of electronic fetal monitoring (NICE, 2001), as well as EmOC (MoHSS, 2009) to design the data collection instrument. The data collection instrument was designed to

describe the management of women in relation to expected standards of care so that both adherence to protocols and deficiencies could be identified.

### 3.5.1 Validity

The validity of an instrument is 'a determination of the extent to which the instrument actually reflects the abstract construct being examined' (Burns & Grove, 2005:376). In order to use a content validated instrument, the researcher developed the construct being examined from literature reviews, then developed the purpose, objectives and research question, and finally drafted a data collection sheet. This was done using the process outlined by Lynn (1986) regarding the determination and quantification of content validity. Stage 1 of this process was to identify dimensions, generate items for all dimensions and integrate items into a usable format (Lynn, 1986).

Stage 2 was carried out by presenting the instrument and domains to a panel of experts to identify areas of omission and to suggest areas of items for improvement or modification (Lynn, 1986). A panel of 4 experts was appointed to complete the second stage of content validity. The panel consisted of two obstetricians / gynaecologists and two midwives who were required to identify areas of omission and to suggest areas of items for improvement or modification (Lynn, 1986). Two steps were taken as recommended by Lynn, firstly through the assertion by a specified number of experts that items (variables) were content valid, and secondly by rating that the entire instrument was content valid. The panel of experts were provided with extensive explanatory notes to support the instrument (Appendix D). The scoring system used as described by Lynn (1986) was a four point scale (1 = not relevant, 2 = sometimes relevant, 3 = usually relevant but needs minor alteration, and 4 = highly relevant). After the completion of stage 2, the instrument was tested (pilot study) on documents similar to the documents studied in the main study to pre-test the instrument for clarity and whether it measured essential aspects of the relevant variables. The outcome of the pilot study indicated that the instrument was able to measure relevant variables and thus no change was made to the instrument.

### 3.5.2 Reliability

According to Parahoo (1997), reliability is a necessary but insufficient condition for validity. Reliability can be assured by the ability of the data collection sheet to yield the same data when it is re-submitted to the same record more than once. To increase reliability and ensure that comprehensive information was gathered, the researcher double extracted the data during the pilot study, did a test-retest (2 weeks apart) and compared the results to obtain a reliability coefficient. During data collection, 10% of the records were double extracted to ensure same results are obtained using the same data collection tool. A simple random sample was employed using a random table (Polit & Beck, 2012). A reliability coefficient of 0.88 was calculated which is considered good (Polit & Beck, 2012). During data collection, the researcher used the split-half test for internal consistency. The data collection sheets were divided into two equal parts and the data was compared for similarity. Consistency was checked with Cronbach's alpha, and a value of 0.78 was reported which is acceptable according to Polit and Beck (2012).

## 3.6 Research personnel

The researcher completed all data collection sheets herself, thus reducing the possibility of inconsistency if there was more than one evaluator. The researcher is a registered nurse and midwife with 8 years of experience in the maternity department. The researcher was familiar with the records used in maternity wards and had familiarised herself with the current guidelines used in the maternity departments.

## 3.7 Pilot study

A pilot study is conducted on a small sample of the population in the same way as the main study to test the method to be used (Polit & Beck, 2012). A pilot study gives a researcher the opportunity to check whether the study is feasible. In this case, a pilot study was done using maternity records of patients who had non-elective caesarean sections in December 2011, thus meeting the inclusion criteria, for both hospitals. During the pilot study the researcher checked for any deficiency in the design of the study. The researcher used the pilot study

results to check for reliability and validity of the results. The data from the pilot study is not part of the final study.

### 3.8 Data collection

A data collection sheet (Appendix C) was used to collect the data. The data collection sheet consisted of all the variables of interest. Explanatory notes (Appendix D) were used alongside the data collection sheet to ensure consistency in evaluating the data. The Robson classification (Appendix B) and the CTG classification (NICE 2001) with the definitions and descriptions of individual features of fetal heart-rate trace (Appendix E) were also included in the explanatory notes. The researcher extracted information from the maternity records. To capture accurate information and for verification, other sources (delivery registers and theatre registers) were used.

The constructs collected included the Robson classification group and the profile of women which consisted of the indication of caesarean section, age, gestational age, gravidity and parity, whether the patient was referred from outside the region or not, whether she had attended an antenatal clinic or not, whether it was a first caesarean or repeated caesarean section, and whether it was a single or multiple pregnancy, and her HIV status. Other constructs collected were the comprehensive admission assessment, the management of uncertain status of labour, the management of induction of labour, the management of the latent phase, and the management of the active phase of labour. Constructs regarding the management of labour included all aspects of Midwifery care that would support physiological labour. Data on maternal and neonatal outcomes were also collected.

### 3.9 Data management

The researcher developed a study coding system to ensure that there was no direct link between the data and the patient record. The data collection sheets were identified by a study code. The researcher rechecked the sheet to make sure that required information was captured and all information from completed data collection sheets were entered onto an Excel spread sheet and saved onto a computer that was accessed by security pin code. The Excel spread sheet was complemented by a codebook which enabled the researcher to enter the data in numerical values; she also created a data entry system for statistical analysis (Polit & Beck, 2012). All completed data collection sheets were stored in safe storage container accessible

only by the researcher and supervisor and data was backed up on CD-ROM. Data will be kept for three years after publication and then destroyed.

### 3.10 Data analysis

The descriptive analysis of the data is presented below. Data was entered onto an Excel spread sheet and analysed using Statistica 11 with the help of a statistician. The variables were measured to enable the researcher to make sense of the data. The overall CS rate was determined by dividing the total number of CSs recorded on the delivery registers and theatre registers which met the inclusion criteria by the total number of all deliveries in the two hospitals within the study period. The non-elective caesarean section rate for the study period was determined by dividing the total number of non-elective caesarean sections, by the total number of deliveries. The proportion of non-elective CSs was determined by dividing the total number of CSs by the total number of non-elective CSs done during the study period. Non-elective CS were categorised using Robson's classification. The frequency and mean for age and gestation was analysed. Frequencies were calculated for indications for non-elective CS and parity before delivery, as well as maternal and neonatal outcomes.

The care received by women in the different phases of labour was also analysed. In order to measure the quality or differing care rendered during the different phases of labour, variables were dichotomised as clinical observations recorded as done according to guidelines of that specific stage or phase of labour and according to the guidelines Ministry of Health and Social Services, 2009; Farrell & Pattinson, 2005). Furthermore, the variables of these different phases of labour were also dichotomised into maternal assessment (blood pressure, pulse, temperature and urine test), fetal assessment (monitoring of fetal heart rate), and progress of labour assessment (monitoring of contractions and vaginal examination). Where there was lack of clarity in the Namibian guidelines (Ministry of Health and Social Services, 2009), the South African guideline for intrapartum care was used (Farrell & Pattinson, 2005). Variables (age, parity, gestation, HIV, local or referral, ANC attended, Apgar score, maternal complication and neonatal complication) were compared across all indications of caesarean section. Midwifery interventions such as support, companion and posture was analysed and presented in relation to the Midwifery Model of Care.

## 3.11 Ethical considerations

The proposal was approved by the Human Research Ethics Committee of the Faculty of Health Sciences at the University of Cape Town (Appendix F) and by the Permanent Secretary of the Ministry of Health and Social Services in Namibia (Appendix G). The researcher also adhered to ethical principles as stipulated in the Helsinki Declaration during the study process. These principles stipulate that data should be fairly and lawfully processed, processed for limited purposes, adequate, relevant, not excessive, accurate, not kept for longer than necessary, processed in line with the rights of data under this act, secured against unauthorised or unlawful processing of personal data and against accidental loss, destruction, or damage to personal data (World Medical Association, 2013). The ethics committee for permission to conduct the study (Appendix F) and permission to access patients records (Appendix G) was obtained prior to collection of data. During data collection, the researcher applied the principles required to ensure that all information was handled appropriately.

### 3.11.1 Confidentiality

The researcher protected the data from disclosure to anyone outside the study. Accidental disclosure was prevented by creating a new identity (codes) for the study subjects. The subject names were stored separately from the research data. The separate sheet with matching details and the data was saved on a computer accessible only by a security code. No names are disclosed in the report of the findings.

### 3.11.2 Anonymity

A unique subject code was assigned to each data collection sheet. The identity of the records was not entered on data collection sheets and there is no direct link between the maternity records and the data collection sheets. The data collection sheet cannot be matched to the record without this separate sheet.

### 3.11.3 Beneficence

There was no direct benefit to the women whose records were evaluated. This study provides information which identifies weaknesses in the clinical management system; this is meant to initiate appropriate responses in terms of training and the development of training materials.

### 3.11.4 Non-maleficence

This data was collected retrospectively; therefore the clinical management of the labour of these women was not affected by this study. The researcher did not directly interact with the women whose records were analysed. There were no negative effects for women whose records are analysed, and no negative effects for health practitioners involved in the care of the women whose records were studied.

## 3.12 Conclusion

The retrospective quantitative research approach employed for conducting this study made it possible to explore and describe the rate and indications of non-elective caesarean sections and see if they complied with the guidelines and care provided prior to the non-elective CSs. The research population consisted of maternity records of women who gave birth by non-elective caesarean section between January and June 2012 in the two referral hospitals. Ethical issues regarding this study which included the unique codes allocation to the data collection sheet was adhered to, and all the information was processed fairly, lawfully and as clearly as possible. This study was thus conducted according to the ethical principles relevant to a study of this nature.

# Chapter 4: Results

## 4.1 Introduction

This chapter presents the study results. The descriptive analysis of data presented includes: general delivery statistics, caesarean section rates (total and non-elective), demographic profile of women with non-elective CS, CS categorised according to Robson ten group classification system and by reported indication for CS. Data is also presented on different aspects of the management of labour: admission assessment, management of women when diagnosis of labour was uncertain, management of induction of labour, management of the latent phase of labour, and management of the active phase of labour. Descriptive data on maternal and neonatal outcomes of women who had non-elective CSs is also presented. Tables and figures are used to provide a clear presentation of the results.

## 4.2 Delivery statistics

Between 1 January 2012 and 31 June 2012 a total of 5296 deliveries took place in the WCH and IKH hospitals. The total number of CSs was 1264. This included 912 that were non-elective and 352 that were elective. Of the 912 women with non-elective CS, 838 (91.9%) records were retrieved and reviewed for this study, but 72 (8.1%) of the records were not found. From the 838 records retrieved, 855 live babies were born (this included 30 pair of twins), and there were 13 intrauterine deaths. It was also noted that during the study period two maternal deaths of women who had undergone non-elective CS were recorded and that these two records were not available for review during data collection due to on-going investigations.

## 4.3 Demographic profile of women

The demographic profile of the study group (women having non-elective CS) included characteristics such as age, gestation, parity before delivery, pregnancy, antenatal attendance, HIV status, whether the CS was the first or a repeat CS, and if the patients were local. Table 1 below presents the demographic profile of the 838 women for whom records were retrieved. The mean age for the study group was 27.1 years (SD 6.5, median 26 and range 15-46). The mean gestation was 37.7 weeks (SD 3.0, median 38 and range 26-44). There were 344

(41.0%) women who were para 0, 460 (55.9%) were para 1-4. and 34 (4.1%) were para >4. A total of 808 women (96.4%) had a singleton pregnancy and 807 (96.3%) attended antenatal care. The records also indicated that 171 women (20.4%) who gave birth by non-elective CS were HIV positive. There were 634 (75.7%) women who according to the records had a CS for the first time. Of the 634 records for women who had CS for the first time, 290 (45.7%) were multigravidas. A total of 736/838 records (87.8%) were for women from within the Khomas region while 102 (12.2%) were referred from other hospitals outside the region.

**Table 1: Demographic profile of women**

| Variables | Total N = 838 | Percentage (%) |
|---|---|---|
| **Age in years** | | |
| ≤15 | 2 | 0.2% |
| 16-20 | 138 | 16.5% |
| 21-25 | 250 | 29.8% |
| 26-30 | 195 | 23.3% |
| 31-35 | 154 | 18.4% |
| 36-40 | 76 | 9.0% |
| 41-45 | 21 | 2.6% |
| 46+ | 2 | 0.2% |
| **Gestation in weeks at delivery** | | |
| 26-30 | 42 | 5.0% |
| 31-35 | 87 | 10.4% |
| 36-40 | 627 | 74.8% |
| 41+ | 82 | 9.8% |
| **Parity before delivery** | | |
| 0 | 344 | 41.0% |
| 1-4 | 460 | 54.9% |
| >4 | 34 | 4.1% |
| **Pregnancy** | | |
| Singleton | 808 | 96.4% |
| Multiple | 30 | 3.6% |
| **Antenatal Care Clinic (ANC)** | | |
| Attended | 807 | 96.3% |
| Did not attend | 31 | 3.7% |
| **HIV status** | | |
| Positive | 171 | 20.4% |
| Negative | 643 | 76.7% |
| Unknown | 24 | 2.9% |
| **Caesarean section** | | |
| First CS | 635 | 75.8% |
| Repeat CS | 203 | 24.2% |
| **Address** | | |
| Local (from Khomas region) | 736 | 87.8% |
| Referral (from other regions) | 102 | 12.2% |

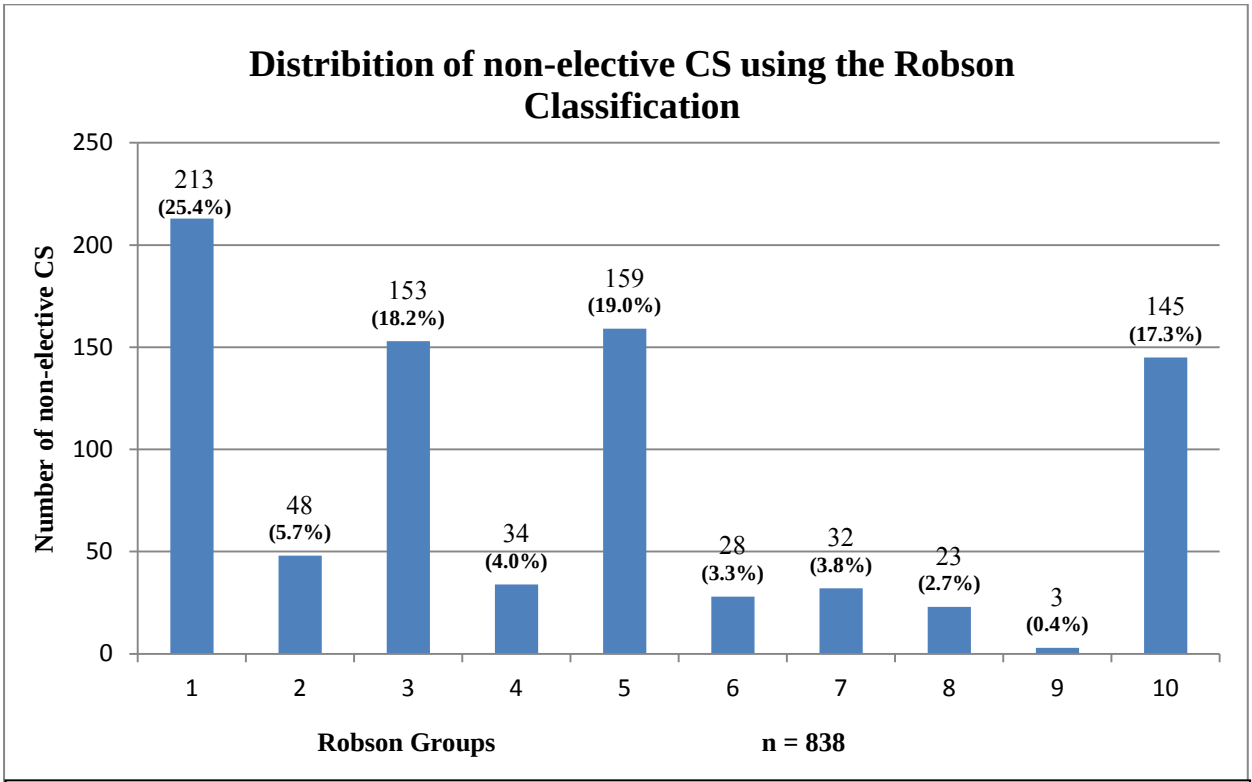
## 4.4 Non-elective caesarean section rate

From the total number of deliveries (n = 5296) that took place during the study period, the number of CSs performed was 1264 (912 non-elective and 352 elective), giving an overall CS rate of 23.9%. The non-elective CS rate was 17.2% during the study period. The proportion of the total CSs that were non-elective was 72.2%.

## 4.5 The Robson classification

The Robson classification system is described in Appendix B. Figure 1 below shows the distribution of non-elective CS per group for the study period.

**Figure 1: Distribution of non-elective CS using the Robson classification**




**Legend**
**1** Nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation in spontaneous labour
**2** Nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation who either had labour induced or were delivered by caesarean section before labour
**3** Multiparous women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal 37 weeks in spontaneous labour
**4** Multiparous women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal to 37 weeks gestation who either had labour induced or were delivered by caesarean section
**5**. All multiparous women, with at least one previous uterine scar and a single cephalic pregnancy at greater than or equal to 37 weeks gestation
**6** .All nulliparous women with a single breech pregnancy
**7.** All multiparous women with a single breech pregnancy including, women with previous uterine scars
**8**. All women with multiple pregnancies, including women with previous uterine scars
**9.** All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars
**10**. All women with a single cephalic pregnancy at less than or equal to 36 weeks gestation, including women with previous scars

As indicated above in Figure 1, group 1 (nulliparous women with a single cephalic pregnancy, at ≥37 weeks gestation in spontaneous labour) constituted the largest group of non-elective CS with a total of 213/838 (25.4%). Group 3 (multiparous women, without a previous uterine scar, with a single cephalic pregnancy at ≥37 weeks in spontaneous labour) represented 153/838 (18.2%), group 5 (all multiparous women, with at least one previous uterine scar and a single cephalic pregnancy at ≥37 weeks gestation) represented 159/838 (19.0%). Group 10 (all women with a single cephalic pregnancy at ≤36 weeks gestation, including women with previous scars) accounted for 145/838 (17.3%).

Apart from groups 1, 3, 5 and 10 which together contributed 670/838 (79.9%), the remaining groups contributed 168 (20.1%) to the overall number on non-elective CS. Groups 2 and 4 included nulliparous and multiparous women respectively with a single cephalic pregnancy who either had labour induced or were delivered by CS before labour. These were women who had non-elective CS without labour commencing. These two groups contributed 82/838 (9.7%) to the overall number of non-elective CS. Groups 6, 7, 8 and 9 combined made up 86/838 (10.3%) of the study group and included primiparous women with breech presentation (group 6), multiparous women with breech presentation (group 7), multiple pregnancies (group 8) and transverse or oblique lie (group 9).

