TRIAL OF LABOUR OR ELECTIVE REPEAT CAESAREAN SECTION IN WOMEN WHO HAVE HAD ONE PREVIOUS CAESAREAN SECTION:

AN ASSESSMENT OF WOMEN'S ATTITUDES, KNOWLEDGE AND PREFERENCES

By

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LIST OF ABBREVIATIONS

ACOG	American College of Obstetricians and Gynaecologists
AJOG	American Journal of Obstetrics and Gynaecology
CS	Caesarean Section
CTG	Cardiotocograph
CD	Caesarean Delivery
ERCS	Elective Repeat Caesarean Section
HCW	Health Care Worker
HREC	Human Research Ethics Committee
MCR	Maternity Case Record
MMH	Mowbray Maternity Hospital
MOU	Midwife Obstetric Unit
NSH	New Somerset Hospital
NICE	National Institute for Health and Care Excellence
RCT	Randomised Controlled Trial
RCOG	Royal College of Obstetricians and Gynaecologists
SA	South Africa
TOL	Trial of Labour
TOLAC	Trial of Labour after Caesarean Section
UK	United Kingdom
US	United States
VBAC	Vaginal Birth after Caesarean Section
WHO	World Health Organisation

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ABSTRACT

INTRODUCTION

Caesarean section (CS) is one of the most frequently performed major abdominal surgeries in the world. There has been a global increasing trend in CS rates over the past three decades, particularly in women who have had one previous CS. Vaginal birth after caesarean section (VBAC) is a safe option and is still strongly recommended by all international authorities with success rates ranging from 60% to 80%. However, women's preference for VBAC vs elective repeat caesarean section (ERCS) remains very poorly understood in South Africa (SA) as very few studies have addressed women's preference for mode of delivery.

Repeat caesarean delivery (CD) is reported as the single largest contributor to the escalating CS rate worldwide. So why do women choose repeat CD? Evidence suggests that fear, health care worker influence, social stigma, cultural practise and religious beliefs can significantly influence the attitude toward CS.

South African data remains limited and we are yet to ascertain how women make their choice and what drives their specific preferences. The rationale behind this study therefore was to gain better insight into why the women in Cape Town choose VBAC or ERCS and to ascertain to what extent their knowledge, attitude and preferences influence their choice. In so doing, we were able to highlight key findings in order to attempt to reduce the increasing CS rate in our country.

AIMS AND OBJECTIVES

The primary objective was to explore women's knowledge, attitudes and preferences for VBAC or ERCS after one previous CS, from 36 weeks gestation, attending antenatal care at Mowbray Maternity Hospital (MMH) and New Somerset Hospital (NSH). The secondary outcome was to describe the major reasons for their preferred mode of delivery.

METHODOLOGY

A prospective descriptive study was conducted over four months, of pregnant participants with one previous lower uterine segment caesarean section (LUSCS), attending antenatal care at MMH and NSH. Participants were recruited from 36-41weeks gestation. Participants over the age of 18 years with one previous LUSCS were eligible for inclusion. Participants with a medical indication for CS were excluded. An interview-based questionnaire, previously

adapted for use in a Cape Town antenatal population regarding women's knowledge, attitudes and preferences for mode of delivery was conducted at a routine antenatal visit. In addition, basic obstetric and socio-demographic data was abstracted from their folders. A descriptive analysis of participants' preferences for mode of delivery was completed, with subgroup comparisons. The Fisher's Exact test was used in all the statistical analyses that involved categorical variables whilst continuous variables were analysed using t-tests.

RESULTS

The study included 100 participants who were eligible for VBAC. Of the participants, 51% preferred ERCS whilst 49% preferred VBAC. Married couples and those in co-habiting relationships, more frequently chose VBAC compared to single participants, who more frequently chose ERCS. Participants were greatly influenced by the opinion of the HCW, particularly if ERCS was suggested, they were likely to choose a CS (p=0.001). If a previous history of long or obstructed labour was reported, participants were inclined to choose ERCS. Fear was identified as a major determinant as 78.4% cited fear of vaginal birth as their reason for preferring a CS. History of previous CS (88.2%) and fear of the risks associated with VBAC were the main reasons cited for their preference. In the group who preferred VBAC, 89.8% were of the perception that VBAC would allow them to recover faster and 87.7% desired to be home sooner therefore, favouring their choice. Whether or not the participants had a previous vaginal delivery or VBAC, it did not affect their preference for mode of delivery in a statistically significant manner.

CONCLUSION

This study which explored knowledge, attitudes and preferences of women who had had one previous CS, concerning their preference for mode of delivery, is one of the first to be done in South Africa. Despite all participants being medically eligible for VBAC, only 49% preferred this option, the remaining 51% preferring ERCS. Significant determinants of their choice were unstable relationships, influence of the doctor, concern about uterine rupture and fear of labour and unpredictability. Knowledge of the complications of ERCS and VBAC was very limited. This information is useful to design further research to improve understanding of these issues and to design services in a way to overcome the identified problems. In particular, women must be provided non-biased evidence-based information in order to foster a relationship of trust with the health care worker, in assisting her to make an informed decision. Similarly improving respectful competent care of women in labour with better attention to alleviating labour pain, will assist in reducing fear.