A further analysis of the age distribution for non-elective CS within Robson classification was carried out. As displayed in Table 2 below, 92/213 (43.2%) of women in Robson classification group 1 were between the ages of 21-25, followed by 67/213 (31.5%) between the age of 16-20. In combining Groups 1 and 2, a total of 192/261 (73.6%) of women who had non-elective CS in these two groups were below the age of 26. As mentioned earlier, Group 1 and 2 included nulliparous women with a single cephalic pregnancy at greater than or equal to 37 weeks. In group one, women were in spontaneous labour, while in group 2, labour was either induced or deliveries by CS were done before labour.

In Group 3, which includes multiparous women without a previous uterine scar with a single cephalic pregnancy, 46/153 (30.1%) of women were between the ages of 31-35. In Group 4, which includes multiparous women without a previous uterine scar with a single cephalic pregnancy for whom labour was either induced or who were delivered by CS before labour, 12/34 (35.3%) of women were in the age group 36-40yrs. In Group 5, which includes

multiparous women with at least one previous uterine scar, 59/159 (37.1%) of women were between the ages of 26-30.

**Table 2: Age distribution for non-elective caesarean section within Robson classification**

| Age distribution for non-elective CS within Robson classification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Age groups (years) | | | | | | | | |
| Robson group | ≤15 | 16-20 | 21-25 | 26-30 | 31-35 | 36-40 | 41-45 | ≥46 | Total |
| **1** | 1 | 67 | **92** | 31 | 18 | 3 | 1 | 0 | 213 |
| **2** | 1 | 14 | **17** | 8 | 7 | 1 | 0 | 0 | 48 |
| **3** | 0 | 5 | 26 | 43 | **46** | 24 | 9 | 0 | 153 |
| **4** | 0 | 1 | 6 | 6 | 8 | **12** | 0 | 1 | 34 |
| **5** | 0 | 13 | 37 | **59** | 30 | 15 | 4 | 1 | 159 |
| **6** | 0 | 9 | **13** | 4 | 2 | 0 | 0 | 0 | 28 |
| **7** | 0 | 0 | **15** | 7 | 2 | 6 | 2 | 0 | 32 |
| **8** | 0 | **6** | 3 | 2 | 7 | 4 | 1 | 0 | 23 |
| **9** | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 3 |
| **10** | 0 | 22 | **40** | 35 | 33 | 11 | 4 | 0 | 145 |
| **Total** | 2 | 138 | 250 | 195 | 154 | 76 | 21 | 2 | 838 |

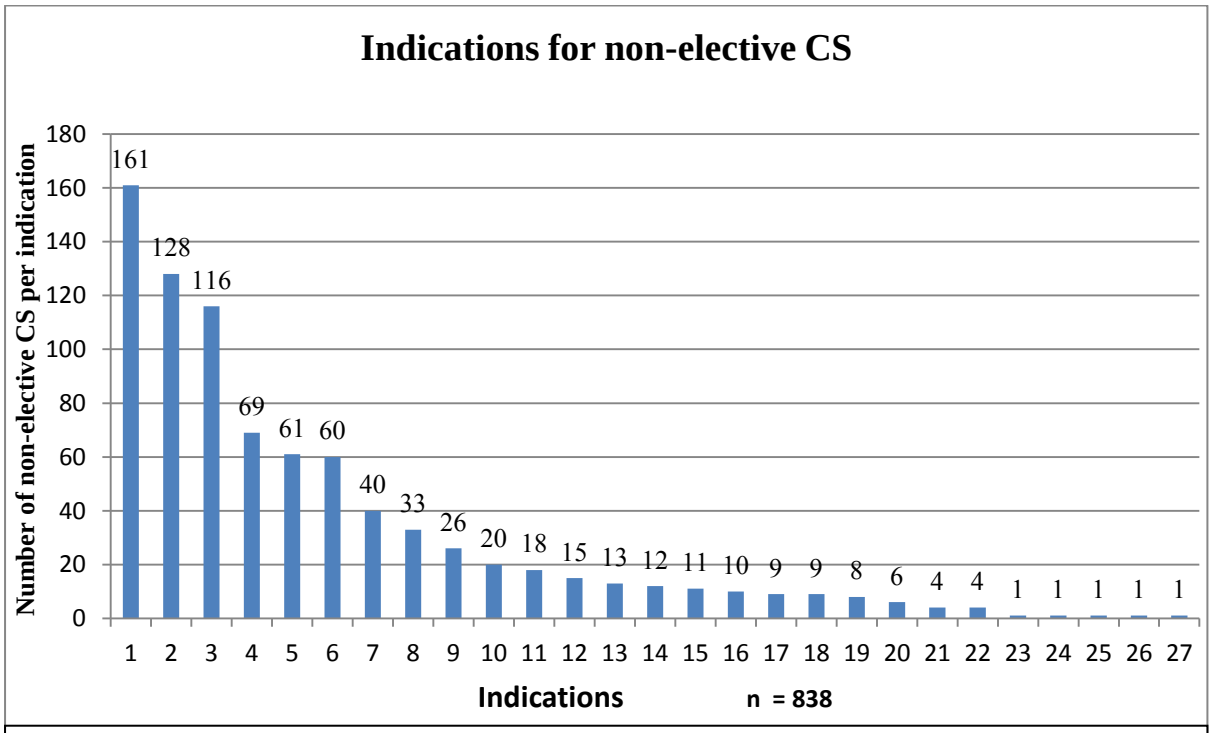
Table 3 below shows the proportion of total HIV positive women within the Robson classification. Groups 3 and 4 which include multiparous women had a higher proportion of HIV positive women than groups 1 and 2 which included primiparous women. There were 48/153 (31.4%) HIV positive cases in group 3, and 9/34 (26.5%) in group 4. Group 9 which comprise all women with a single pregnancy with a transverse or oblique lie, including women with a previous uterine scar, had a total number of three women, with one woman being HIV positive. This resulted in group 9 containing a higher proportion of HIV positive women 1/3 (33.3%) than any other group, although it is a small group. There were 35/145 (24.1%) HIV positive women in group 10.

**Table 3: Proportion of HIV positive women per Robson classification**

| Proportion of HIV positive women per Robson classification | | | |
|---|---|---|---|
| **Robson groups** | **Total in group** | **Total HIV positive** | **Total % in group** |
| **1** | 213 | 29 | 13.6% |
| **2** | 48 | 6 | 12.5% |
| **3** | 153 | 48 | 31.4% |
| **4** | 34 | 9 | 26.5% |
| **5** | 159 | 28 | 17.6% |
| **6** | 28 | 4 | 14.3% |
| **7** | 32 | 6 | 18.8% |
| **8** | 23 | 5 | 21.7% |
| **9** | 3 | 1 | 33.3% |
| **10** | 145 | 35 | 24.1% |
| **Total** | 838 | 171 | 20.4% |

A total of 27 different reasons/indications for non-elective CS (n=838) were recorded in the patient records. These are presented in order of frequency of the indication in Figure 2 and are the following: failure to progress in the first stage 161 (19.2%), fetal distress 128 (15.3%), eclampsia/pre-eclampsia/imminent eclampsia 116 (13.8%), previous CS x1 69 (8.2%), CPD 61 (7.3%), malpresentation 60 (7.1%), failed trial of scar 40 (4.8%), previous CS x2 or more 33 (3.9%), rupture of membranes 26 (3.1%), non-reassuring CTG 20 (2.3%), prolonged second stage of labour 18 (2.1%), placenta praevia 15 (1.8%), multiple pregnancy 13 (1.55%), placenta abruptio 12 (1.4%), malposition 11 (1.3%), failed induction of labour 10 (1.2%), antepartum haemorrhage 9 (1.1%), cord prolapse 9 (1.1%), meconium stained liquor 8 (0.9%), pregnancy induced hypertension 6 (0.7%), fetal abnormality 4 (0.5%), pre-existing medical conditions 4 (0.5%), pre-term labour 1 (0.1%), previous complicated delivery 1 (0.1%), post-dates 1 (0.1%), polyhydramnios 1 (0.1%) and intrauterine death (grandmultiparous) 1 (0.1%).

**Figure 2: The distribution of indications for non-elective caesarean section**




**1** failure to progress in first stage
**2** fetal distress
**3** eclampsia/pre-eclampsia/imminent eclampsia
**4** previous CS x1
**5** cephalopelvic disproportion
**6** malpresentation
**7** failed trial of scar
**8** previous CS x2 or more
**9** rupture of membranes
**10** non-reassuring CTG
**11** prolonged 2nd stage of labour
**12** placenta praevia
**13** multiple pregnancy
**14** placenta abruptio
**15** malposition
**16** failed induction of labour
**17** antepartum haemorrhage
**18** cord prolapse
**19** meconium stained liquor
**20** pregnancy induced hypertension
**21** fetal abnormality
**22** pre-existing medical conditions
**23** pre-term labour
**24** previous complicated delivery
**25** post-dates
**26** polyhydramnios
**27** intrauterine death (grandmultipara)

The 27 indications for non-elective CS retrieved from the records were not exclusive and therefore a further categorisation into seven groups was done to enable a simpler comparison with the Robson group. These groups are:

1. Problems with labour progress (n=251). This group includes failure to progress in the first stage (161), CPD (61), prolonged second stage (18) and malposition (11).
2. Problems with fetal condition (n= 156). This group includes fetal distress (128), non-reassuring CTG (20) and MSL (8).
3. Previous CS (n=142). This group includes previous CS x1 (69), failed trial of scar (40) and previous CS x2 or more (33).
4. Hypertensive problems (n=122). This group includes eclampsia/ pre-eclampsia/ imminent eclampsia (116) and pregnancy induced hypertension (6).
5. Malpresentation (n=60).

6. Antepartum haemorhage (n=36). This group includes antepartum haemorhage (9), placenta praevia (15) and abruption placenta (12).
7. Miscellaneous (n=71). This group includes rupture of membranes (26), multiple pregnancy (13), failed induction of labour (10), cord prolapse (9), fetal abnormality (4), pre-existing medical condition (4), preterm labour (1), previous complicated delivery (1), postdates (1), polyhydramnios (1) and intrauterine death (grandmultipara) (1).

Table 4 below shows a further analysis of these grouped indications with Robson classification. Problems with labour progress accounted for 137/213 (64.3%) of the Robson group 1, and 83/153 (54.2%) of the Robson group 3. Robson groups 1 and 3 also made up 61/213 (28.6%) and 54/153 (35.3%) respectively, of problems with the fetal condition. Hypertensive problems (HT) accounted for a higher proportion in groups 2 (17/153), 4 (11/34) and 10 (78/145). Antepartum haemorrhage (APH) accounted for a higher proportion in groups 4 (5/34) and 10 (20/145).

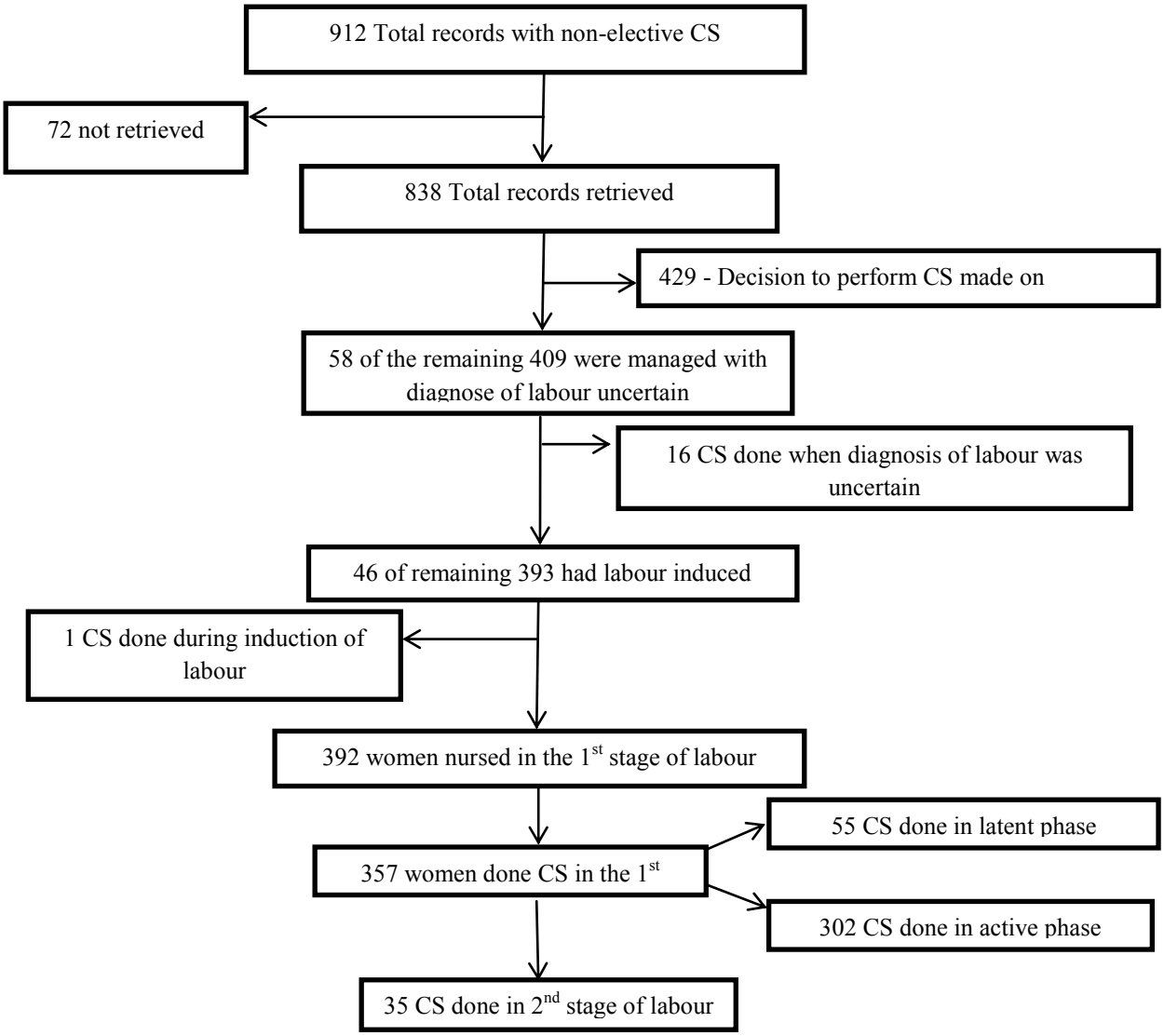
**Table 4: Analysis of grouped indications of non-elective caesarean section with Robson classification**

| Robson group | Problem with labour progress | Problem with fetal condition | Previous CS | HT problems | Mal-presentation | APH | Miscellaneous | Total in Robson group |
|---|---|---|---|---|---|---|---|---|
| **1** | 137 (64.3%) | 61 (28.6%) | 0 (0.0%) | 5 (2.3%) | 0 (0.0%) | 1 (0.5%) | 9 (4.2%) | 213 |
| **2** | 10 (20.8%) | 11 (22.9%) | 0 (0.0%) | 17 (35.4%) | 0 (0.0%) | 1 (2.1%) | 9 (18.7) | 48 |
| **3** | 83 (54.2%) | 54 (35.3%) | 0 (0.0%) | 3 (2.0%) | 0 (0.0%) | 7 (4.6%) | 6 (3.9%) | 153 |
| **4** | 6 (17.6%) | 5 (14.7%) | 0 (0.0%) | 11 (32.3%) | 0 (0.0) | 5 (14.7%) | 7 (20.6) | 34 |
| **5** | 3 (1.9%) | 13 (8.2%) | 134 (84.3%) | 5 (3.1%) | 0 (0%) | 2 (1.2%) | 2 (1.2%) | 159 |
| **6** | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 28 (100%) | 0 (0.0%) | 0 (0.0%) | 28 |
| **7** | 3 (9.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 28 (87.5%) | 0 (0.0%) | 1 (3.1%) | 32 |
| **8** | 5 (21.7%) | 0 (0.0%) | 0 (0.0%) | 3 (13.0%) | 1 (4.3%) | 0 (0.0%) | 14 (60.9) | 23 |
| **9** | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 (100.0%) | 0 (0.0%) | 0 (0.0%) | 3 |
| **10** | 4 (2.7%) | 12 (8.3%) | 8 (5.4%) | 78 (53.8%) | 0 (0.0%) | 20 (13.8%) | 23 (15.9) | 145 |
| **Total in category** | 251 (30.0%) | 156 (18.6%) | 142 (17.0) | 122 (14.5%) | 60 (7.2%) | 36 (4.3%) | 71 (8.5%) | 838 |

## 4.6 Management of women who had non-elective caesarean section

The following Figure 3 shows the flow of how non-elective CSs were performed from available records at different phases of labour during the study period. From the figure it is evident that just over half of non-elective CS = 429 (51.2%) were done on admission. Some of the women who had a non-elective CS on admission were in labour. The reasons for non-elective CS done on admission are presented later in this chapter (4.6.3). A total of 357/838 (42.6%) women had non-elective CS performed in the first stage of labour of which 55 were done in the latent phase of labour and 302 were done in the active phase of labour. A total of 35/838 (4.2%) had non-elective CS performed in the second stage of labour.

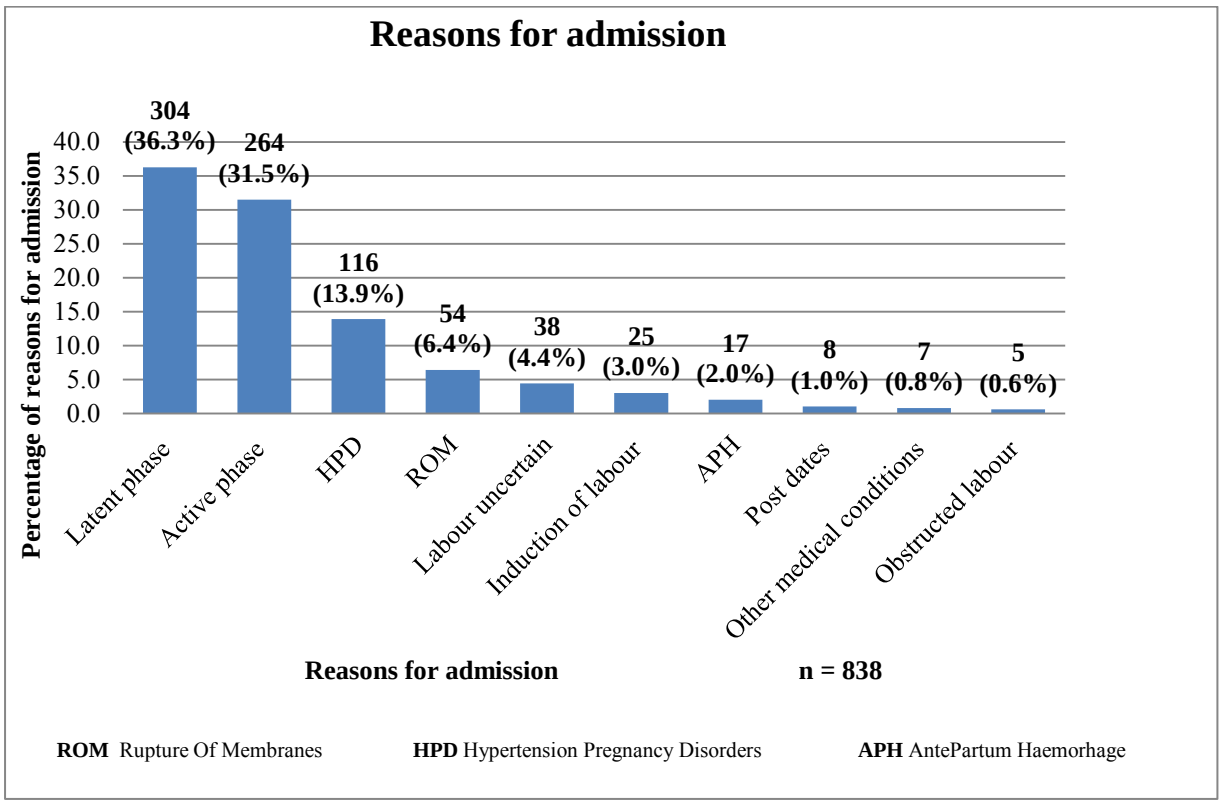
**Figure 3: Flow chart of records and the phase in which the C/S was performed**



### 4.6.1 Reasons for admission

Ten reasons for admission of women who had non-elective CS were recorded. Most women were admitted in the latent phase, i.e. 304/838 (36.0%), followed by the active phase, i.e. 264/838 (32.0 %). A total of 116/838 (14.0%) of women were admitted with hypertension pregnancy disorders (HPD). Five women (0.6%) who were admitted due to obstructed labour were referrals. Figure 4 below shows the all recorded reasons for admission.