1. INTRODUCTION

Caesarean sections have been performed for hundreds of years. It is a life-saving intervention in certain circumstances and is one of the most frequently performed major abdominal surgeries. The first citation of an abdominal delivery is reported as early as the sixteenth century.[2] The CS rate has progressively been increasing over the past three decades, with China and Mexico having the highest rates globally, up to 50%.[3] The current international CS rates are significantly greater than the CS rate of 10% of births recommended by the WHO at a population level, in 2014.[4] This range has been suggested as evidence indicates that there is no reduction in maternal and neonatal mortality and morbidity when the rate exceeds this.[5] The global average CS rate is 18.6% with Africa at 7.3%.[2] Repeat CD is the single largest contributor to the escalating CS rate worldwide.

Testimony to the escalating CS rate particularly in Africa, Biccard et al executed the largest single, prospective investigation of African surgical activity and outcomes as far as we know to date.[6] The primary outcome of the study was to assess in-hospital postoperative complications. They studied 11 422 patients from 247 hospitals across 25 African countries who underwent an operative procedure as part of a one-week snapshot of surgical activity. Although the main aim was to quantify surgical outcomes, the most notable finding was that CS was the most common surgical procedure performed (3 792 patients, 33%).[7]

In the Western Cape, the District Health Information System (DHIS) reported CS rates of 19.9% in 2008 and 24.6% in 2010.[8] Furthermore, the South African Health Review (SAHR) 2011 reported CS rates 19.4% in 2008 and had risen to 22.5% in 2010.[7] A multitude of complex reasons have been cited to try to explain the growing trends in CS rates. A systematic review (21 studies, 2 282 922 deliveries) showed that serious morbidity in future pregnancies (including hysterectomy, blood transfusions, adhesions, and surgical injury) increases as the number of previous CS deliveries increases.[9] Of note, the primary CS rate ie. the first CS per 100 live births to women who had no previous CS, has had a direct impact on the decision regarding mode of delivery in the subsequent pregnancy.[10]

At this point in time, there is no official standardised classification system for CS. The "Robson 10-group classification" has in recent years become widely used in many countries (Appendix A).[11] It was first proposed in 2001 and is based on the characteristics of each individual woman and her pregnancy rather than on the indication for CS. In 2014, WHO conducted a systematic review of the experience of users with the Robson classification to assess the pros and cons of its adoption, implementation and interpretation.[11] WHO concluded that the Robson classification system can be used as a global tool for assessing, monitoring and comparing caesarean section rates within healthcare facilities over time, and between facilities.

The option of vaginal birth after caesarean (VBAC) has been promoted by some obstetricians since the 1950s. VBAC increased after a 1980 National Institutes of Health (NIH) consensus statement questioned the need for routine repeat CD and discussed situations in which VBAC could be performed.[12] In the United Kingdom (UK), a national clinical practice guideline for VBAC has been available since 2004. Furthermore, in the United States (US), VBAC rates increased from >5% in 1985 to 28.3% in 1996, with the overall CD rate decreasing to nearly 20% by 1996. However, reports of uterine rupture and other complications during trial of labour after caesarean (TOLAC) also increased so that by 2006, the VBAC rate had decreased to 8.5% and the total CD rate had increased to 31.1%.[13]

2. RATIONALE OF THE STUDY

Essentially there are three possible birth outcomes for women with a previous CS:

1. A successful VBAC (allowing spontaneous labour to occur, anticipating a vaginal delivery)
2. An unsuccessful trial of labour (TOL) resulting in an emergency CS
3. A planned elective repeat caesarean section (ERCS)

There is very limited data on South African women's preference for mode of delivery. This is one of the first studies to be done in SA on preferences for mode of delivery amongst women with previous CS. The rationale behind this study therefore was to gain better insight into why the women in Cape Town choose VBAC or ERCS and to ascertain to what extent their knowledge, attitude and preferences influence their choice.

3. LITERATURE REVIEW

The National Institute for Health and Care Excellence (NICE, 2013), similar to the Royal College of Obstetricians and Gynaecologists (RCOG, 2015) and the American College of Obstetricians and Gynaecologists (ACOG, 2010) stated that women with one previous low transverse CS and a subsequent low risk pregnancy should be informed about the risks and benefits of VBAC versus ERCS.[14] Women should be offered a TOLAC after having made the decision together with their care provider. VBAC is a safe option for healthy women with a previous CS and success rates range from 60% to 80%.

Very good data shows a lower maternal mortality rate with a TOL compared to ERCS (death number 3.8/100,000 live births for TOL vs. 13.4/100,000 live births for ERCS). At term, these numbers are 1.9 and 9.6/100,000 live births, respectively. In addition, an unsuccessful TOL has a higher rate of complications compared to a successful VBAC or ERCS.[10]

South African guidelines for the management of women with one previous CS recommends antenatal care at a clinic or community health centre but labour must be managed in hospital with continuous cardiotocograph (CTG) and 24-hour theatre facilities (Guidelines for Maternity Care in South Africa, National Department of Health, 2015). A doctor should see the mother at the first antenatal visit (to review the history) and again at 36 weeks (to plan the mode of delivery). The woman must have reliable transport if she chooses to VBAC or stay in a maternity waiting home close to the hospital to await the onset of labour.

Community health centres, MOU's and basic antenatal clinics are classified as Level 1 maternity service providers. These units accommodate basic antenatal follow up for low risk obstetric patients. They do not have theatre facilities and therefore are unable to adequately manage intrapartum care for women with a previous CS. District and secondary level hospitals (ie. MMH and NSH) and tertiary maternity service providers are classified as Level 2 and 3 respectively. These facilities are staffed and equipped to do both elective and emergency intra-partum CS if the need arises. Both Level 2 and 3 facilities offer the patient the option to choose their preferred mode of delivery after counselling.

In a recent large UK series (143 970 women in their second pregnancy, with previous CS), 52% of women attempted a VBAC, and 63% of these women had a successful vaginal delivery.[15] The remaining third of women who attempted VBAC underwent an emergency CS. Women who were young, white, and socioeconomically advantaged were more likely to have a vaginal delivery, as were those whose first CS was elective.

The main risk associated with trial of labour after a low transverse CS in developed countries is uterine rupture, the prevalence of which ranges from 0.3% to 0.9%.[16] This risk is increased for classical and low vertical uterine incisions, induction of labour and greater than one previous CS. A previous vaginal birth decreases the risk of uterine rupture to ± 600/100,000. Moreover, a history of previous vaginal birth, whether before or after a previous CS, is associated with an increased likelihood of VBAC.

There are no randomised controlled trials (RCT) comparing the two approaches, which would be difficult to justify ethically.[17] However, the absolute risk of adverse outcomes when attempting a TOLAC or an ERCS remains low. Hence the woman's preferences for a particular birth experience are likely to dominate decision making.

Women begin decision-making for birth after CS much earlier than previously reported. A Canadian study by Munro et al demonstrated that some women began their decision-making for VBAC even in the immediate postpartum period of their primary CS.[18] A systematic review by Black et al of qualitative literature examined twenty articles reporting the views of 507 women from four countries including UK, US, China and Australia.[19] It reflected that women's choices were influenced by personal experience and psychosocial concerns. A strong preference for VBAC appears to be driven by a belief that vaginal birth is 'normal' and has some intrinsic value. Reasons women select TOL include a desire for their partners' involvement, a belief that labour and vaginal delivery are empowering, a feeling of being cheated in their previous birthing experience of a vaginal delivery, maternal-infant bonding, greater ease in breastfeeding, easier recovery and a keen desire to return to normal life soon after vaginal birth. The systematic review focussed on perceptions in high income countries, with much higher caesarean section rates, and much better outcomes, where a lot of effort has been directed at educating women on the safety of vaginal birth over the past decades. It is

important to note that the choices of African women may be influenced by different factors compared to the above-mentioned, which also creates an important justification for this study.

By contrast, McCourt et al undertook a critical review of the literature on ERCS and decision making.[20] A total of 17 articles out of 80 selected, fitted the criteria for review. Women's preference for CS varied from 0.3-14% and were related to psychological factors, perceptions of safety, or in some countries, was influenced by cultural or social factors. A clear preference for ERCS from early in pregnancy can be driven by a fear of vaginal birth from previous negative experience of attempting but failing to achieve vaginal delivery, prolonged labour with associated maternal exhaustion, inadequate pain relief in labour and an unreasonable fear of childbirth ('tokophobia'). Women feel the need to restore a positive emphasis on their birthing experience which they feel the predictability of ERCS provides.[17]

Lastly, there are women who embark on their next pregnancy undecided about their mode of delivery. These women are more open to suggestion by health care providers, relatives, friends and even social media. An American questionnaire-based study by Bernstein et al was conducted to assess women's preferences for TOL versus ERCS and whether patients were making an informed decision.[21] When patients perceived their providers as having a preference for ERCS, very few chose TOLAC, whereas the majority chose TOLAC if this was their provider's preference. This demonstrated a huge lack of knowledge on the risks and benefits of both modes of delivery. This group of women are dependent on their interaction with a health care provider to allay their fears, to identify their main concerns, to provide emotional and psychological support as well as to provide the knowledge about their physical health consequences of modes of delivery after CS.