**Figure 4: Reasons for admission**




### 4.6.2 Admission assessment

Of all the women who had a non-elective CS during the study period, only 2 (0.2%) records did not indicate if an admission assessment was done. A total of 824/836 (98.6%) had a maternal assessment (blood pressure, pulse, respiration, temperature and urine test) done on admission. All 836 records showed that fetal assessment (fetal heart rate) was done on admission. On admission, the method used for monitoring FHR was CTG 688/836 (82.0%), hand held doptone 2/836 (0.2%) and fetoscope 6/836 (0.7%), whilst for 144/836 (17.2%) women the records did not indicate the method of monitoring FHR on admission. Progress of

labour assessment (assessment of contractions and vaginal examination) was applicable to 681 women on admission. Only 666/838 (97.8%) had progress of labour assessment done on admission.

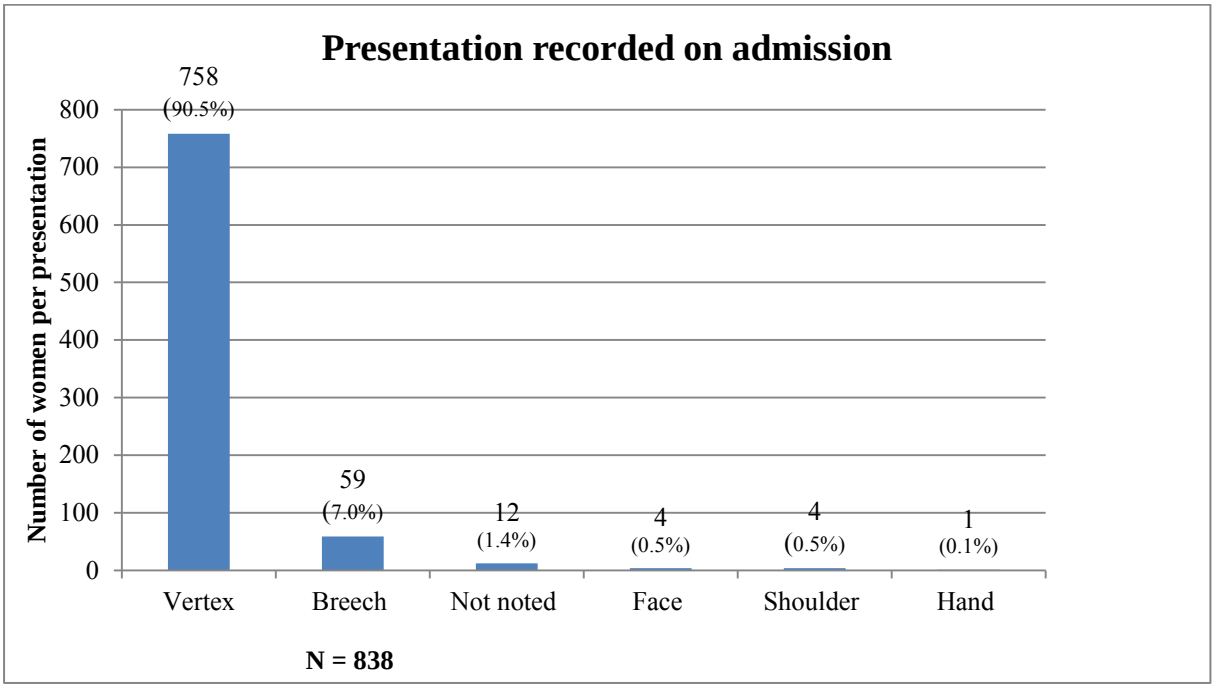
There were 642/838 (76.6%) women with normal observations and 196/838 (23.4%) with abnormal observations on admission. The most frequent abnormal observations recorded on admission were high blood pressure in 59/836 women (7.0%) followed by previous CS x2 or more in 33/836 (3.9%), antepartum haemorrhage for 26 (3.1%) and malpresentation for 22/836 women (2.7 %). Other abnormal observations recorded on admission are presented in Table 5 below.

**Table 5: Abnormal observations recorded on admission**

| Abnormal observation recorded on admission (n = 196) | Number | Percentage |
|---|---|---|
| **High blood pressure** | 59 | 7.0% |
| **CS x2 or more** | 33 | 3.9% |
| **Antepartum haemorrhage** | 26 | 3.1% |
| **Malpresentation** | 22 | 2.6% |
| **Preterm labour** | 12 | 1.4% |
| **Meconium stained liquor** | 11 | 1.3% |
| **Abnormal FHR** | 11 | 1.3% |
| **Eclamptic fit** | 11 | 1.3% |
| **CPD** | 4 | 0.5% |
| **No FHR** | 3 | 0.4% |
| **Pyrexia** | 2 | 0.2% |
| **Rectovaginal fistula** | 1 | 0.1% |
| **Caput/moulding** | 1 | 0.1% |
| **Total** | 196 | 23.2% |

On admission, 758/838 (90.4%) of women who had non-elective CS had a vertex presentation, while for 12/838 (1.4%) women the records did not indicate the presentation. Women who had breech presentation on admission were 59/838 (7.0%). There was no indication in the records as to whether external cephalic version had been attempted during antenatal visits. The presentations recorded on admission are shown in Figure 5.

**Figure 5: Presentations recorded on admission**




### 4.6.3 Reasons for non-elective caesarean section performed on admission

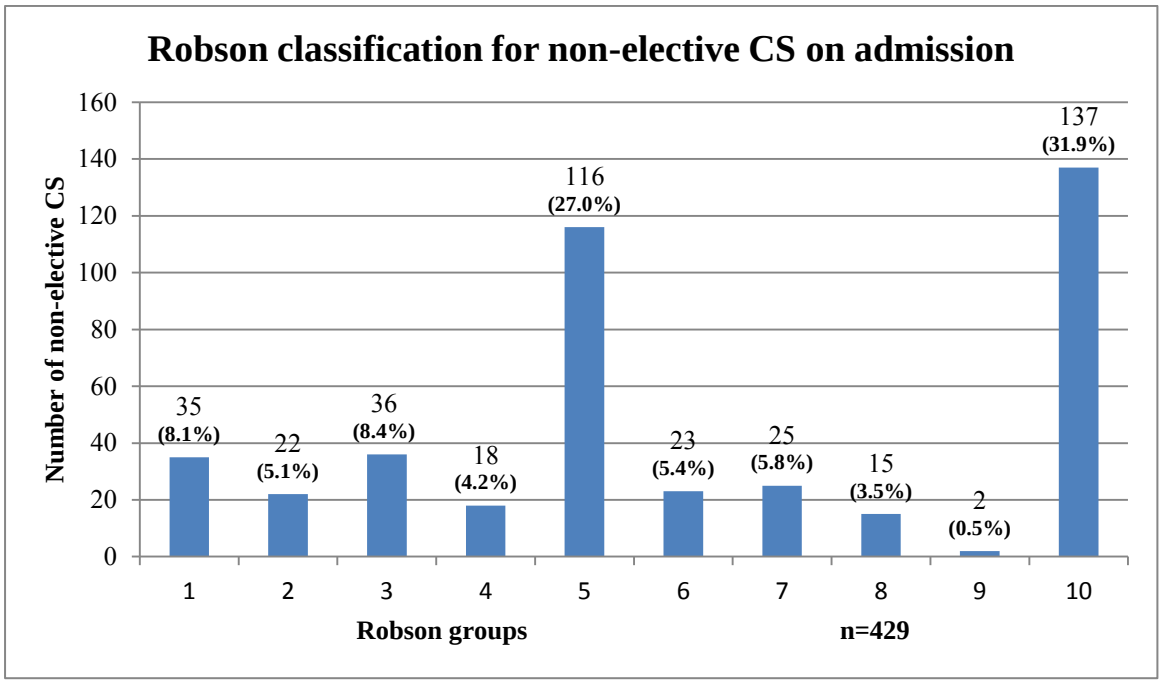
A total of 429/838 (51.2%) decisions to perform non-elective CS were made on admission. The indications were examined according to the 7 grouped indications for CS as documented in the patient records, and according to the Robson's classification into 10 groups. The most common reason for the decision to perform non-elective CS on admission was hypertensive problems 113/429 (26.3%), followed by a previous CS 102/429 (23.8%). Table 6 below indicates the reasons for non-elective CS performed on admission as derived from documentation in the patient records.

**Table 6: Reasons for non-elective CS performed on admission**

| Indication for non-elective CS n = 429 | Number | Percentage |
|---|---|---|
| **Problems with labour progress** | 33 | 7.7% |
| **Problems with fetal condition** | 61 | 14.2% |
| **Previous CS** | 102 | 23.8% |
| **Hypertensive problems** | 113 | 26.3% |
| **Malpresentation** | 46 | 10.7% |
| **Antepartum haemorrhage** | 28 | 6.5% |
| **Miscellaneous** | 46 | 10.7% |

The reasons for non-elective CS performed on admission were also classified according to Robson's classification. The Robson's classification for non-elective CS done on admission is shown in Figure 6 below.

**Figure 6: Robson classification for non-elective caesarean section done on admission**



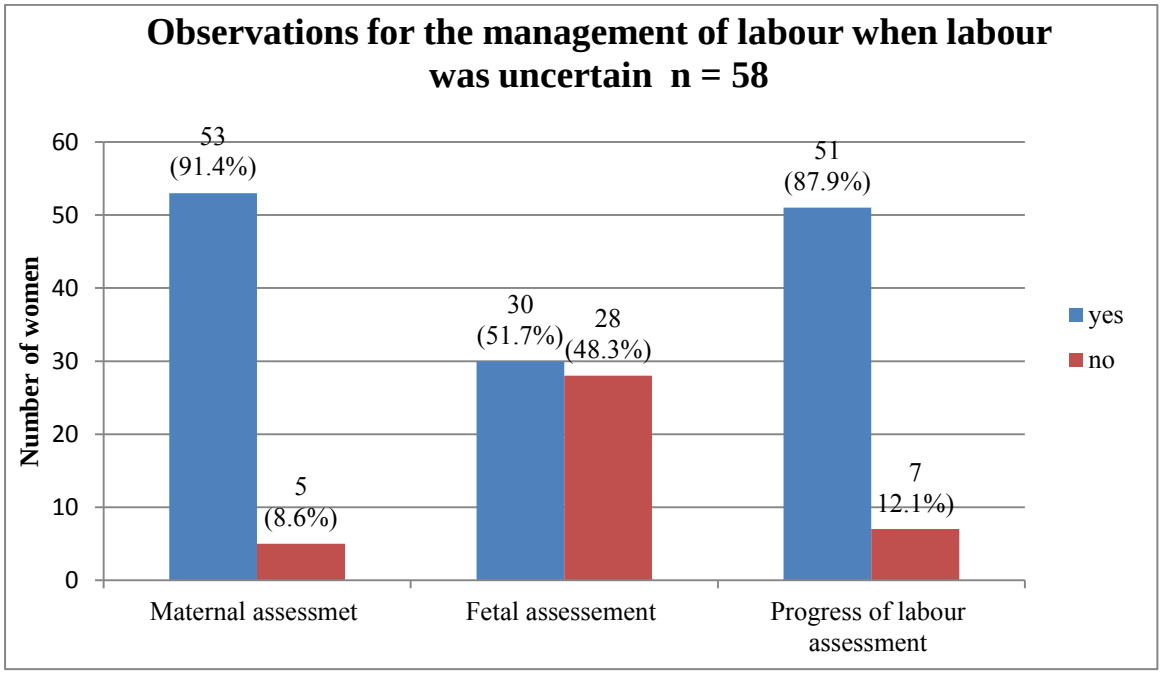

Of the non-elective CS performed on admission, 137/429 (31.9%) were women with a single cephalic pregnancy at less than or equal to 36 weeks gestation, including women with previous scars (group 10). Group 5, multiparous women with at least one previous uterine scar and a single cephalic pregnancy at greater than or equal to 37 weeks gestation, had 116/429 (27.0%) of the CSs performed on admission. These findings are similar to the

analysis of the grouped indications for non-elective CS performed on admission as indicated in Table 6 above. The high proportion of non-elective CS on admission in Robson's group 10 could be connected to the high proportion of high blood pressure as an abnormal observation noted on admission on Table 5.

### 4.6.4 Management of women where diagnosis of labour was uncertain

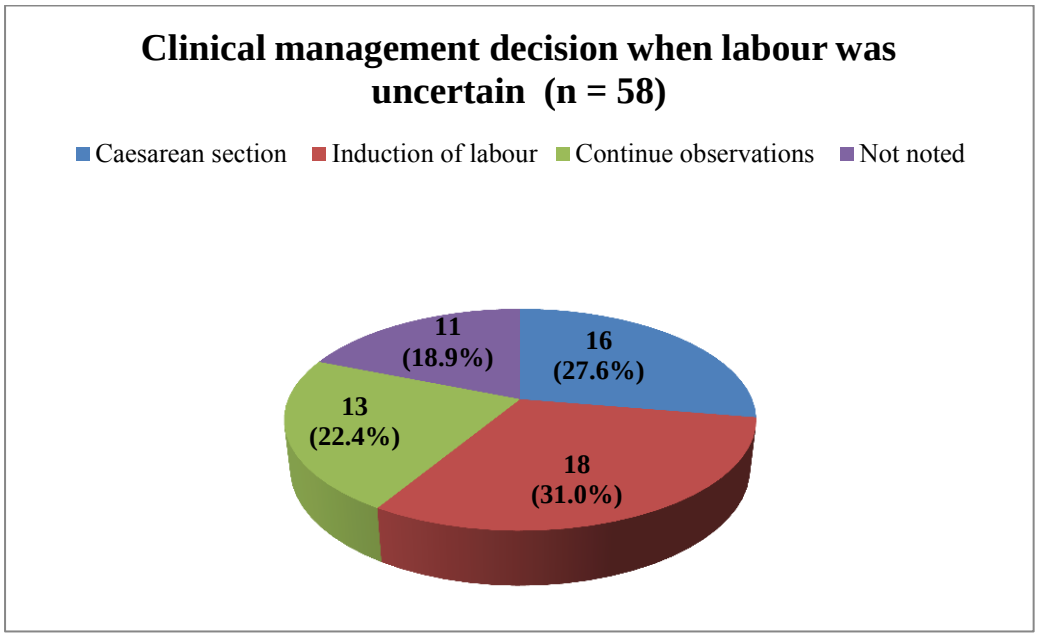
A total of 58/838 (6.9%) women were assessed on admission and the diagnosis of labour was uncertain. These findings are presented in Figure 7 below. This also included the records which showed that on admission there was no indication that the patient was in labour, but that due to other observed facts the patient was admitted.

**Figure 7: Observations for the management of labour when labour was uncertain**




A total of 53/58 (91.4%) had a maternal assessment done after 4 hours, 30/58 (51.7%) had a fetal assessment done after 2 hours, and 51/58 (87.9%) had a progress of labour assessment done after 4 hours. This was in accordance with the intrapartum care guidelines (Farrell & Pattinson, 2005). The MoHSS guideline was not used because there are no specific guidelines on management of uncertain labour. Figure 8 below shows the clinical management decision made after 4 hours for women with labour uncertain.

**Figure 8: Clinical management decision when diagnosis of labour was uncertain**

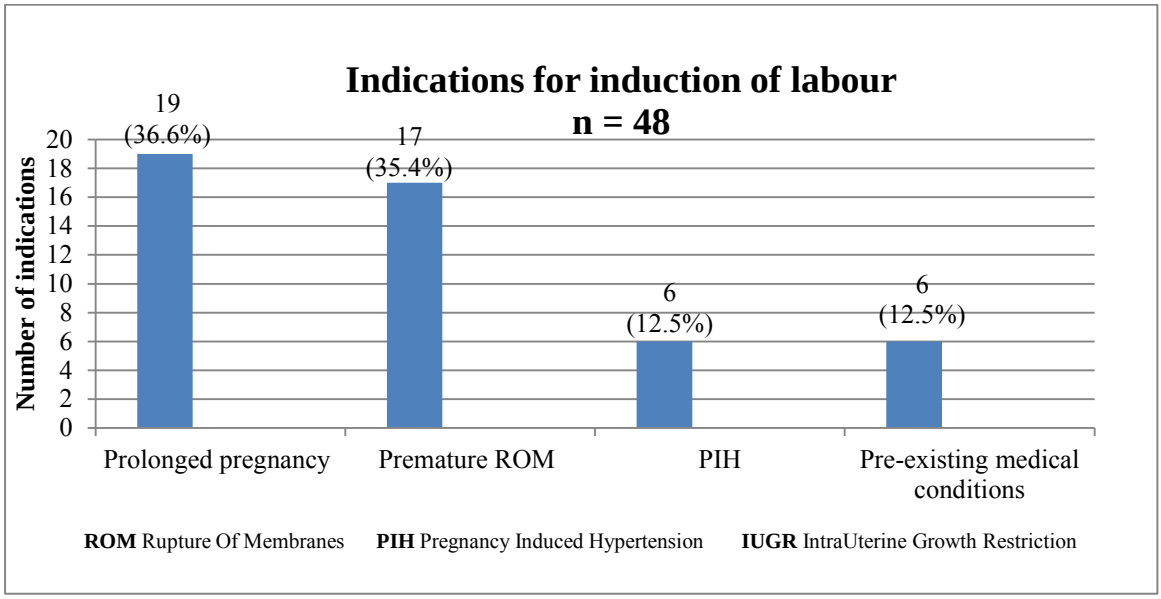



Clinical management decisions made after 4 hours when diagnosis of labour was uncertain were CS 16 (27.6%), induction of labour 18 (31.0%), continued observations 13 (22.4%), and 11 (18.9%) of the records did not indicate what decisions were made. For the sixteen women who had non-elective CS performed when the diagnosis of labour was uncertain, previous CS was the most frequent reason accounting for five women (31.3%), followed by miscellaneous reasons for three (18.7%). Hypertensive problems, malpresentation, problems with labour progress and problems with fetal conditions accounted for two women (12.5%) each.