In a Cochrane review on interventions for supporting pregnant women's decision making about mode of delivery after CS , it was found that a decision making tool had no significant effect on women's planned mode of delivery, congruence between planned and actual mode of delivery or rate of adverse events.[22]

It is important to recognise that in some circumstances, a patient's choice regarding her desired mode of delivery may be mismatched with the healthcare providers' preference. Private sector personnel may not be willing to take the responsibility to manage a woman requesting TOLAC due to the exorbitant medico-legal implications in the event of an adverse outcome.[23] A survey regarding VBAC administered to fellows of the ACOG indicated that providers were performing an increasing number of CS due to risk of liability and cited patient preference as the primary indication. Increased malpractice litigation in South Africa (SA) is also evidenced by a study conducted by Chalmers et al (1992) which showed that 75.3% of private sector doctors cited "fear of litigation" as one of the main reasons for performing CS, compared to 21.2% of doctors working in state-run hospitals.[24]

As alluded to above, childbirth in SA is a tale of two different halves, with the majority of middle-class, predominantly white women having access to private medical care (where an ERCS is provided on request without a medical indication) and most poor, predominantly black women attending state-funded obstetric units and public hospitals (where every patient is counselled and advised toward a TOLAC, provided there are no contra-indications).[25] According to national statistics, 83% of South African women give birth in the public sector and 6% enjoy high-quality private medical care (South African Demographic and Health Survey, 2007). While public sector figures for CS rates range between 15-20%, private maternity care is extremely medicalized with CS rate estimates ranging from 40-82%.[26]

This gross disproportion speaks to our South African history. Previously disempowered women have not been able to fully equip themselves with the necessary education and tools needed to make an informed decision when it comes to their childbirth options. They also have not acquired the resources to afford the luxury of private medical care. Therefore, they are fully dependant on state sector personnel to provide them with information on clinical risks and benefits, to listen to their personal health goals and make a shared decision for mode of delivery.

Society, cultural practise and religious beliefs can also significantly influence the attitude toward CS. A Nigerian study by Aziken et al showed that culturally biased misconceptions about CS were the main reason for a number of patients refusing CS, regardless of its

necessity.[27] Some reasons given by women for not accepting CS included being laughed at by friends, husband's disapproval, and the notion that delivery by CS is not culturally acceptable. A deep reliance on faith and the supernatural to see women through labour were reported, testify to the low level of understanding of women about the need and justification for CS.

The media has labelled women declining VBAC "too posh to push" and the stigma that has arisen from this critique has become more than a health issue. This social stigmatisation is not only attributable to the antenatal decision-making regarding mode of delivery, however, extends into the pueperium as well. Skinner et al analysed the psychological consequences of pelvic floor trauma following vaginal birth.[28] Women reported they felt traumatised and abandoned as the morbidities of vaginal birth were not adequately discussed with them. The debate on the appropriateness of ERCS vs VBAC remains ongoing, however, the ultimate decision about the choice for mode of delivery rests with the individual woman and her autonomy must be respected.

The clinical policy in the Metro West region in the Western Cape, which includes MMH and NSH, allows women the choice of ERCS or VBAC. The gestational age for ERCS is 39 weeks in order to avoid the risk of spontaneous labour in a multiparous patient and the morbidity associated with an emergency intrapartum CS. In those women who prefer VBAC, the gestational age upto which we suggest awaiting spontaneous labour is 40 weeks. An ERCS is thereafter scheduled between 40-41 weeks, in order to avoid the risks associated with a prolonged pregnancy.

The whole concept of making choices regarding childbirth is certainly not a straightforward one. South African data on women's preference for mode of delivery remains limited, although there has been an increasing trend towards involving patients in the decision-making process. Historically women do not make choices outside of their social contexts, but we are yet to ascertain how they make their choice and what drives their specific preferences. The rationale behind this study therefore is to gain better insight into why the women in Cape Town choose TOL or ERCS and to ascertain to what extent their knowledge, attitude and preferences influence their choice. In so doing, we will be able to highlight key findings in order to attempt to reduce the increasing CS rate in our country.

4. AIMS AND OBJECTIVES

4.1 THE PRIMARY OBJECTIVE

To explore women's knowledge, attitudes and preferences for VBAC or ERCS after one previous CS, from 36 weeks gestation, attending antenatal care at MMH and NSH.

4.2 THE SECONDARY OUTCOMES

To describe the major reasons for their preferred mode of delivery

5. METHODS

5.1 STUDY DESIGN

This was a prospective descriptive study of pregnant participants from 36 weeks gestation, with one previous LUSCS. The study had an analytical cross-sectional design with a semi-quantitative component.

5.2 STUDY SETTING

The antenatal care of participants with one previous CS was conducted at both MMH and NSH respectively. A designated clinic attending to participants specifically with a previous CS, was attended on a Wednesday at MMH. Participants with a previous CS were seen on various other days of the week at NSH. These participants either lived locally in the respective drainage areas of the two above-mentioned institutions or were referred from 36 weeks gestation, after booking and receiving interim antenatal care at a local MOU. There are eleven MOUs in the Cape Town metropolitan area providing antenatal care for low risk patients and interim care up to 36 weeks gestation for those who have had a previous CS. MMH and NSH are secondary level public hospitals in the southern suburbs of Cape Town, with MMH being solely a maternity facility. They both serve as a referral centre for complicated cases as well the delivery of participants with one previous CS from several MOUs. Participants attending False

Bay Hospital, Hanover Park, Gugulethu and Mitchell's Plain MOU's respectively are referred to MMH for antenatal care and delivery. Those participants attending Wesfleur and Vredenburg Hospitals as well as Vanguard and Du Noon MOU's are referred to NSH.