### 4.6.5 Induction of labour

There were a total of 48 women where the plan was for them to have an induction of labour. Indications of induction of labour are presented on Figure 9 below. The most common indication for induction of labour recorded in the patient's notes were prolonged pregnancy 19 (39.6%) followed by pre-labour rupture of membranes in 17 cases (35.4%).

**Figure 9: Indications for induction of labour**




A total of 46 women had successful induction of labour, went into labour and had CS done either in the latent or in the active phase of labour. It was noted that in some of these women who had induction of labour and was done CS either in the first or second stage of labour, failed induction was given as the reason for performing non-elective CS. A further analysis of ten women whose induction of labour failed indicated that eight women had non-elective CS done in the latent phase of labour, with five due to a prolonged latent phase, and three with no indicated reason. There was one woman who had a CS done after one attempt at induction failed, while one had a CS in the active phase of labour with no reason indicated. One woman never had an induction done due to abnormal pre-induction findings. Another one had labour induced, however, after one cycle of induction she was not in labour and a CS was done. The risk of prolonged rupture of membranes in HIV positive woman might have influenced the decision to perform a non-elective CS at this stage.

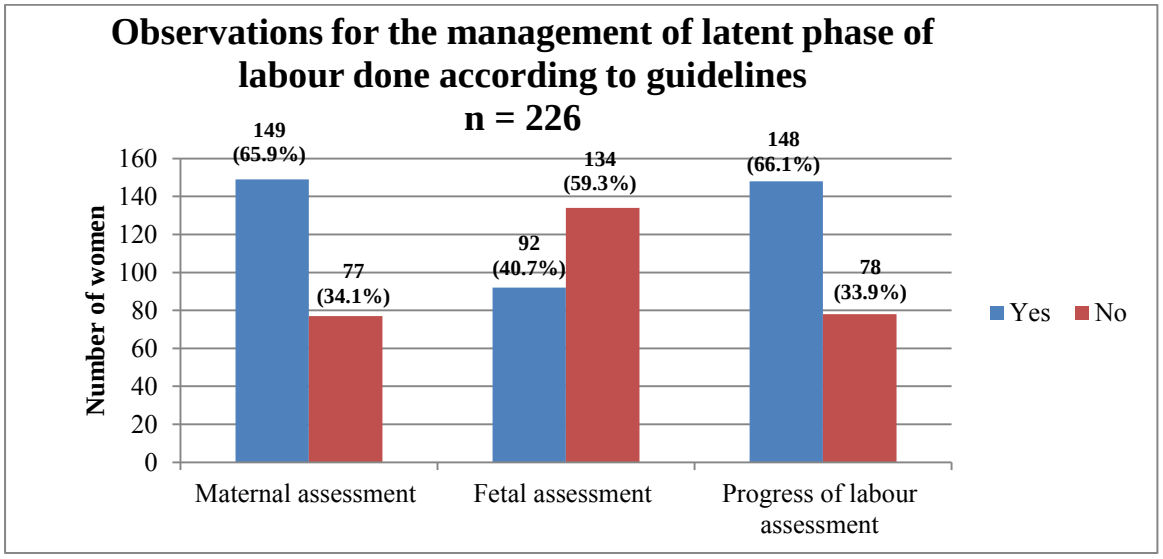
Out of the 47 women who were induced for labour, 33/47 (70.0%) were induced with prostaglandins, 12/47 (25.5%) with oxytocin, while two (4.3%) were induced by sweeping the membranes. The method used for monitoring FHR before induction was CTG 46/47 (97.9%), and in only one case (2.1%) this was done with a hand held doptone. A total of 42/47 (89.4%) CTGs done were normal, four (8.5%) were suspicious and only one (1.9%) were pathological. Of the 47 women who were induced, 27/47 (56.4%) started labour after

one cycle of induction. For the remainder, (21/47 (44.7%) of women who did not go into labour after induction, 20/21 (90.9%) were further induced and one (9.1%) had a CS done.

### 4.6.6 Management of latent phase of labour

The records of women who were managed in the latent phase of labour were analysed to find out if clinical observations were recorded according to the Ministry of Health and Social Services (MoHSS, 2009) guidelines for the latent phase of labour. Out of 392 women who were managed in the first stage of labour (Figure 3), 226 were managed in the latent phase of labour. As illustrated in Figure 4, some of the 304 women admitted in the latent phase of labour had non-elective CS performed on admission. Figure 10 below shows the observations done during the management of the latent phase of labour.

**Figure 10: Observations for the management of latent phase of labour done according to guidelines**



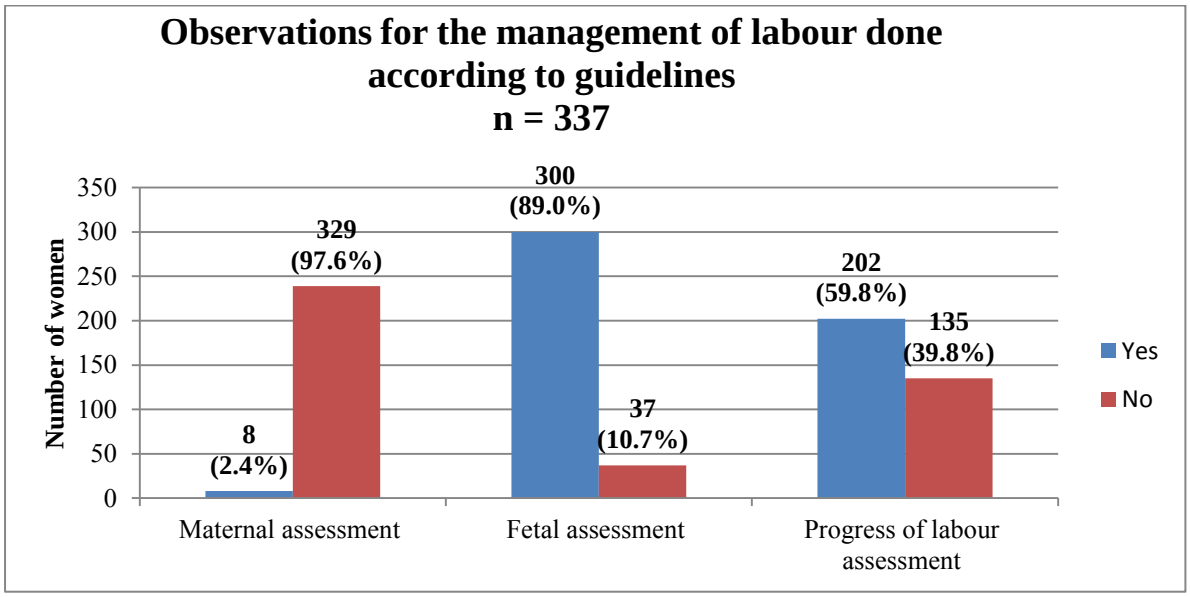

There were 149/226 (65.9%) records that indicated that maternal assessment was done during the latent phase of labour. There were 92/226 (40.7%) of the records that indicated that fetal assessment was done as per guidelines; one (0.4%) record did not indicate whether fetal assessment was done or not. There were 224/226 (99.1%) women who had progress of labour assessed during the latent phase of labour, but with only 148/224 (66.1%) having it done according to the guidelines. Two (0.9%) of the records did not indicate whether progress of labour assessment was done during the latent phase of labour.

The method used for monitoring FHR in the latent phase was CTG in 221 (97.8%) of the cases, while in 5 (1.8%) cases the method used for monitoring FHR was not indicated, and only one (0.4%) record indicated that a hand held doptone device was used to monitor the FHR. The assessments of findings of the CTGs found on the maternity records were as follows: 194 (87.8%) of the CTG were normal, 22 (9.9%) were suspicious and 5 (2.3%) were pathological. For all 5 records that showed that the CTG was pathological, delivery was expedited. Only 46 (20.1%) of the women nursed in the latent phase had a partogram opened. After 8 hours of latent phase, 158 (75.6%) progressed into active labour, while 51 (24.4%) had a prolonged latent phase. The clinical management decision made in the latent phase was as follows: 143 (63.3%) women continued with normal labour, 55 (24.3%) had a CS performed, and only 28 (12.4%) had enhancement of contractions.

### 4.6.7 Management of active phase of labour

As indicated on the flow chart (Figure 3), 392 women were managed in the first stage of labour. In total, 337 (40.2%) women were managed in active labour. These are women who were admitted in the active phase, women who progressed from uncertain labour or from induction of labour, as well as women who progressed from the latent phase of labour. Figure 11 below shows the observations done for the management of women during the active phase of labour. This indicates that only 8/337 (2.4%) of the women who were managed in the active phase of labour had a maternal assessment done in accordance with the guidelines, 300/337 (89.0%) had a fetal assessment done, and 202/337 (59.8%) had a progress of labour assessment done. Only one (0.3%) record did not indicate if fetal and progress of labour assessments were done.

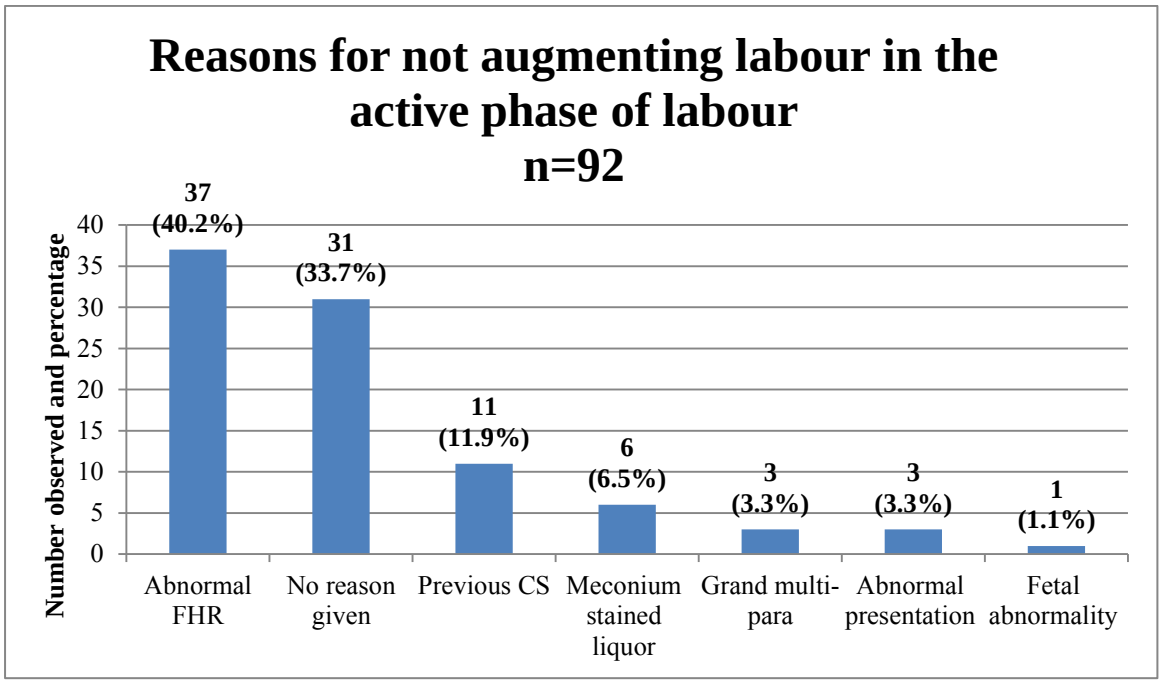
**Figure 11: Observations for the management of active phase of labour done according to guidelines**




During the active phase of labour, FHR monitoring was done with a CTG in 314/337 (93.2%) of the cases, two (0.6%) with a hand held doptone device and one (0.3%) with a fetoscope. Out of 314 CTGs that were done, 231/314 (73.6%) were normal, 60/314 (19.1%) were suspicious, with 23/314 (7.3%) pathological. From the 60 records that indicated that the CTGs were suspicious, only 20/60 (33.3%) were repeated while 17/60 (28.3%) were not repeated, and 23/60 (38.3%) records did not indicate whether the CTGs were repeated or not. Of the 23 records that indicated that the CTGs were pathological, 21/23 (91.3%) of the women had delivery expedited.

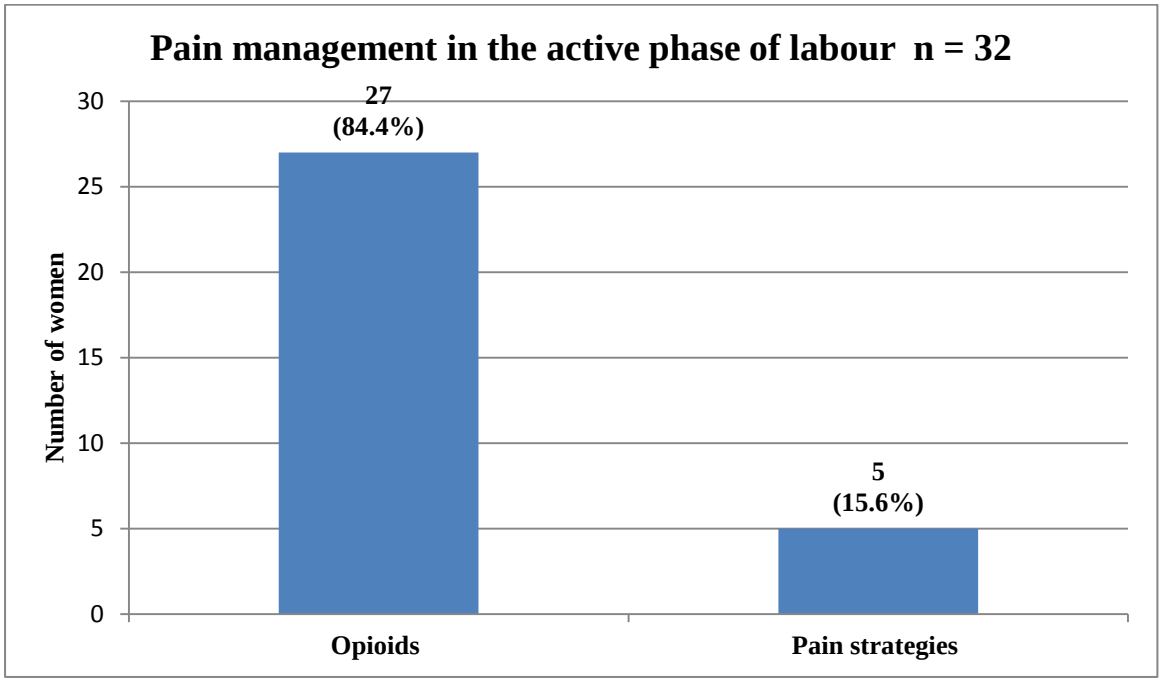
During the active phase of labour, 326/337 (96.7%) of women had a partogram commenced. Recordings on the partograms indicated that in 235/326 (72.1%) of the cases, the cervical dilatation crossed the alert line, and 126/326 (38.7%) crossed the action line. Inefficient contractions were recorded on 183/337 (56.3%) records, with 91/183 (49.7%) indicating that labour was augmented, while 92/183 (50.3%) indicated that labour was not augmented. For 31/183 (33.7%) cases, the records did not indicate the reasons why labour was not augmented. Figure 12 below shows the reasons for not augmenting labour in the remaining 61 women. The most frequent reasons recorded for not augmenting labour were abnormal FHR in 37/92 (40.2%) of cases and previous CS in 11/92 (11.9%) of cases.

**Figure 12: Reasons for not augmenting labour in the active phase of labour in women with poor progress and inadequate contractions**




In the first stage of labour, 110/392 (28.1%) records indicated that women were mobile and 62/392 (15.8%) received fluids or energy management (including food) during the first stage of labour. It was also noted in the records that two (0.5%) women were kept in an upright position during the first stage of labour, and only one (0.3%) woman had a companion during the first stage of labour. In active phase of labour only 32/337 (9.5%) of the records indicated that women received pain management. Five out of the 32 (15.6%) cases were managed with pain strategies, i.e. either used breathing techniques or massage to relieve the pain, while 27/32 (84.4%) were given opioids. These findings are presented in Figure 13 below.

**Figure 13: Pain management in the active phase of labour**




### 4.6.8 Management of the second stage of labour

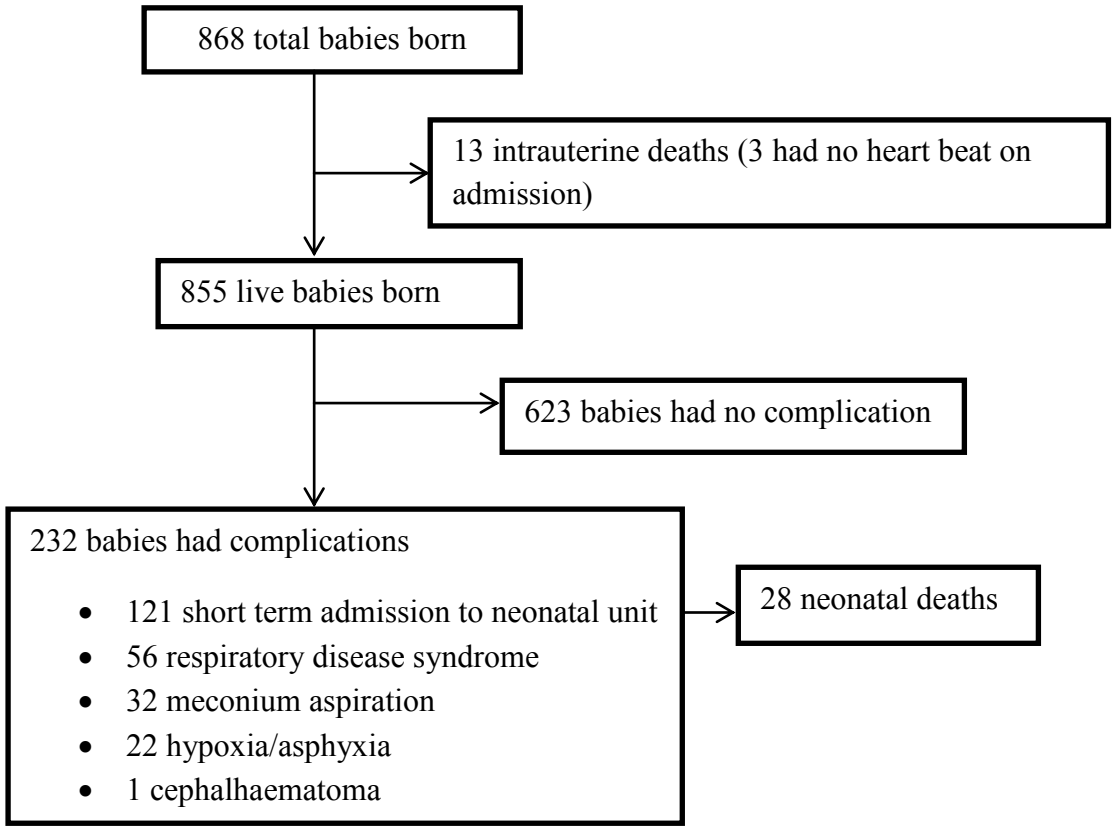
The records indicated that 35/337 (10.4%) women progressed with active labour until the cervical os was fully dilated. Only 3/35 (8.6%) had the second stage of labour assisted, whereby one (33.3%) was assisted with an episiotomy, one (33.3%) with vacuum extraction, and one (33.3%) with forceps. Both procedures failed to achieve vaginal delivery. There were 33/35 (94%) women who were not assisted with delivery in the second stage; the reasons reported were: 10/33 (30.3%) abnormal FHR, 10/33 (30.3%) abnormal presenting part, and 2/32 (6.1%) presenting part high, while no reason was recorded for not assisting delivery on 11 (33.3%) of the records.

## 4.7 Maternal and perinatal outcomes

A total of 799/838 (95.3%) of women did not experience any maternal complications. Maternal complications noted from the records indicated that 27/838 (3.2%) had post-partum haemorrhage, 8/838 (1.0%) developed wound infection, 2/838 (0.2%) developed hypotension during the operation, 1/838 (0.1%) had intraoperative bleeding, 1/838 (0.1%) had intraoperative aspiration. No hysterectomy or relook laparotomy was noted on the records.

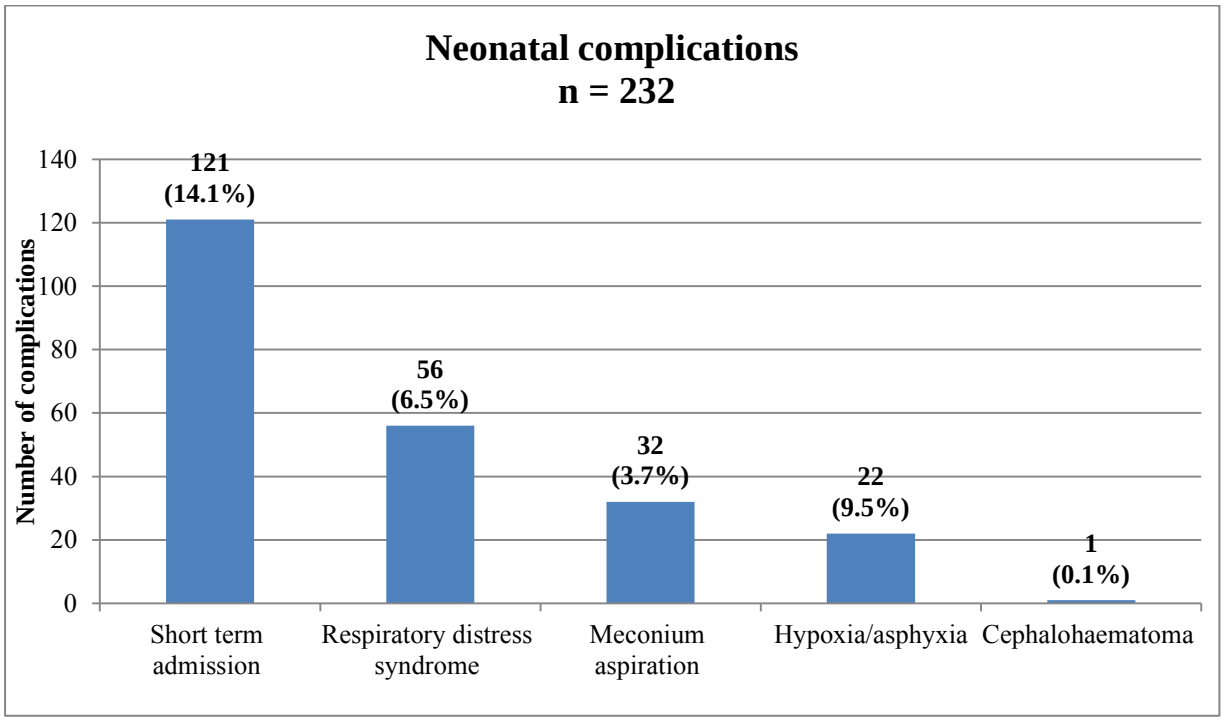
A total of 868 babies were born by non-elective CS during the study period of which 855 were live babies and there were 30 pairs of twins. There were 623/855 (72.9%) babies which did not have any complications. There were 13/868 (1.5%) intrauterine deaths (three (0.4%) had no heart beat on admission, 10 died after admission but before birth), 232/855 babies with complications and 28/855 (3.3%) resulted in neonatal deaths. Figure 14 below shows the flow chart of neonatal outcomes.

**Figure 14: The flow chart of neonatal outcomes**




Neonatal complications were observed in 232/855 (26.3%) of records and these included short term admission to the neonatal unit 121/855 (14.1%), respiratory distress syndrome 56/855 (6.5%), and meconium aspiration 32/855 (3.7%). It was beyond the scope of this study to identify the causes of neonatal and intrauterine deaths and also the outcomes of all babies admitted to the neonatal unit recorded during the study period. The distribution of neonatal complications is presented in Figure 15 below.

**Figure 15: Neonatal complications**




## 4.8 Conclusion

This chapter presented the analysis of data collected from maternity records of women who had undergone non-elective CS during the study period. The general delivery statistics is presented. The overall CS rate of 23.9% as well as the non-elective CS rate of 17.2% for the study period was determined. The demographic profile of women whose records were reviewed is presented and indicated that a high 75.8% of women had CS for the first time. Robson's classification was used as a framework for analysing CS. The management of women who had non-elective CS during the study period was analysed by looking into maternal, fetal and progress of labour assessments in the different phases of labour as well as supportive strategies to facilitate labour. Furthermore, this chapter provided an analysis of maternal and perinatal outcome recorded during the study period.

# Chapter 5: Discussion

## 5.1 Introduction

This chapter will discuss the results of the study while indicating the similarities and differences with studies done in other settings. The Robson classification will be discussed in comparing the findings of different studies. Implications for Midwifery practice arising from the results will also be discussed. Furthermore, limitations of this study will be discussed and recommendations will be made in this chapter. Resulting from this study, potential areas that need further investigation are identified.

## 5.2 Description of the study population

The WCH and IHK hospitals had 912 non-electives CS during the study period. A total of 838 maternity records were reviewed for this study. Efforts were made to retrieve the missing records with the help of the matrons and the secretaries in charge of the maternity wards. The records reviewed were of women of child bearing age 15 – 46 years, which is in line with the WHO definition of 14 – 49 years. There were two women less or equal the age of 15 years in this study group and this surgery, at the very beginning of their reproductive phase, poses an impact and risk for future pregnancies and deliveries.

The gestational age at CS ranged from 26 to 44 weeks with a mean gestation of 37.65, meaning all pregnancies were viable. In the study population, 41.0% of women were para 0 and 75.8% of the study group had a CS for the first time. The high number of women undergoing CS for the first time is of concern, regarding the implications for future pregnancies and deliveries. In total, 96.3% of women in the study population had attended the ANC at least once, which is a higher percentage than the national average of 85% as estimated by the WHO (2006). In this study group, 20.4% of the women were HIV positive; these findings are similar to the results of an HIV/AIDS epidemiological survey done in 2006 that showed that in Namibia 19% of pregnant women attending ANC were HIV positive (WHO, 2006). This is consistent with the fact that HIV is not an indication for CS in Namibia.

## 5.3 Non-elective caesarean section rates

The WCH and IHK had an overall CS rate of 24% between 1 January and 30 June 2012. The Namibian Demographic and Health Survey (DHS) of 2006-2007 stated that at regional level, the Khomas region was reported to have the highest CS rate of 26% in the country (Ministry of Health and Social Services, 2008). Given the estimated CS rate of 26% in the Khomas region, this data gives a fair reflection even though 8% of the records could not be retrieved. The high CS rate in the Khomas region could be linked to the number of delivery related complications referred from other hospitals outside this region. Inequities in access to basic maternal health interventions in other regions of Namibia (Zere et al, 2010) can also lead to women migrating to the Khomas region in search for basic intervention e.g women with previous CS. Even though the observed CS rate is higher than the WHO recommended standard, the figures are not directly comparable and the CS rate for the whole catchment population as per definition of CS rate would be less. Other factors that are contributing to the higher rate of CS in this region need to be explored.

Of the total group of women who had a CS performed, 72.2% were non-elective CS. A study of this nature had never been done in these two hospitals before; therefore no comparison with previous findings on non-elective CS was possible. A prospective study done in Malawi, with similar socio-demographic and health profiles to Namibia, examined potentially modifiable factors that may influence the high maternal and perinatal mortality associated with CS. That study reported a rate of 94% of emergency/non-elective CS (Fenton, Whitty & Reynold, 2003). The high rate of non-elective CS in this study is attributed to a high number of problems with labour progress, problems with fetal conditions, and hypertensive problems. This study was not designed in a way that could establish whether all the non-elective CSs were necessary. Looking into the number of non-elective CS, it is probable that some of these CS would have been lifesaving, e.g. CS done due to hypertensive problems and antepartum haemorrhage. It would, however, be of interest to explore whether some of the CS done in labour for women with term pregnancies may not have been indicated. This would require a study with a different methodology in which indications for CS are examined by an expert team.

The lower proportion of elective CS in this study could be related to the fact that in Namibia a CS is not done on the basis of women's request. It is not known to what extent midwives'

skills play a role in assessing women during the antenatal period, which might be related to the low proportion of planned CS.

## 5.4 Classification of non-elective caesarean sections according to the Robson classification groups

The results of this analysis indicated that the Robson classification groups 1, 3, 5 and 10 were the largest contributors to the overall non-elective CS. Group 1 is considered one of the most important groups in the obstetric population (Robson, 2001). It is the most studied and most controversial in terms of management. The findings from this study that groups 1, 3 and 5 made a biggest contribution to the overall CS rate in the hospitals studied is consistent with what Robson (2001) discussed, and is in accordance with the most common findings from other studies such as Litorp et al (2013), Kelly et al (2013), Chong, Su and Biswas (2012), and McCarthy et al (2007). In our study, group 5 has a lower proportion because no elective CS was included. The most frequent reason for non-elective CS in group 1 was "failure to progress[i]" in the first stage of labour. This finding is similar to a population based multi-centre cohort study done in Denmark which analysed low risk nulliparous women who had undergone emergency CS; it found that "failure to progress" was the most common indication (Haerskjold, Hegaard & Kjaergaard, 2012). The large number of women in group 1 will result in the increase in the number of women with previous CS in the future and therefore it is important to prevent the first CS where possible. This observation is partially confirmed by the finding that group 5 (women with previous CS) was the second largest Robson group that contributed to the overall non-elective CS in this study.

Group 3 is similar to group 1 but refers to multiparous women in spontaneous labour without a previous uterine scar. Group 3 was the third largest group that contributed to the overall non-elective CS rate. Both groups 1 and 3 are related to the management of labour. The analysis of group 3 indicated that 10.7% of women had non-elective CS performed due to CPD. Even though multiparous women had normal deliveries previously, this study noted CPD as one of the complications in their current pregnancies. Adequate antenatal care and early diagnosis of complications as well as better management of labour might reduce the CS rate in this group.

Group 5 (women with at least one previous uterine scar) is considered a major contributor to the rate of CS (Robson, 2001). Group 5 was the second largest Robson group contributing to

the overall non-elective CS rate in this study. In other studies (Kelly et al, 2013; Chong, Su & Biswas, 2013) group 5 was found to be the largest group.

Group 10 was also a major contributor to non-elective CS rate in this study. Regarded as an important contributor to the overall CS rate (Robson, 2001), the high number of non-elective CS in this group might be attributed to the study setting. This high contribution is reflected by the high spontaneous preterm labour rate in our study population and also by the need to deliver preterm by CS due to factors such as hypertensive problems and antepartum haemorrhage. Rupture of membranes as a documented indication contributed to the high number of women in group 10. This indicates a high number of women with preterm rupture of membranes at less or equal to 36 weeks of gestation. This study was limited to non-elective CS only, but these form the majority of preterm CS, since elective preterm CS is uncommon.

From the analysis of this study, 5% of women had non-elective CS performed due to "failed" vaginal birth after caesarean section (VBAC). VBAC is an acceptable practice in the developed world (Martel & McKinnon, 2005) and is also believed to be safe. Several studies report a high VBAC success rate of 86.3% in women with prior vaginal delivery, compared to 60.9% in women without (Landon et al, 2005). In our study, the total number of women who were offered VBAC was not documented, therefore the failure rate for VBAC in our setting could not be determined. Important factors that influence the management of labour in low risk and/or uncomplicated pregnancies need to be examined and improved where possible in order to prevent the first CS. Midwifery skills are also needed for the identification of women who are candidates for and most likely to have successful VBAC.

Across the Robson classification, a high proportion of HIV was found in groups 3. Groups 1 and 2 that are made up of nulliparous women accounted for 20.5% of HIV positive cases. A comparison of HIV positive and negative pregnant women done in public hospitals in South Africa noted that HIV infection in pregnancy increases the risk of intrauterine growth retardation, premature labour and other infections in pregnant women (Bodkin, Klopper & Langley, 2005). The need to avoid artificial rupture of membranes in HIV positive women in labour means that this procedure cannot be used to augment labour and thus may contribute to higher CS rate in HIV positive women in labour. The management of pregnant HIV positive women regarding the provision of antiretroviral therapy as well as the mode of

delivery is crucial in the reduction of perinatal HIV transmission. In this study, 58% of women who had rupture of membranes as indication for non-elective CS were HIV positive, reflecting the need to deliver the fetus soon after rupture of membranes to reduce the risk of perinatal HIV transmission.

A further analysis was done to determine how the top 5 documented indications for non-elective CS overlap with the Robson classifications. The top 5 indications were: "failure to progress" in the first stage of labour, fetal distress, eclampsia/pre-eclampsia/imminent eclampsia, previous CS x1 and malpresentation respectively. Groups 1, 3 and 8 had a high number of "failures to progress" in the first stage of labour. "Failure to progress" in the first stage of labour is associated with the increased CS rate and an increased risk of fetal and maternal morbidity. Prevention of poor progress by timeous augmentation through membrane rupture or Oxytocin infusion (Bugg, Siddiqui & Thornton, 2011) could prevent the occurrence of prolonged labour.

Since the Robson classification does not identify the indications for CS, an analysis was done in this study to analyse the documented indications for non-elective CS within each Robson group, in order to enable the implications for Midwifery practices to be better explored. This will be discussed in more detail in the following section on assessment of management of women.

## 5.5 Assessment of the management of women admitted to the maternity unit who had non-elective caesarean section

### 5.5.1 Admission assessment

A comprehensive assessment of pregnant women admitted into the maternity ward is vital. It is here where potential delivery complications are observed. Ninety seven per cent of the women in this study had a comprehensive assessment done on admission. This means that maternal, fetal and assessment of progress of labour (where relevant) was done on admission. The comprehensive assessment of women on admission identified 51.1% of non-elective CSs were decided upon at admission. The most frequent reason for the non-elective CS that was decided on at admission was previous CS. This means that these women were either booked for CS but started labour before the planned date of admission, or that both health workers

and these women did not make a decision regarding the mode of delivery prior to labour. It is also possible that some women did not turn up for the CS on the planned day. Factors contributing to this high proportion of non-elective CS due to previous CS need to be explored further.

### 5.5.2 Management of women with previous caesarean section

In Namibia, the current guidelines for management of patients with a previous CS is to evaluate all women with previous CS at approximately 36 weeks of gestation to make a decision as to the probable mode of delivery (Ministry of Health and Social Services, 2009). According to this guideline of patients with previous CS, the decision for VBAC should be reviewed at each ANC visit. For women who choose VBAC, they should be admitted at 38 weeks of gestation to wait for spontaneous labour. There are currently no studies done in Namibia to explore knowledge of as well as attitudes towards VBAC for women, midwives and obstetricians.

This study noted a total of 34 women who had previous CS x2 or more, of which 29 were between 36-40 weeks of gestation and 32/34 women attended ANC. The maternity records did not indicate whether any of these women with previous CS x2 had CS planned however as per Ministry of Health and Social Services guidelines (2009), women with two or more previous CSs should have an elective CS planned at 36 weeks. These numbers illustrate the importance of a proper assessment of pregnant women with previous CS during their ANC visits. The findings indicate that several of these non-electives CS performed in labour could have instead been elective CSs planned prior to labour. This clearly highlights the need for proper assessment and education of women during antenatal care.

### 5.5.3 Fetal heart rate monitoring during labour

The analysis of this study showed that the most common method used for monitoring FHR in all phases of labour including on admission was CTG. The CTGs were of poor quality as most of them did not have tocograph (uterine) recordings. The use of electronic fetal monitoring is associated with an increase in maternal interventions (National Institute of Clinical Excellence, 2001) because the electronic fetal monitor is sensitive and the interpretation of findings requires skill. There is no evidence that the use of CTG for fetal

monitoring improves perinatal outcome (Grivell, Alfrirevic, Gyte & Devane, 2012) and has no impact on morbidity and mortality (Thacker, Stroup & Chang, 2006) and therefore no evidence for routine use of CTG in low risk women. Poor skills in interpreting CTG can mean that fetal hypoxia is missed with resultant poor outcome, but conversely if interpreted incorrectly as fetal distress an unnecessary CS can be performed. Intermittent auscultation with a fetoscope or doptone is an appropriate method of monitoring fetal heart rate in low risk labour. The management of women when labour was uncertain indicated a good maternal assessment. The poor fetal assessment could be associated with lack of guidelines for managing uncertain labour. The management of women in the latent phase of labour indicated inadequate fetal assessments. Fetal distress as an indication for non-elective CS was a common factor in this study.

### 5.5.4 Women with malpresentation

A total of 64 women had non-elective CS performed due to malpresentation of which 53 were due to breech presentation. It is interesting to note that half the women who had non-elective CS due to breech presentation were nulliparous, again indicating that this should have been picked up before admission and therefore a need to plan CS. None of their records noted whether external cephalic version was done, and in 21/64 of the records, external cephalic version was contraindicated. Contraindicating factors noted on the records were: active phase of labour, rupture of membranes and abnormal fetal heart rate. It was beyond this study's objectives to determine the number of successful vaginal breech deliveries or successful external cephalic versions. In Namibia, external cephalic version is performed in the absence of contraindicating factors. Midwives are primarily health care providers for women attending ANC in Namibia. There is a need to look into the health care provider's skills of identifying an abnormal presentation as well as their external cephalic version skills.