The current practise at MMH and NSH is to offer antenatal counselling regarding the options for mode of delivery, to discuss the risks and benefits of VBAC versus ERCS and to identify the indications for ERCS and those women suitable for a VBAC. The quality and in-depth nature of the counselling was not standardised, nor did it happen at a specific gestational age. However, at 36 weeks gestation, most women had a fair amount of input and adequate counselling and were ready to make a final decision regarding their preferred mode of delivery. They had the option to choose either ERCS or VBAC, regardless of whether there was a medical indication for CS or not.

5.3 STUDY METHODOLOGY

The study participants were recruited in the third trimester from 36 weeks gestation, at a routine antenatal clinic visit at MMH or NSH. An interview-based questionnaire (see Appendix B) was administered to participants with one previous LUSCS lasting approximately fifteen minutes.

The questionnaire was adapted from the WHO questionnaire, which explored preferences for mode of delivery amongst low risk women in an Argentinian study.[29] The above mentioned WHO questionnaire was previously adapted for use in a Cape Town antenatal population and was used locally.[30] Furthermore, a second source from which the study questionnaire was adapted was from the American Journal of Obstetrics and Gynaecology (AJOG), which looked at participants with one previous LUSCS and their choice between ERCS versus VBAC[19].

The questions highlighted participants' knowledge, attitudes and preferences related to their decision-making process around mode of delivery.

Basic obstetric and medical data was collected from the participants' MCR (see Appendix C). Written informed consent (see Appendix D) was be obtained prior to the questionnaire-based interview.

The questionnaire was conducted in a private room by the principal investigator in English and Afrikaans. It was available in three languages ie. English, Afrikaans and isiXhosa. For those participants whose home language was isiXhosa, the interview was conducted in either English or Afrikaans depending on the participants' preference. Their second language was spoken fluently enough that the assistance of an isiXhosa-speaking research midwife was not required, even though this option was provided. A patient information leaflet (see Appendix E) was given to all participants in the above-mentioned languages of their preference. Recruitment took place over a three-month period.

5.4 STUDY POPULATION

5.4.1 INCLUSION CRITERIA

- Age: 18 years or more
- Gestational age: 36-41 weeks
- One previous lower uterine segment CS
- Singleton pregnancy
- Cephalic presentation
- Attending antenatal care at MMH or NSH

5.4.2 EXCLUSION CRITERIA

- Contraindication to vaginal delivery
- More than one previous lower uterine segment CS
- Previous classical uterine scar
- Previous myomectomy
- Multiple gestations
- Malpresentation of the fetus
- Major placenta praevia
- Severe medical complications
- Obstetric complications that precluded a trial of labour

5.5 DATA COLLECTION

Data was collected by the Principal investigator in the languages of English and Afrikaans using a structured questionnaire-based interview. Further data regarding basic obstetric, medical and socio-demographic information was transcribed from the participants' maternity case record (MCR). All the above-mentioned information was entered into a purpose designed data collection sheet which was divided into two sections. Section A included the information obtained from the participant's folder as described above. Section B provided the information on participant's general knowledge as well as their preferences for mode of delivery obtained from the questionnaire.

Each participant was allocated a unique study number which appeared on the questionnaire form. Each participant remained anonymous and no identifiable information appeared on the questionnaire form. The completed forms were stored at MMH and NSH in the absence of the principal investigator from the antenatal clinic. These forms were collected weekly upon completion. The data was entered weekly into the above-mentioned data collection sheet, which was password protected. Once all the data had been entered into the electronic spread sheet, the original questionnaire forms were safely stored until such time that the data has been analysed. Thereafter, these source documents were destroyed.

5.6 SAMPLE SIZE

A sample size of 100 participants with one previous CS were included. The calculation was based on the assumption that 60% of participants with a previous CS would prefer a VBAC and 30% would prefer an ERCS. Approximately 10% of patients were undecided on this matter. This calculation comes from review of the current available literature indicating different preferences for mode of delivery after one previous CS. A two-sided significance level of 95% was used and a power of 80%. The calculation is shown in the table below:

5.6.1 SAMPLE SIZE CALCULATION

Sample Size: X-Sectional, Cohort, & Randomized Clinical Trials

Two-sided significance level(1-alpha):	95
Power (1-beta, % chance of detecting):	80
Ratio of sample size, Unexposed/Exposed:	1
Percent of patients choosing trial of labour:	60
Percent of patients choosing repeat caesarean section:	30
Odds Ratio:	0.29
Risk/Prevalence Ratio:	0.5
Risk/Prevalence difference:	-30

	Fleiss with CC
Sample Size – Exposed	50
Sample Size-Nonexposed	50
Total sample size:	100

References

Kelsey et al., Methods in Observational Epidemiology 2nd Edition, Table 12-15

Fleiss, Statistical Methods for Rates and Proportions, formulas 3.18 &3.19

5.7 STATISTICAL ANALYSIS

All data was entered into a database. A data analysis software program ie. STATA version 12.1 was used to analyse the data, together with the help of my supervisor. A descriptive analysis of participants' preferences for mode of delivery was conducted, with subgroup comparisons. Continuous variables were analysed using t-tests. The Fisher's Exact test was used in all the statistical analyses that involved categorical variables, unless otherwise specified. Participants' preference was the grouping variable.