### 5.5.5 Induction of labour

With careful consideration, labour can be induced if there are perceived benefits to the mother or baby. The most common indications for induction of labour in this study were prolonged pregnancy followed by premature rupture of membranes. The most common method used was prostaglandins. Forty-eight women were induced for labour during the study period and 10 had CS done due to failed induction of labour. Induction of labour is

associated with improved maternal outcome in women with mild hypertensive diseases beyond 37 weeks gestation (Koopmans et al, 2009). This study highlighted hypertensive problems as a major contributor to the number of non-elective CSs performed. This study highlighted that 12% of women induced were induced due to pregnancy induced hypertension. This study could not, however, establish the perinatal outcome of these women nor could it establish the gestation of all women who had a CS done due to hypertensive problems. This means that missed opportunities for induction of labour in this group could not be assessed.

## 5.6 Management of women in the first stage of labour

With regard to the management of women in the first stage of labour, 47.0% of non-elective CSs that took place during the study period were done in the first stage of labour. The partogram is known as a universal and efficient tool for monitoring and identifying women in need of obstetric intervention (Nyamtema et al, 2008). The use of a partogram is the standard for monitoring and guiding management of labour in Namibia. In the two hospitals under study, a high initiation of 96.7% of the partogram was noticed. This study did not examine if the partogram was properly interpreted and acted upon. This study noted that 72% of partogram used had crossed the alert line of which 39% crossed the action line indicating that despite the abnormal findings, action was not taken timeously. The records of women who had a partogram started during the active phase of labour show that 183 had inefficient contractions but only 91 had augmentation of labour. No information was found regarding the reasons for not augmenting labour.

This study revealed a high proportion of poor maternal, fetal and progress of labour assessments of women in the first stage of labour. This substandard care might have played a major role in the high proportions of non-elective CS done in the first stage of labour. Better management of labour could lead to early identification of problems and interventions such as augmentation and rupture of membranes, mobility and rehydration. On the other hand, poor monitoring of labour could also lead to fetal distress or prolonged labour not being detected in time which could result in adverse outcomes. Better monitoring, if detecting more fetal complications by CTG, could lead to a higher CS rate. The lack of maternal assessment noted in this study could reflect poor recording and monitoring of labour and possibly poor supervision. Poor progress of labour assessment of labour could hinder early detection of

complications and timely interventions. These findings all show the urgent need for improvements in monitoring labour, and it would therefore be useful to examine the management of women in the first stage of labour in more detail. Skills and clear guidelines are required in this phase of labour.

The management of women in the latent phase of labour indicated inadequate fetal assessments. Fetal distress as an indication for non-elective CS was a common factor in this study. The management of women in the active phase of labour revealed a concerning figure of only 2.3% of women having a proper maternal assessment done. This poor monitoring of women in the active phase of labour indicates the high likelihood of delay in identifying complications. The high number of women having CS in the first stage of labour relates to women in group 1 and 3 of the Robson classification. As labour progresses, the chances of maternal and/or fetal distress increase. The poor quality of both maternal and fetal assessment in this stage could again be associated with lack of skills, lack of midwives, excessive workload or lack of equipment. These findings are in keeping with the 2013 report of the presidential commission of enquiry on the health activities and affairs of the MoHSS which indicated that lack of infrastructure, equipment and availability of a health work force adequately trained in critical areas are some of the major challenges (United Nations Country Team, 2013).

## 5.7 Management of women in the second stage of labour

In the second stage of labour, few women had assisted delivery. Malpresentation was one of the reasons that delivery was not assisted. This indicated lack of skills in as this could have been picked up earlier. Women undergoing CS delivery at full dilatation are more likely to have intra-operative complications and infants with perinatal asphyxia (Allen, O'Connell & Baskett, 2005). Potential strategies to prevent second stage CS would be the use of vacuum and forceps where possible to help reduce the number of second stage CS as well as the possibility of adverse outcomes.

## 5.8 Maternal and perinatal outcome

Poor maternal assessment of women during the first stage of labour found in this study indicates poor intrapartum care and could contribute to existing maternal and perinatal mortality in this region. No maternal death is recorded in this study sample. Maternal and neonatal morbidity is known to be associated with CS in the second stage (Cebekulu & Buchmann, 2006). In our study, amongst the 18 non-elective CS done for a prolonged second stage of labour, 3 women had maternal complications (2 had PPH, 1 intraoperative bleeding) and 5 neonatal complications (3 hypoxia, 2 meconium aspiration, and 1 cephalhaematoma) recorded. This study also noted that 8/838 (10.0%) of women developed wound infections post-operatively but this could not be linked to CS done at any particular stage of labour, therefore, further investigation on CS done in the second is stage is required. This study could not establish if the poor outcome was due to delayed intervention in the second stage nor could it identify if assisted delivery, e.g. vacuum would have been possible.

This study recorded 28 neonatal deaths. This study could not further investigate the causes or reasons for neonatal deaths. Neonatal complications noted were short term admission to a neonatal unit, respiratory distress and meconium aspiration. This high number of neonatal deaths and complications is similar to the findings of the WHO global survey on maternal and perinatal health in Africa which found that emergency CS are often performed too late to reduce perinatal deaths; this was also associated with more fresh stillbirths, neonatal deaths and several neonatal morbidity (Shah et al, 2009). Further study is required to explore if maternal and perinatal outcomes can be associated with the poor intrapartum management of women.

## 5.9 Midwifery care

In reference to the Midwifery Model of Care (Rooks, 1999), identification of complications basically through observation is emphasised and therefore this finding provide a baseline for the need to improve practice and education of midwives. Even though the generalisation of these findings is limited to the women under study, this study revealed areas of labour management and decision making that need improvement. The poor management of women in the first stage of labour could also be linked to poor pain management and low or poor application of approaches to labour management such as mobility, companionship and hydration. The analysis of the active labour phase records indicated that out of 350 women,

only 110 were mobilised during the active phase of labour. Sixty-two had either fluid or energy management. There is a need for training midwives in the skills of applying approaches such as posture, ambulation, hydration and continuous support during labour which is believed to offers multiple benefits to the woman during labour (El-Hamamy and Arulkumaran, 2005).

Support during labour has benefits for both the mother and the baby. In this study only one woman had a companion during labour. Continuous support during labour is associated with spontaneous vaginal birth, fewer interventions during labour as well as short labours (Hodnett et al, 2012). As midwives focuses on the normalcy of the pregnancy, interventions are recommended when appropriate (Rooks, 1999). Continuous support of women during labour reduces the duration of labour and the number of CS, thus improving the outcome and birth experience of women (Kashanian, Javadi & Haghighi, 2010). In accordance with the Midwifery Model of Care, midwives use their own physical and emotional energy to encourage, support, and comfort women during birth. The provision of continuous support of women does not require special expertise, and it is therefore necessary to introduce support for women during labour. This could be a very important intervention in these two hospitals to assist in reducing CS rates in labour.

## 5.10 Limitations of the study

This study was a retrospective investigation by design and the validity of the findings are therefore limited to the population studied. Not all necessary information was found in the records, e.g. on the auscultation method used. The effectiveness of the retrospective clinical audit depends on the quality of the data source, but to ensure that enough data was gathered, delivery registers and theatre registers were also used when necessary.

Much of the documentation, especially CTG papers and consent forms for operations were not filed and some were missing but efforts were made to retrieve all the documents. The non-retrieval of 8% of the records was also a limitation even though it was unlikely to make a significant difference to the findings given that it is a small number.

The study only measured the institutional non-elective caesarean section rate in public hospitals due to the limited time and size of the study. This study only reviewed non-elective

CS and no normal vertex deliveries were reviewed; this limited the capacity to examine risk factors for CS in general. Indications for non-elective CS were obtained based on doctor's operative notes as in most of the records no reason for the operation was recorded prior to it being carried out. The data obtained does not allow for any judgment to be made on whether the non-elective CSs performed were necessary or not.

There was a limitation on the application of the Robson classification system because the total delivery data is not included and elective CSs were excluded. The classification is only used to determine the proportions of non-elective caesarean sections in each group. Since this classification was not used before in this study setting, it was not possible to compare the distribution into Robson's groups with previous findings so as to establish any possible trends.

Assessment of the management of labour was limited by reviewing documentation. Records do not always reflect what was or was not done in practice. This study only covered the 2 steps of the audit cycle; the remaining steps will be carried out in the dissemination process.

## 5.11 Strength of the study

The strength of this study is based on its design, analysis process and findings. The design made it possible to retrieve data and provide a snap shot of a population. This study was conducted in the Khomas region which is a most populous region in the country and hosts the capital city. The hospitals studied provide maternal care to patients at all levels of care i.e. primary, secondary and tertiary, therefore findings from this study is significant to reflect intrapartum care in Namibia.

## 5.12 Implications for Midwifery practice

It could be suggested from these results that substandard monitoring and management of women during labour might have influenced the decision to perform non-elective CS. There has been no previous study in this setting which has focused on the intrapartum management of women during labour. Without research on which to build guidelines, midwives are not able to render proper care to women during labour as evidence based practice. This study provides a baseline from which intervention strategies could be developed to improve

understanding in order to address the high number of non-elective caesarean sections and remedy the deficiencies noted in the management of labour.

Midwives need to have a greater understanding of the importance of interventions for low risk women such as mobilisation during labour, rehydration, as well as pain management to allow women to cope with labour pains.

Despite the challenges such as lack of availability of a health work force adequately trained in critical areas, midwives need clear guidance to support optimum practice and the improvement of their skills.

## 5.13 Recommendations

### 5.13.1 Recommendation for training and practice

Skills and knowledge of midwives and doctors regarding intrapartum assessment, monitoring and management need to be reviewed. Skills training would need to include CTG interpretation, external cephalic version and assisted delivery. There is also a need to look into the need for counselling of women with previous CS during ANC visits and labour, as well as improvements in decision making around VBAC and timing of CS in women with more than one CS.

The prospective implementation of the Robson classification can also help to address the current situation of multiple reasons/indications for non-elective CS. Ongoing daily or weekly delivery folder reviews to audit indications for CS in the two hospitals, together with a more standardised way of assessing indications, could help to assess whether the CSs were necessary or not. An implementation of audit review cycle is also recommended inclusive of training institutions.

### 5.13.2 Recommendation for research

A prospective study of this nature is e.g. the Robson classification, on a prospective basis is recommended to help identify factors associated with reasons for non-elective CS. Implementing the Robson classification prospectively will help to provide a broader overview of the overall CS rate and identify trends within each subcategory.

A detailed audit on intrapartum management is recommended. Inconsistency in the management of women during labour was noticed. A detailed audit is also required to investigate the high number of low risk nulliparous and multiparous women in spontaneous labour undergoing CS.

Even though the partogram was used, a detailed study is required regarding the correct use of partograms in terms of interpretation and decision making. A prospective study into this area would help provide a comprehensive overview of the management of the active phase of labour and allow for interventions where necessary.

### 5.13.3 Recommendation for policy

There is a need to examine the guidelines regarding pain management as well as approaches to labour management such as mobilisation and companions in labour for low risk women. Clear guidelines are required in the management of labour. There is also a need for policy to encourage clinical audit of intrapartum care as well as antenatal management.

## 5.14 Conclusion

This chapter discussed the results of the study. Poor progress of labour was found to be the leading reason for non-elective CS in this study. The analysis of the non-elective CS rate led to a number of observations which included the high proportion of non-elective CSs, a large number of different and multiple reasons/indications for non-elective CS, as well as a noticeably high number of primary CS. This study also noted a concerning amount of substandard intrapartum care which needs urgent intervention. Furthermore, limitations of this study, recommendations and implications for Midwifery practice were discussed in this chapter.

# Chapter 6: Conclusion

## 6.1 Introduction

In this chapter, the main findings with regards to the objectives and the research question are summarised. A general conclusion based on the findings of the study is presented. Furthermore, references to the relevant sections or parts of this thesis are made.

## 6.2 Conclusion on the study objectives

The objectives of this study focused on the determination of the overall as well as the non-elective CS rates during the specified study period, a description of non-elective CS according to the Robson classification, a description of the profile of women in the study, and a description of the antepartum factors and labour management of women who had non-elective CS. The objectives of this study were met by retrieving data retrospectively using the data collection tool (Appendix C) and presented in Chapter 3.

The CS rate was 23.9%, the non-elective CS rate was 17.2%, and the proportion of total CSs that were non-elective was 72.2%. The Robson classification was used as a framework for analysing non-elective CS. The analysis concluded that groups 1, 3, 5 and 10 made major contributions to the rates of non-elective CS. This led to a recommendation for regular ongoing daily or weekly delivery records audits of indications of CS in the two hospitals, together with more standardised ways of assessing indication. The implementation of the Robson classification can also help to address the current situation of multiple reasons/indications for non-elective CS as noted in Figure 2.

The delivery statistics showed that HIV infection was found in 20.4% of women. An overwhelming percentage of 75.8% of women had primary CS was also noted. This has implications for the future management of pregnancies. At least 96.3% of these women had attended ANC. A total of 429/838 non-elective CSs were done on admission while a further 357/838 was performed in the 1st stage of labour. This study could not, however, establish if these non-elective CSs were necessary or not, but a substandard management of women in all stages of labour was noted. It was not possible to link this substandard care to a noted high number of both maternal and neonatal complications. Little evidence on factors linked to the

Midwifery model of care was found and recommendations are made with regards to the assessment of the management of labour. There is also a need for a detailed study regarding the correct use of partograms and a detailed audit to investigate the high number of low risk nulliparous and multiparous women undergoing CS. The skills of midwives regarding intrapartum management also need to be reviewed.

It emerged from this study that problems with labour progress was the most common reason why women had non-elective CSs, followed by problems with fetal conditions and previous CSs. Clinical management factors for non-elective CS included factors such as:

- HIV infections
- Number of women with previous CS
- Unavailability of guidelines for management of women when the diagnosis of labour is uncertain
- Poor fetal assessment at all stages and phases of labour
- Poor progress of labour assessment of women in the first stage of labour
- Lack of maternal assessments / observations in the active phase of the first stage of labour
- Poor pain management and approaches to management of labour such as drug-free methods
- Lack of companions during the progress of labour.

Implications for Midwifery practice resulting from this study include the need for clear guidance to support optimum practice, for improving the training of midwives and for the assessment of their skills.

### 6.3 Dissemination of the study

The descriptive analysis allowed the researcher to identify points of significance such as CS rate, identification of groups and demographic data of women with high incidences of CS. As an ethical obligation and requirement for the audit cycle, the findings of this study will be disseminated to the Ministry of Health and Social Services and the hospitals investigated as well as to the training institutions within the country. This will serve as a motivation for the implementation of audits aimed at quality improvements. Given the current inadequate data on studies done in this setting, this study findings will be written up for a peer reviewed journal and also presented at related international or national conferences.

## 6.4 Concluding remarks

This minor dissertation presented the rates of CSs and non-elective CSs. This being the first study of this nature in these two hospitals, it opens up for a range of further investigations. Areas such as primary CS in low risk women, the intrapartum management of women, and multiple indications of CS as well as perinatal outcome need urgent attention. There is also a need for the improvement of Midwifery care. It can be concluded from the study that frequent audits of delivery records of indications of CS together with a standardised way of assessing indications of CS could help in assessing whether a CS was indeed necessary.

## References


1. Allen, V.M., O'Connell, C.M. & Baskett, T.F. 2005. Maternal and perinatal morbidity of caesarean delivery at full cervical dilatation compared with caesarean delivery in the first stage of labour. *British Journal of Obstetrics and Gynaecology*. 112(7): 986-990.
2. Anwar, S. 2013. Perinatal women's perceptions about Midwifery led model of care in secondary care hospitals in Karachi, Pakistan. *Midwifery.* 30(3): e79-e90
3. Betrán, A.P., Gulmezoglu, A.M., Robson, M., Merialdi, M., Souza, J.P., Wojdyla, D., Widmer, M., Carroli, G. et al. 2009. WHO global survey on maternal and perinatal health in Latin America: classifying caesarean sections. *Reproductive Health Journal.* 6(18).
4. Betrán, A.P., Merialdi, M., Lauer, J.A., Bing-Shun, W., Thomas, J., Van Look, P. & Wagner, M. 2007. Rates of caesarean section: Analysis of global, regional and national estimates. *Paediatric and perinatal epidemiology.* 21(2):98-113.
5. Bodkin, C., Klopper, H. & Langley, G. 2006. A comparison of HIV positive and negative pregnant women at a public sector hospital in South Africa. *Journal of Clinical Nursing.* 15(6):735-741.
6. Brown, H., Paranjothy, S., Dowswell, T. & Thomas, J. 2009. Package of care for active management in labour for reducing caesarean section rates in low-risk women. *Obstetrics and Gynaecology.* 1218-1220.
7. Buekens, P., Curtis, S. & Alayon, S. 2003. Demographic and Health Surveys: Caesarean section rates in sub-Saharan Africa. *British Medical Journal (Clinical Research Ed.)*. 326(7381):136.
8. Bugg, G.J., Siddiqui, F. & Thornton, J.G. 2011. Oxytocin versus no treatment or delayed treatment for slow progress in the first stage of spontaneous labour. *Cochrane Database Systematic Review*. 7.
9. Burns, N. & Grove, S.K. 2005. *The practice of nursing research, conduct, critique, & utilization.* 3rd ed. Philadelphia, WB Saunders Company: Elsevier.
10. Cavallaro, F.L., Cresswell, J.A., França, G.V., Victora, C.G., Barros, A.J. & Ronsmans, C. 2013. Trends in caesarean delivery by country and wealth quintile: Cross-sectional surveys in southern Asia and sub-Saharan Africa. *Bulletin of the World Health Organization.* 91(12):914-922D.

11. Cebekulu, L. & Buchmann, E. 2006. Complications associated with caesarean section in the second stage of labour. *International Journal of Gynaecology & Obstetrics.* 95(2):110-114.
12. Chong, C., Su, L.L. & Biswas, A. 2012. Changing trends of caesarean section births by the Robson Ten Group Classification in a tertiary teaching hospital. *Acta Obstetricia et Gynaecologica Scandinavica.* 91(12):1422-1427.
13. Clark, E.A. & Silver, R.M. 2011. Long-term maternal morbidity associated with repeat caesarean delivery. *American Journal of Obstetrics and Gynecology.* 205(6):S2-S10.
14. Dumont, A., De Bernis, L., Bouvier-olle, M. & Bréart, G. 2001. Caesarean section rate for maternal indication in sub-Saharan Africa: A systematic review. *The Lancet.* 358(9290):1328-1333.
15. El-Hamamy, E. & Arulkumaran, S. 2005. Poor progress of labour. *Current Obstetrics & Gynecology*. 15(1): 1-8.
16. Farrell, E & Pattinson, B. 2005. *Intrapartum care in South Africa. Review and Guidelines.* Medical Research Council. Pretoria, South Africa.
17. Fenton, P.M., Whitty, C.J. & Reynolds, F. 2003. Caesarean section in Malawi: prospective study of early maternal and perinatal mortality. *British Medical Journal (Clinical Research Ed.)*. 327(7415): 587. DOI:10.1136/bmj.327.7415.587.
18. Fraser, D & Cooper, M.A. 2009. *Myles textbook for midwives.* 15th ed. Edinburgh: Churchill Livingstone.
19. Fraser, D., Cooper, M.A. & Nolte, A.G.W. 2006. *Myles textbook for midwives*. African edition. Edinburgh: Churchill Livingstone.
20. Gibbons, L., Belizán, JM., Lauer, JA., Betrán, AP., Merialdi, M. & Althabe, F. 2010. The global numbers and costs of additionally needed and unnecessary caesarean sections performed per year: Overuse as a barrier to universal coverage. In *World Health Report 2010.* World Health Organization. Geneva.
21. Graham, W. 2009. Criterion-based clinical audit in obstetrics: Bridging the quality gap? *Best Practice & Research Clinical Obstetrics & Gynaecology.* 23(3):375-388.
22. Grivell, R.M., Alfirevic, Z., Gyte, G.M. & Devane, D. 2012. Antenatal cardiotocography for fetal assessment. *Cochrane Database Systematic Review.* 12.
23. Haerskjold, A., Hegaard, H. & Kjaergaard, H. 2012. Emergency caesarean section in low risk nulliparous women. *Journal of Obstetrics & Gynaecology*. 32(6):543-547.

24. Häger, R.M., Daltveit, A.K., Hofoss, D., Nilsen, S.T., Kolaas, T., Øian, P. & Henriksen, T. 2004. Complications of Cesarean deliveries: Rates and risk factors. *American Journal of Obstetrics and Gynecology.* 190(2):428-434.
25. Hatem, M., Sandall, J., Devane, D., Soltani, H. & Gates, S. 2009. Midwife-led versus other models of care for childbearing women (Review). *The Cochrane Collaboration.*
26. Hildingsson, I. & Thomas, J.E. 2007. Women's perspectives on maternity services in Sweden: processes, problems, and solutions. *Journal of Midwifery & Women's Health.* 52(2):126-133.
27. Hill, K., Thomas, K., AbouZahr, C., Walker, N., Say, L., Inoue, M. & Suzuki, E. 2007. Estimates of maternal mortality worldwide between 1990 and 2005: An assessment of available data. *The Lancet.* 370 (9595):1311-1319.
28. Hodnett, E.D., Gates, S., Hofmeyr, G.J., Sakala, C. & Weston, J. 2012. Continuous support for women during childbirth. *Cochrane Database of Systematic Reviews.* 10.
29. Hogan, M.C., Foreman, K.J., Naghavi, M., Ahn, S.Y., Wang, M., Makela, S.M., Lopez, A.D., Lozano, R. et al. 2010. Maternal mortality for 181 countries, 1980–2008: A systematic analysis of progress towards Millennium Development Goal 5. *The Lancet.* 375(9726):1609-1623.
30. Ivers, N., Jamtvedt, G., Flottorp, S., Young, J.M., Odgaard-Jensen, J., French, S.D., O'Brien, M.A., Johansen, M. et al. 2012. Audit and feedback: Effects on professional practice and healthcare outcomes. *Cochrane Database Systematic Reviews.* 6.
31. Kashanian, M., Javadi, F. & Haghighi, M.M. 2010. Effect of continuous support during labour on duration of labour and rate of caesarean delivery. *International Journal of Gynaecology & Obstetrics.* 109(3): 198-200.
32. Kelly, S., Sprague, A., Fell, D.B., Murphy, P., Aelicks, N., Guo, Y., Fahey, J., Lauzon, L. et al. 2013. Examining Caesarean section rates in Canada using the Robson Classification System. *Journal of Obstetrics and Gynaecology Canada.* 35 (3):206-214.
33. Khan, K.S., Wojdyla, D., Say, L., Gülmezoglu, A.M. & Van Look, P.F. 2006. WHO analysis of causes of maternal death: A systematic review. *The Lancet.* 367(9516):1066-1074.
34. Kolås, T., Hofoss, D., Daltveit, A.K., Nilsen, S.T., Henriksen, T., Häger, R., Ingemarsson, I. & Øian, P. 2003. Indications for cesarean deliveries in Norway. *American Journal of Obstetrics and Gynecology.* 188(4):864-870.

35. Koopmans, C.M., Bijlenga, D., Groen, H., Vijgen, S., Aarnoudse, J.G., Bekedam, D.J., van den Berg, Paul P, de Boer, K. et al. 2009. Induction of labour versus expectant monitoring for gestational hypertension or mild pre-eclampsia after 36 weeks' gestation (HYPITAT): A multicentre, open-label randomised controlled trial. *The Lancet.* 374(9694): 979-988
36. Landon, M.B., Leindecker, S., Spong, C.Y., Hauth, J.C., Bloom, S., Varner, M.W., Moawad, A.H., Caritis, S.N. et al. 2005. The MFMU Caesarean Registry: Factors affecting the success of trial of labour after previous caesarean delivery. *American Journal of Obstetrics and Gynecology*. 193(3): 1016-1023.
37. Lauer, J.A., Betrán, A.P., Merialdi, M. & Wojdyla, D. 2010. Determinants of caesarean section rates in developed countries: supply, demand and opportunities for control. *World Health Report (2010) Background Paper.* 29.
38. Litorp, H., Kidanto, H.L., Nystrom , L., Darj, E. & Essén, B. 2013. Increasing caesarean section rates among low-risk groups: A panel study classifying deliveries according to Robson at a university hospital in Tanzania. *BMC Pregnancy and Childbirth.* 13(1):107.
39. LoBiondo-Wood, G & Haber, J. 2002. *Nursing Research. Methods, Critical Appraisal, and Utilization.* St Louis: Mosby.
40. Lurie, S. 2005. The changing motives of caesarean section: From the ancient world to the twenty-first century. *Archives of Gynecology and Obstetrics.* 271(4): 281-285.
41. Lynn, M. R. 1986. Determination and quantification of content validity. *Nursing Research.* 35(6), 382-385.
42. Martel, M.J., MacKinnon, C.J. & Clinical Practice Obstetrics Committee, Society of Obstetricians and Gynaecologists of Canada. 2005. Guidelines for vaginal birth after previous Caesarean birth. *Journal of Obstetrics and Gynaecology Canada.* 27(2): 164-188.
43. McCarthy, F.P., Rigg, L., Cady, L. & Cullinane, F. 2007. A new way of looking at Caesarean section births. *Australian and New Zealand Journal of Obstetrics and Gynaecology.* 47(4):316-320.
44. Ministry of Health and Social Services. 2009. *Guidelines on Essential and Emergency Obstetric Care.* Windhoek. Ministry of Health and Social Services
45. Ministry of Health and Social Services. 2008. *Namibia: Demographic Health Survey 2006-2007.* Windhoek. Ministry of Health and Social Services

46. Namibia Statistics Agency. 2012. 2011 Population and Housing Census Regional Profile, Khomas Region. http://www.nsa.org.na/files/downloads/490_Khomas%20Region%20.pdf [2014, November 28]
47. National Institute for Health and Clinical Excellence. 2008. Induction of labour clinical guidance 70. www.nice.org.uk/nicemedia.pdf/PCNICEGuidance.pdf [2013, March 15]
48. National Institute for Health and Clinical Excellence. 2007. *Intrapartum care of healthy women and their babies during birth: clinical guidance 55.* www.nice.org.uk/nicemedia.pdf/PCNICEGuidance.pdf [2013, March 15].
49. National Institute for Clinical Excellence. 2002. *Principles for best practice in clinical audit*. Abingdon: Radcliffe Medical Press. www.nice.org.uk/media/796/23/BestPracticeClinicalAudit.pdf [2013, June 1].
50. National Institute for Health and Clinical Excellence. 2001. *The use of electronic fetal monitoring. Clinical Guidance.* www.nice.org.uk/nicemedia.pdf/PCNICEGuidance.pdf [2013, March 15].
51. Nyamtema, A., Urassa, D., Massawe, S., Massawe, A., Lindmark, G. & Van Roosmalen, J. 2008. Partogram use in the Dar es Salaam perinatal care study. *International Journal of Gynecology & Obstetrics.* 100(1):37-40.
52. Parahoo, K. 1997. *Nursing research: principles, process and issues*. Basingstoke, Palgrave: Macmillan.
53. Pattinson, B. 2012. Reducing maternal deaths. *South African Journal of Obstetrics and Gynaecology.* 18(2):30-31.
54. Pattinson, R., Kerber, K., Waiswa, P., Day, L.T., Mussell, F., Asiruddin, S., Blencowe, H. & Lawn, J.E. 2009. Perinatal mortality audit: Counting, accountability, and overcoming challenges in scaling up in low-and middle-income countries. *International Journal of Gynecology & Obstetrics.* 107:S113-S122.
55. Paxton, A., Maine, D. & Hijab, N. 2003. Using the UN process indicators of emergency obstetric services. *AMDD workbook.*
56. Penna, L. & Arulkumaran, S. 2003. Caesarean section for non-medical reasons. *International Journal of Gynecology & Obstetrics.* 82(3):399-409.
57. Polit, D.F. & Beck, C.T. 2012. *Nursing Research. Generating and assessing evidence for nursing practice.* 9th Ed. Philadelphia: Lippincott Williams & Wilkins.

58. Raees, M., Yasmeen, S., Jabeen, S., Utman, N. & Karim, R. 2012. Maternal morbidity associated with emergency versus elective caesarean section. *Journal of Postgraduate Medical Institute (Peshawar-Pakistan).* 27(1).
59. Robson, M.S. 2001. Classification of caesarean sections. *Fetal and Maternal Medicine Review,* 12:23-39 DOI: 10.1017/S0965539501000122.
60. Rooks, J. P. 1999. The Midwifery Model of Care. *Journal of Nurse-Midwifery.* 44: 370–374. DOI: 10.1016/S0091-2182(99)00060-9.
61. Ronsmans, C. 2000. *What is the evidence for the role of audits to improve the quality of obstetric care?* Health Services Organisation and Policy No. 17:207 – 228
62. Ronsmans, C., Campbell, O.M.R., McDermott, J. & Koblinsky, M. 2002. Questioning the indicators of need for obstetric care. *Bulletin of the World Health Organization*. 80(4): 317-324.
63. Ronsmans, C., Holtz, S. & Stanton, C. 2006. Socioeconomic differentials in caesarean rates in developing countries: A retrospective analysis. *The Lancet.* 368(9546):1516-1523.
64. Singh, R. & Nath Trivedi, A. 2011. Is the caesarean section rate a performance indicator of an obstetric unit? *Journal of Maternal-Fetal and Neonatal Medicine.* 24(2):204-207.
65. Shah, A., Fawole, B., M'Imunya, J.M., Amokrane, F., Nafiou, I., Wolomby, J., Mugerwa, K., Neves, I. et al. 2009. Cesarean delivery outcomes from WHO global survey on maternal and perinatal health in Africa. *International Journal of Gynaecology & Obstetrics*. 107(3):191-197.
66. Souza, J.P., Gülmezoglu, A., Lumbiganon, P., Laopaiboon, M., Carroli, G., Fawole, B. & Ruyan, P. 2010. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: The 2004-2008 WHO Global Survey on Maternal and Perinatal Health. *BMC Medicine.* 8(1):71.
67. Stanton, C.K. & Holtz, S.A. 2006. Levels and trends in caesarean birth in the developing world. *Studies in Family Planning.* 37(1): 41-48.
68. Stanton, C. & Ronsmans, C. 2008. Recommendations for routine reporting on indications for caesarean delivery in developing countries. *Birth.* 35(3): 204-211.
69. Stjernholm, Y.V., Petersson, K. & Eneroth, E. 2010. Changed indications for caesarean sections. *Acta Obstetricia et Gynaecologica Scandinavica.* 89(1):49-53.

70. Thacker, S., Stroup, D. & Chang, M. 2006. Continuous electronic heart rate monitoring for fetal assessment during labour. *Cochrane Database of Systematic Reviews.* Issue 3. CD000063. DOI: 10.1002/14651858.CD000063.pub2.
71. Todman, D. 2007. A history of caesarean section: from ancient world to the modern era. *Australian and New Zealand Journal of Obstetrics and Gynaecology.* 47(5): 357-361.
72. United Nations. 2000. United Nations Millennium Declaration. Resolution adapted by the General Assembly, 55th Session of the United Nations General Assembly, New York. http://www.un.org/millennium/declaration/ares552e.pdf [2013, December 18].
73. United Nations Country Team. 2013. United Nations Partnership Framework – Namibia (2014-2018): A partnership for growth, job creation and equity. http://www.na.undp.org/content/dam/namibia/docs/legalframework/undp_na_UNPAF_26%20July%202013.pdf [2014, July 4].
74. Van Dillen, J., Meguid, T., Petrova, V. & van Roosmalen, J. 2007. Caesarean section in a semi-rural hospital in Northern Namibia. *BMC Pregnancy and Childbirth.* 7(1):2.
75. Villar, J., Carroli, G., Zavaleta, N., Donner, A., Wojdyla, D., Faundes, A., Velazco, A., Bataglia, V. et al. 2007. Maternal and neonatal individual risks and benefits associated with caesarean delivery: Multicentre prospective study. *British Medical Journal.* 335(7628):1025.
76. Villar, J., Valladares, E., Wojdyla, D., Zavaleta, N., Carroli, G., Velazco, A., Shah, A., Campodónico, L. et al. 2006. Caesarean delivery rates and pregnancy outcomes: The 2005 WHO global survey on maternal and perinatal health in Latin America. *The Lancet.* 367(9525): 1819-1829.
77. Wagaarachchi, P., Graham, W., Penney, G., McCaw-Binns, A., Yeboah Antwi, K. & Hall, M. 2001. Holding up a mirror: Changing obstetric practice through criterion-based clinical audit in developing countries. *International Journal of Gynecology & Obstetrics.* 74(2):119-130.
78. World Health Statistics 2012. Part III. Global Health Indicators http://www.who.int/gho/publications/worldhealthstatistics/2012/en/ [2013, January 30].
79. World Health Organization. 2009. *Maternal and Child Health in Namibia.* 2nd Edition. www.who.int/.../maternal/mch_namibia.pdf [2013, January 30].

80. World Health Organization. 2003. *Essential antenatal, perinatal and postpartum care.* Regional office for Europe. Copenhagen. www.euro.who.int/document/e79235.pdf [2013, February 8].
81. World Health Organization. 2006. *Country Health System Fact Sheet. Namibia.* http://www.afro.who.int/pt/downloads/doc_download/1286-namibia-country-health-system-fact-sheet-2006.html [2013, January 28]
82. World Atlas maps. n.d. Namibia [online map]. Available: https://www.google.com/search?q=world+atlas+map+namibia [2014, August 15].
83. World Medical Association. 2013 *World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research involving Human Subjects.* World Medical Association. Fortaleza.
84. Zander, L. & Chamberlain, G. 1999. ABC of labour care: Place of birth. *British Medical Journal.* 318(7185):721.
85. Zere, E., Tumusiime, P., Walker, O., Kirigia, J., Mwikisa, C. & Mbeeli, T. 2010. Research Inequities in utilization of maternal health interventions in Namibia: Implications for progress towards MDG 5 targets. *International Journal for Equity in Health.* 9:16

# Appendices

## Appendix A: The Six UN Process Indicators of Emergency Obstetric Services (EmOC) and Recommended Levels

| UN Process Indicator | Definition | Recommended level |
|---|---|---|
| **1. Amount of EmOC services available** | Number of facilities that provide EmOC | Minimum: 1 Comprehensive EmOC facility for every 500,000 people<br><br>Minimum: 4 Basic EmOC facilities per 500,000 people |
| **2. Geographical distribution of EmOC facilities** | Facilities providing EmOC well-distributed at subnational level | Minimum: 100% of subnational areas have the minimum acceptable numbers of basic and comprehensive EmOC facilities |
| **3. Proportion of all births in EmOC facilities** | Proportion of all births in the population that take place in EmOC facilities | Minimum: 15% |
| **4. Met need for EmOC services** | Proportion of women with obstetric complications treated in EmOC facilities | At least 100%<br>[Estimated as 15% of expected births] |
| **5. Caesarean sections as a percentage of all births** | Caesarean deliveries as a proportion of all births in the population | Minimum 5%<br>Maximum 15% |
| **6. Case fatality rate** | Proportion of women with obstetric complications admitted to a facility who die | Maximum 1% |

## Appendix B: Robson classification

### The ten groups of women (Robson 2001)

1. Nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation in spontaneous labour
2. Nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation who either had labour induced or were delivered by caesarean section before labour
3. Multiparous women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal 37 weeks in spontaneous labour
4. Multiparous women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal to 37 weeks gestation who either had labour induced or were delivered by caesarean section
5. All multiparous women, with at least one previous uterine scar and a single cephalic pregnancy at greater than or equal to 37 weeks gestation
6. All nulliparous women with a single breech pregnancy
7. All multiparous women with a single breech pregnancy including, women with previous uterine scars
8. All women with multiple pregnancies, including women with previous uterine scars
9. All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars
10. All women with a single cephalic pregnancy at less than or equal to 36 weeks gestation, including women with previous scars

## Appendix C: Data collection sheet

**SUBJECT CODE**

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |

**PART I: CLASSIFICATION OF CAESAREAN SECTION**

1. Robson classification[1]

| |
|---|
| |

**PART II: PROFILE OF THE RECORD**

2. Indication for caesarean section

| | |
|---|---|
| 1. Malposition[2] | |
| 2. Malpresentation[3] | |
| 3. Cephalopelvic disproportion | |
| 4. Fetal abnormality | |
| 5. Cord prolapse | |
| 6. Fetal distress | |
| 7. Failure to progress in first stage | |
| 8. Prolonged second stage | |
| 9. Failed trial of scar | |
| 10. Failed induction of labour | |
| 11. Eclampsia | |
| 12. Pregnancy induced hypertension | |
| 13. Pre-existing medical conditions | |
| 14. Previous caesarean section | |
| 15. Multiple pregnancy | |
| 16. Not noted[4] | |
| 17. Others | |

If others state…….