6. ETHICAL CONSIDERATIONS

Participation in this study was voluntary and all information was treated confidentially and in accordance with the Helsinki Declaration.[1] Informed consent was sought from each study participant prior to conducting the interview-based questionnaire and MCR data collection. The consent form was available in English, Afrikaans and isiXhosa. A patient information leaflet was also given to each study participant providing further information about the study.

The data collection form and completed questionnaires were kept in a secure office at MMH and NSH respectively. The data was entered onto an electronic spread sheet that was password protected. The original data collection forms were destroyed once the information had been successfully entered onto the spread sheet and the data analysed to ensure participant confidentiality.

There was no risk posed to the participants during the study nor was their medical care affected if they chose to withdraw from the study at any time. If participants raised any questions regarding their planned mode of delivery upon completion of the interview-based questionnaire, this was discussed with them at the time as well as by a senior doctor in the clinic.

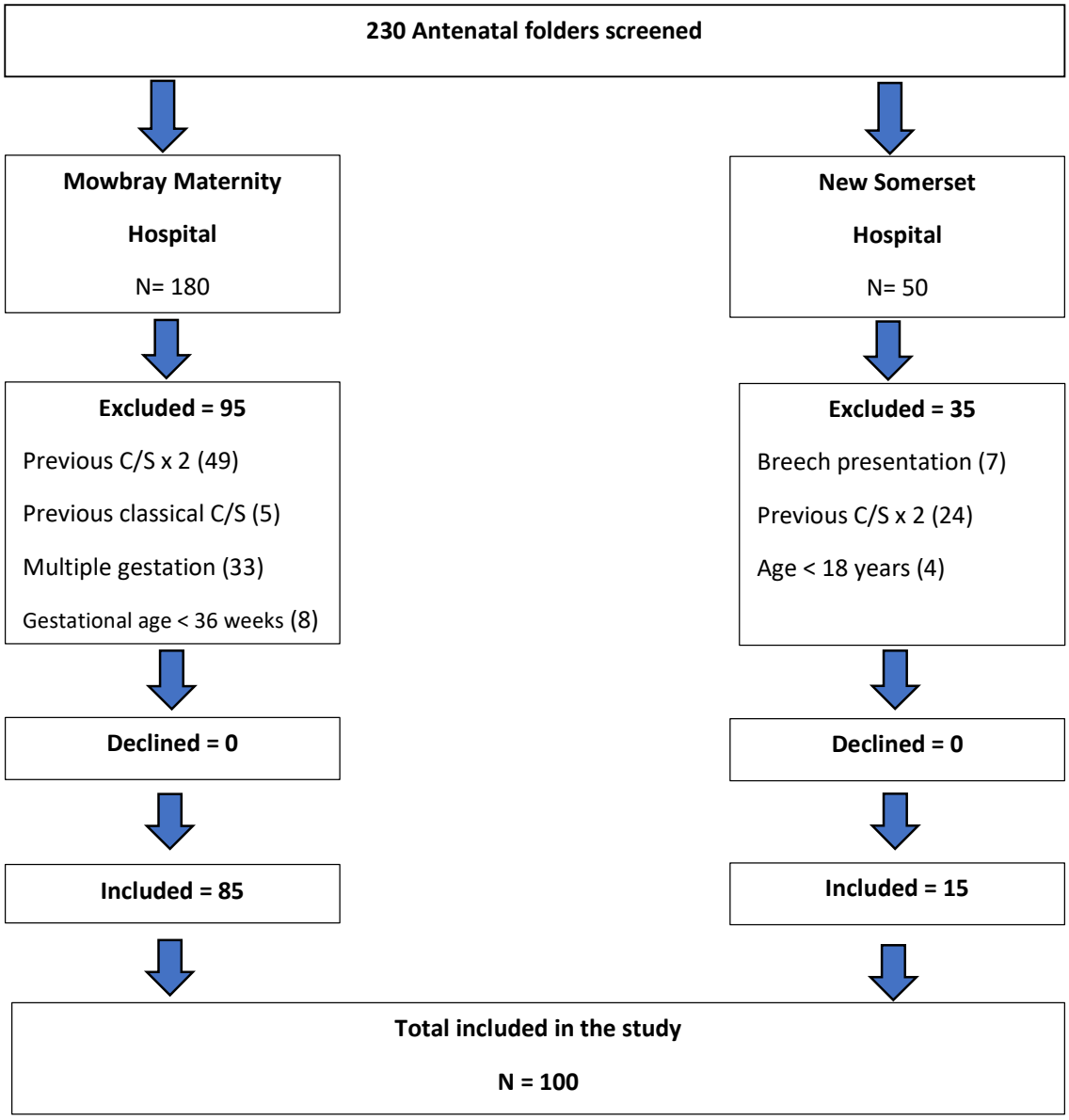
Permission for this study was sought from the Department of Obstetrics and Gynaecology Research Committee and the University of Cape Town Ethics Committee prior to data

collection. MMH and NSH facility approval was also sought prior to commencement, from the respective institutions' research ethics committees. Each of the supervisors involved in this research study ie. Prof SR Fawcus and Dr Gregory Petro worked at MMH and NSH respectively at the time the interviews were conducted. They were able to oversee the study and ensured the research was conducted in the way it was set out to.

7. RESULTS

Participants were recruited over a three-month period in the antenatal clinics at MMH and NSH. MMH has a dedicated antenatal clinic every Wednesday to follow up patients with previous CS. NSH has a much smaller obstetric department comparatively and therefore patients with a previous CS were seen on any day of the week. A total of 230 antenatal folders were screened to assess suitability for recruitment. Of these, 100 women met the inclusion criteria and were invited to participate in the study. All of them agreed. The recruitment process is depicted in Figure 1.

Figure 1: Flow chart of recruitment process



All the participants recruited were eligible for VBAC, based on the exclusion criteria. The data that will be presented will be for the entire group and subdivided into those who preferred ERCS and those who preferred VBAC. This division was not based on their final mode of birth but on the participants' preferences for birth after a previous CS. The Fisher's Exact test was used in all the statistical analyses, unless otherwise specified.

Amongst the 100 participants, 51% preferred ERCS compared to 49% who preferred VBAC. When comparing the difference between preference for mode of delivery between MMH and NSH, the group of participants that preferred ERCS at MMH comprised 48.2% compared to 66.7% of participants at NSH. In contrast, the group of participants who preferred a VBAC at MMH comprised 51.8% compared to 33.3% of participants at NSH (Odds ratio, 2.146; 95% confidence interval [CI], 0.684 to 6.729; p=0.264). Proportionately more participants at NSH chose ERCS compared to MMH, where more participants chose VBAC, but the difference was not significant.

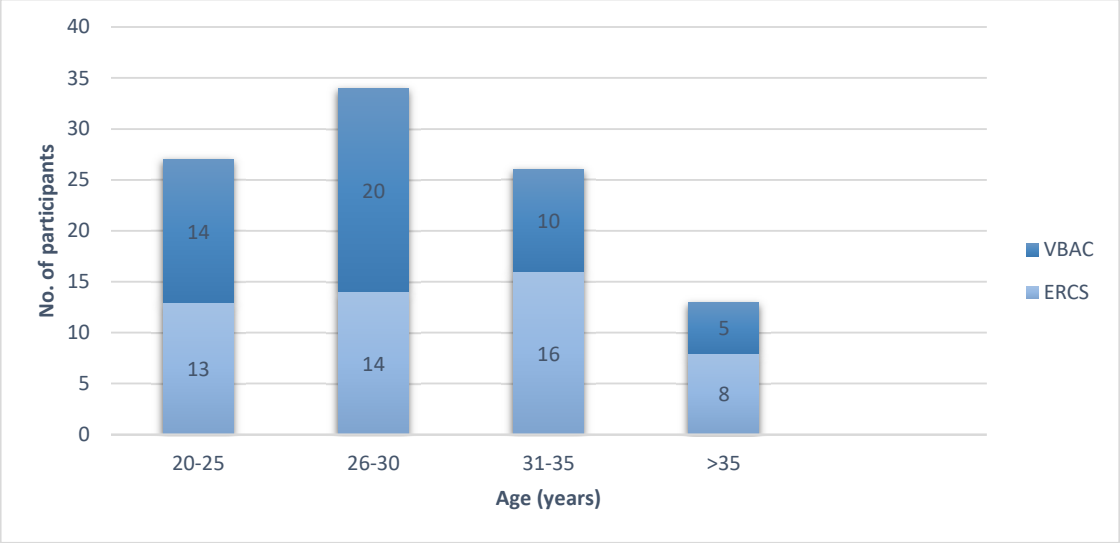
The socio-demographic characteristics of the study participants are described in Table 1 and Figures 2 to 4.

There were 27 participants in the 20-25year age group. Fifty percent of the study population were in the age range of 26-35years, with 13 participants over the age of 35 years. The study compared women's preferences for mode of delivery against their age including several other variables namely ethnicity, home language, level of education, monthly income, and HIV status. Figure 2 represents the comparison of preferred mode of delivery between the different age groups.

Table 1: Socio-demographic characteristics of study participants and their preferred mode of delivery