3. Is the patient from within the region or been referred form other regions?

| | |
|---|---|
| 1. Local | |
| 2. Referral | |

4. Age in years

| |
|---|
| |

5. Gestation in weeks at delivery

| |
|---|
| |

6. Parity before delivery

| | |
|---|---|
| 1. Para 0 | |
| 2. Para 1-4 | |
| 3. Para >4 | |

7. Pregnancy

| | |
|---|---|
| 1. Singleton | |
| 2. Multiple pregnancy | |

8. Antenatal care attended

| | |
|---|---|
| 1. Yes | |
| 2. No | |

9. HIV status

| | |
|---|---|
| 1. Positive | |
| 2. Negative | |
| 3. Unknown | |

10. Caesarean section

| | |
|---|---|
| 1. First | |
| 2. Repeat | |

**PART III: ADMISSION**

11. Comprehensive admission assessment

| | Yes | No | Not noted | Not applicable |
|---|---|---|---|---|
| a) Abdominal palpation done on admission? | | | | |
| b) Fetal heart rate done on admission? | | | | |
| c) Blood pressure done on admission? | | | | |
| d) Pulse rate done on admission? | | | | |
| e) Respiration rate done on admission? | | | | |
| f) Temperature done on admission? | | | | |
| g) Urine test done on admission? | | | | |
| h) Assessment of contractions? | | | | |
| i) Vaginal examination[5] done on admission | | | | |

12. Method used for monitoring fetal heart rate on admission

| | |
|---|---|
| 1. CTG | |
| 2. Doptone | |
| 3. Fetoscope | |
| 4. Not noted [4] | |

13. If CTG[6] was used on admission what was the findings?

| | |
|---|---|
| 1. Normal[7] | |
| 2. Suspicious[8] | |
| 3. Pathological[9] | |
| 4. Not noted[4] | |

14. Fetal presentation on admission

| | |
|---|---|
| 1. Vertex | |
| 2. Face | |
| 3. Breech | |
| 4. Shoulder | |
| 5. Brow | |
| 6. Chin | |
| 7. Cord | |
| 8. Other | |
| 9. Not noted[4] | |

If other state…….

15. If presentation was breech, was external cephalic version attempted?

| | |
|---|---|
| 1. Attempted | |
| 2. Not attempted | |
| 3. Contraindicated | |
| 4. Not noted[4] | |

16. Reason for admission

| | |
|---|---|
| 1. Uncertain[10] | |
| 2. Induction of labour[11] | |
| 3. Latent phase[12] | |
| 4. Active phase[13] | |
| 5. Other[14] | |

If other state …….

**If reason for admission was uncertain or other, continue with variable 17**

**If reason for admission was for induction of labour go to variable 20**

**If reason for admission was latent phase go to variable 27**

**If reason for admission was active phase go to variable 35**

**PART IV: MANAGEMENT OF UNCERTAIN LABOUR**

17. Were clinical observations done as required?

| | Yes | No | Not noted |
|---|---|---|---|
| a) Abdominal palpation repeated after 4 hours? | | | |
| b) The fetal heart rate repeated after 2 hours? | | | |
| c) Blood pressure repeated after 4 hours? | | | |
| d) Pulse repeated after 4 hours? | | | |
| e) Respiration repeated after 4 hours? | | | |
| f) The temperature repeated after 4 hours? | | | |
| g) Urine test repeated after 4 hours? | | | |
| h) Assessment of contractions repeated after 4 hours? | | | |
| i) Vaginal examination[5] repeated after 4 hours? | | | |

18. Diagnose after 4 hours

| | |
|---|---|
| 1. Latent phase [12] | |
| 2. Active phase[13] | |
| 3. Not in labour | |
| 4. Not noted [4] | |

19. Clinical management decision

| | |
|---|---|
| 1. Caesarean section | |
| 2. Induction of labour[11] | |
| 3. Continue labour observations | |
| 4. Not noted [4] | |

**If clinical management decision was induction of labour continue with variable 20**

**If diagnosis was latent phase go to variable 27**

**If the diagnosis was active phase go to variable 35**

**PART V: MANAGEMENT OF INDUCTION OF LABOUR**

20. Indication for induction of labour

| | |
|---|---|
| 1. Pregnancy induced hypertension | |
| 2. Intrauterine death | |
| 3. Post dates | |
| 4. Premature ruptured membranes | |
| 5. Intrauterine growth retardation | |
| 6. Other indications | |
| 7. Not noted[4] | |

If other indications state ……

21. Method used for induction of labour[11] (possible more than one option)

| | |
|---|---|
| 1. Sweeping of amniotic membranes | |
| 2. Amniotomy | |
| 3. Oxytocin | |
| 4. Prostaglandins | |
| 5. Catheter | |
| 6. Not noted[4] | |

22. Method used for monitoring fetal heart rate before induction

| | |
|---|---|
| 1. CTG | |
| 2. Doptone | |
| 3. Fetoscope | |
| 4. Not noted [4] | |

23. If CTG[6] was done before induction what was the finding

| | |
|---|---|
| 1. Normal [7] | |
| 2. Suspicious [8] | |
| 3. Pathological [9] | |
| 4. Not noted [4] | |

24. Did labour start after one cycle[15] of induction of labour

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted [4] | |

25. If labour did not start after one cycle of induction, what was the decision?

| | |
|---|---|
| 1. Further attempt | |
| 2. Caesarean section | |
| 3. Others | |
| 4. Not noted[4] | |

If others state ……..

26. If labour started after one cycle, was the diagnosis

| | |
|---|---|
| 1. Latent phase[12] | |
| 2. Active phase[13] | |
| 3. Not noted[4] | |

**If diagnosis was latent phase continue with variable 27**

**If diagnosis was active phase go to variable 35**

**PART VI: MANAGEMENT OF THE LATENT PHASE OF LABOUR**

27. Were clinical observations done as required?

| | **Yes** | **No** | **Not noted** |
|---|---|---|---|
| a) Contractions monitored 4 hourly? | | | |
| b) Fetal heart rate measured 2 hourly? | | | |
| c) Blood pressure done 4 hourly? | | | |
| d) Pulse rate done 4 hourly? | | | |
| e) Respiration rate done 4 hourly? | | | |
| f) Temperature done 4 hourly? | | | |
| g) Urine test done at least 4 hourly? | | | |
| h) Was vaginal examination[5] done at least 4 hourly? | | | |
| i) Was any diagnosis made after 8 hours? | | | |

28. Method used for monitoring fetal heart rate in latent phase of labour.

| | |
|---|---|
| 1. CTG | |
| 2. Doptone | |
| 3. Fetoscope | |
| 4. Not noted [4] | |

29. If CTG was used, what was the finding?

| | |
|---|---|
| 1. Normal [7] | |
| 2. Suspicious[8] | |
| 3. Pathological [9] | |
| 4. Not noted[3] | |

30. If CTG was suspicious, was CTG repeated?

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted | |

31. If CTG was pathological, was delivery expedited?

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted[3] | |

32 Was the partogram[16] used in the latent phase?

| | |
|---|---|
| 1. Yes | |
| 2. No | |

33. If diagnosis was made after 8 hours, what was the diagnosis?

| | |
|---|---|
| 1. Prolonged latent phase | |
| 2. Active phase [13] | |
| 3. Not noted[4] | |

34. What clinical decision was made if diagnosis was prolonged latent phase?

| | |
|---|---|
| 1. Caesarean section | |
| 2. Induction/augmentation of labour | |
| 3. Continue labour observations | |
| 4. Not noted [4] | |

**PART VII: MANAGEMENT OF ACTIVE LABOUR**

35. Were clinical observations done as required?

| | Yes | No | Not noted |
|---|---|---|---|
| a) Contractions assessed ½ hourly? | | | |
| b) Fetal heart rate done ½ hourly? | | | |
| c) Blood pressure done hourly? | | | |
| d) Pulse rate done hourly? | | | |
| e) Respiration rate done hourly? | | | |
| f) Temperature done 4 hourly? | | | |
| g) Urine test done when patient passed urine? | | | |
| h) Were vaginal examinations[5] done 2 hourly? | | | |

36. Method used for monitoring fetal heart rate in active phase of labour.

| | |
|---|---|
| 1. CTG | |
| 2. Doptone | |
| 3. Fetoscope | |
| 4. Not noted [4] | |

37. If CTG was used, what was the finding?

| | |
|---|---|
| 1. Normal [7] | |
| 2. Suspicious[8] | |
| 3. Pathological [9] | |

38. If CTG was suspicious, was the CTG repeated?

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted | |

39. If CTG was pathological, was delivery expedited?

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted[4] | |

40. Was partogram[16] used in the active phase of labour?

| | |
|---|---|
| 1. Yes | |
| 2. No | |

41. If the partogram was used, was any of the following observed?

| | **Yes** | **No** | **Not noted** |
|---|---|---|---|
| 1. Did the cervical dilatation recording cross the alert line? | | | |
| 2. Inefficient contractions[17]? | | | |
| 3. Did the cervical dilatation recording cross the action line? | | | |
| 4. Any abnormal vaginal examination finding (caput, moulding or meconium stained liquor? | | | |

42. Clinical management decision regarding abnormal observation

| | |
|---|---|
| 1. Caesarean section | |
| 2. Continue with normal labour | |
| 3. Augmentation of labour | |
| 4. Not noted [4] | |

43. If normal labour continued until full dilatation of the cervix, and contractions were efficient[17], was assisted delivery attempted?

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted[4] | |

If yes state with what ……..

44. If no assisted delivery was attempted, were there any explanatory notes?

| | |
|---|---|
| 1. Presentation level high | |
| 2. Excessive moulding | |
| 3. Caput | |
| 4. No qualified personnel | |
| 5. No instruments | |
| 6. Not noted[4] | |

45. If contractions were inefficient[18] was labour augmented[19]?

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted[4] | |

46. If labour was not augmented, what was the reason?

| | |
|---|---|
| 1. Previous caesarean section | |
| 2. Grand multi-parity | |
| 3. Abnormal fetal heart | |
| 4. Other | |
| 5. Not noted[4] | |

If other please note……..

47. Was pain managed[20] by midwifes during the active phase of labour?

| | |
|---|---|
| 1. Yes | |
| 2. No | |
| 3. Not noted[4] | |

48. If yes, with what?

| | |
|---|---|
| 1. Pain relief strategies[21] | |
| 2. Intravenous and or intramuscular opioids | |
| 3. Not noted[4] | |

49. Did the labour record indicate any evidence of any of these approaches to labour management?

| | Yes | No |
|---|---|---|
| 1. Patient informed about decision | | |
| 2. Mobility during labour | | |
| 3. Upright posture | | |
| 4. Fluid management/appropriate hydration | | |
| 5. Energy management | | |
| 6. Companion during labour | | |

**PART VIII: MATERNAL OUTCOME**

50. Maternal complication after caesarean section.

| | |
|---|---|
| 1. None | |
| 2. Post-partum haemorrhage | |
| 3. Ruptured uterus | |
| 4. Death | |
| 5. Infection | |
| 6. Other | |

If other state …….

**PART IX: NEONATAL OUTCOME**

51. Birth weight

| |
|---|
| |

52. Apgar score after 1 minute

| |
|---|
| |

53. Apgar score after 5 minutes

| |
|---|
| |

54. Neonatal complication

| | |
|---|---|
| 1. None | |
| 2. Respiratory distress syndrome | |
| 3. Death | |
| 4. Admitted to neonatal unit | |
| 5. Other | |

If other state ……

## Appendix D: Explanatory notes used alongside the data collection sheet

The following explanatory notes were set out to guide the researcher during data collection. The superscript is for cross references e.g. a [1] will indicate explanatory point one and so on.

1. The Robson classification will be used to describe the profile of the indications for non-elective caesarean sections according to the classifications on Appendix A (variable 1)
2. Malposition includes the vertex presenting in a position other than occipito anterior (variable 2).
3. Malpresentation means that some other part of the foetus, such as buttocks, shoulder, or face is presenting at or near the pelvic inlet (Jean Martin 2002) (variable 2).
4. 'Not noted' will be given as an answer to the question where the information regarding the variable is missing (variable 2, 13, 14, 17 - 26, 31, 33-36, 40, 42– 48).
5. Gravidity and parity will be noted inclusive of the outcome of the record under study i.e. gravidity at delivery and parity after delivery (variable 6 and 7).
6. NICE clinical guideline C, 2001 (Appendix C) will be used to assess the Cardiotocograph (CTG) (variable 14, 23, and 36). The CTG to be assessed is the admission CTG, after the diagnosis was made and a CTG done with the new diagnosis or clinical management. A maximum of 4 CTGs will be assessed from a record of a woman admitted in uncertain labour, was induced, proceeded to latent phase and up to active phase before caesarean section was done i.e. the admission CTG, CTG done during induction of labour, CTG done on latent phase and the CTG done on active phase.
7. Normal CTG refers to a FHR trace in which all four features are classified as reassuring (NICE Clinical guidelines 55, 2007) (variable 14, 23, 29 and 38).
8. Suspicious CTG is a FHR trace with one feature classified as non-reassuring and the remaining features classified as reassuring (NICE Clinical guidelines 55, 2007) (variable 14, 23, 29 and 38).
9. Pathological CTG is a FHR trace with two or more features classified as non-reassuring or one or more classified as abnormal (NICE Clinical guidelines 55, 2007) (variable 14, 23, 29 and 38).
10. Labour is uncertain when there is no evidence of latent phase (see 12 below). No partogram is expected to be used when diagnosis was uncertain labour (variable 15).
11. Induction of labour is 'the process of artificially stimulating the uterus to start labour' (WHO, 2011) (variable 15, 18 and 22).

12. The definition of labour is regular contractions and one of the following: cervical changes, "show", rupture of membranes (Farrell & Pattinson, 2006). Latent phase of labour is the time between the onset of labour and 3 – 4 cm dilatation (Holmes & Baker 2006). All records that reflect that the patient was admitted with contractions and the vaginal examination showed the cervical dilatation of below 4 cm will be regarded as latent phase. Different sets of questions are set out due to the differences in frequencies of observations (variable 15, 17 and 26).

13. Active phase of labour is the time between the ends of the latent phase of labour to fully dilatation (Holmes & Baker 2006). All records that shows that the decision for caesarean section was made after the cervix dilatation was 4 cm and above will be assessed in this part. Specific questions are set to assess the patterns of observations due to the differences in the patterns of observations (variable 15, 17, 26 and 34). The documentation of the progress of labour is expected to be by the use of the partogram in active phase of labour.
14. Other labour status will present all the records which show that on admission there was no indication that the patient was in labour but due to other observed facts the patient was admitted. (variable 15)
15. One cycle of induction is applicable where Prostaglandins as a method for induction of labour was used i.e. a maximum of 2 doses of Prostaglandins (NICE Clinical guideline 70, 2008) (variable 24-26).
16. It is expected that observations for women in established labour i.e. latent phase throughout the process of labour, be plotted on the patogram but not when diagnosis of labour is uncertain or induction of labour (variable32 and 41).
17. Inadequate quality recording is when either the CTG shows that there was a poor contact from external transducer or the foetal scalp electrode is not working or detached (NICE Clinical guideline C, 2001) (variable 30 and 39). This finding is relates to fetal heart tracing.
18. Inefficient contraction is when the contractions are less than 3 in ten minutes each lasting less than 40 seconds while efficient contraction is when a woman experiences at least 3 contractions each lasting for more than 40 seconds (WHO 2011) (variable 44 and 46).
19. Augmentation of labour (variable 46) is an artificial method used to strengthen contractions which have started spontaneously.

20. Pain management is the use of pain relief options during labour (variable 47).
21. Pain relief strategies will be applicable to the records that reflected a woman had either used breathing techniques or massage to relieve the pain (variable 48) (NICE Clinical guidelines 55, 2007).

## Appendix E: National Institute of Clinical Excellence CTG classification

| Cardiotograph (CTG) Classification | | | | |
|---|---|---|---|---|
| **Normal** | A CTG where all four features fall into the category | | | |
| **Suspicious** | A CTG whose features fall into one of the non-reasuring categories and remainder of the feature are reassuring | | | |
| **Pathological** | A CTG whose features fall into two or more non-reasuring categories and remainder of the feature are reassuring | | | |
| | | | | |
| Fetal heart-rate feature classificaiton | | | | |
| | | | | |
| | Baseline (bpm) | Variability (bpm) | Decelearations | Acceleration |
| | | | | |
| Reassuring | 110-160 | ≥5 | None | Present |
| Non-reassuring | 100-109, 161-180 | <5 for ≥ 40 but <90 | Early deceleration | **The absence of** |
| | | | Variable decelerations | **accelerations with an** |
| | | | Single prolonged decelerarion up to 3 minutes | **otherwise normal** |
| Abnormal | <110 >180 | <5 for ≥90 minutes | Atypical variable decelerations | **CTG is of an** |
| | Sinusoidal patterns | | Late decelerations | **uncertain** |
| | for ≥10 minutes | | Single prolonged deceleration >3 minutes | **significane** |
| | | | | |

## Appendix F: Approval letter from the University of Cape Town

HREC Ref no 380/2013 – 15Jul2013

UNIVERSITY OF CAPE TOWN

**Faculty of Health Sciences**
**Human Research Ethics Committee**
**Room E52-24 Groote Schuur Hospital Old Main Building**
**Observatory 7925**
**Telephone** [021] 406 6338 • **Facsimile** [021] 406 6411
**e-mail:** shuretta.thomas@uct.ac.za
**Website:** www.health.uct.ac.za/research/humanethics/forms

15 July 2013

**HREC REF: 380/2013**

**Ms H Shikwambi**
**c/o A/Prof S Clow**
Nursing & Midwifery
Health & Rehab
OMB, F-Floor

Dear Ms Shikwambi

**PROJECT TITLE: NON-ELECTIVE CAESAREAN SECTIONS IN THE KHOMAS REGION, NAMIBIA: IMPLICATIONS FOR MIDWIFERY PRACTICE**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year till the 30th July 2014**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/research/humanethics/forms)

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

**Please quote the HREC. REF in all your correspondence.**

Yours sincerely

**PROFESSOR M BLOCKMAN**
**CHAIRPERSON, FHS HUMAN ETHICS**
Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938
This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP) and Declaration of Helsinki guidelines.

s.thomas

## Appendix G: Approval letter from the Ministry of Health and Social Services

9-0/0001

REPUBLIC OF NAMIBIA

*Ministry of Health and Social Services*


| | | |
|---|---|---|
| **Private Bag 13198** | **Ministerial Building** | **Tel: (061) 2032510** |
| **Windhoek** | **Harvey Street** | **Fax: (061) 222558** |
| **Namibia** | **Windhoek** | **E-mail:** eshaama@mhss.gov.na |
| **Enquiries:** Ms. E.N Shaama | **Ref:** 17/3/3 | **Date:** 19 July 2013 |


**OFFICE OF THE PERMANENT SECRETARY**

**Ms. Hilma I.T. Shikwambi**
**P.O. Box 4698**
**Windhoek**
**Namibia**

Dear Ms. Shikwambi

***Re: Non-elective caesarean sections in the Khomas region, Namibia: Implications for the midwifery practice***

1. Reference is made to your application to conduct the above-mentioned study.

2. The proposal has been evaluated and found to have merit.

**3. Kindly be informed that permission to conduct the study has been granted under the following conditions:**

3.1 The data to be collected must only be used for completion of your MSc (Nursing) Degree;
3.2 No other data should be collected other than the data stated in the proposal;
3.3 A quarterly report to be submitted to the Ministry's Research Unit;
3.4 Preliminary findings to be submitted upon completion of study;
3.5 Final report to be submitted upon completion of the study;
3.6 Separate permission should be sought from the Ministry for the publication of the findings.

Yours sincerely,

PERMANENT SECRETARY

**MR. ANDREW NDISHISHI**
**PERMANENT SECRETARY**

*" Health for All "*

[i] This is how the data was extracted from the records, not a reflection of failure on the part of the woman