	Preferred Elective CS N=51 (%)	Preferred VBAC N=49 (%)	Total N=100 (%)
Age (years)			
20-25	13 (25.5)	14 (28.6)	27 **(27)**
26-30	14 (27.4)	20 (40.8)	34 **(34)**
31-35	16 (31.4)	10 (20.4)	26 **(26)**
>35	8 (15.7)	5 (10.2)	13 **(13)**
Ethnicity			
Black (SA)	28 (54.9)	21 (42.9)	49 **(49)**
White	0	0	0
Coloured	16 (31.4)	13 (26.5)	29 **(29)**
Black (non-SA)	7 (13.7)	15 (30.6)	22 **(22)**
Home Language			
English	9 (17.6)	4 (8.2)	13 **(13)**
Afrikaans	9 (17.6)	9 (18.4)	18 **(18)**
Xhosa	26 (51.1)	20 (40.8)	46 **(46)**
French	2 (3.9)	3 (6.1)	5 **(5)**
Shona	4 (7.8)	9 (18.3)	13 **(13)**
Other	1 (2.0)	4 (8.2)	5 **(5)**
Highest Level of Education			
Primary school incomplete	1 (2.0)	0	1 **(1)**
Primary school complete	3 (5.9)	2 (4.1)	5 **(5)**
High school incomplete	22 (43.1)	15 (30.6)	37 **(37)**
High school complete	20 (39.2)	26 (53.1)	46 **(46)**
Tertiary education	5 (9.8)	6 (12.2)	11 **(11)**
Monthly Income			
None	8 (15.7)	14 (28.6)	22 **(22)**
Child grant only	22 (43.1)	11 (22.4)	33 **(33)**
< R3 000	8 (15.7)	10 (20.4)	18 **(18)**
R3 000 - R10 000	11 (21.6)	10 (20.4)	21 **(21)**
> R10 000	2 (3.9)	4 (8.2)	6 **(6)**
Relationship			
Single	3 (5.9)	1 (2.0)	4 **(4)**
Steady partner - not cohabiting	20 (39.2)	9 (18.3)	29 **(29)**
Steady partner - cohabiting	5 (9.8)	9 (18.3)	14 **(14)**
Married	23 (45.1)	30 (61.4)	53 **(53)**
Divorced	0	0	0
Widowed	0	0	0

Figure 2: Comparison of preferred mode of delivery between the different age groups



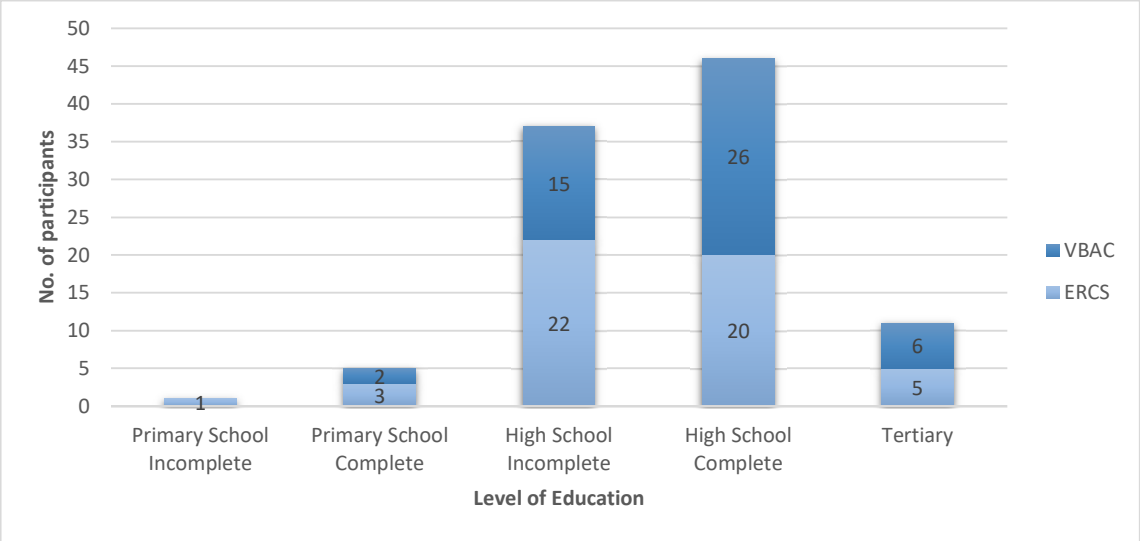
Of all the study participants, more women over the age of 30 years preferred ERCS compared to VBAC. However, the difference between the means of the ages of the participants who chose ERCS or VBAC was not statistically significant (p=0.445).

There were only two ethnic groups represented in the study. Coloured participants represented 29% and 71% were Black African participants. There were no White or Asian participants interviewed during the data collection period. Since a large Black foreign refugee participant population attends MMH and NSH for antenatal care, the Black African population was subdivided into South African and non- South African participants. The non-South African group represented the following countries: Malawi, Congo, Zimbabwe, Burundi and Mozambique. Amongst the Black (non-SA) participants, 68.2% preferred VBAC as their preferred mode of delivery compared to Black (SA) participants of whom 42.9% preferred VBAC.

Xhosa was the home language spoken in 46% of the study population, followed by Afrikaans (18%), English (13%), Shona (13%) and French (5%) respectively.

Figure 3 represents the comparison of preferred mode of delivery between different education levels. Of the study population, 5% had only primary school education. There was 37% of participants who did not complete high school, 46% completed high school and 11% had a tertiary education. Those participants who had access to higher education ie. completed high school and tertiary education chose VBAC in 56% compared to those participants who did not achieve high school completion (39.5%). This was not found to be statistically significant (Odds Ratio, 0.51; 95% CI, 0.228 to 1.142; p=0.110).

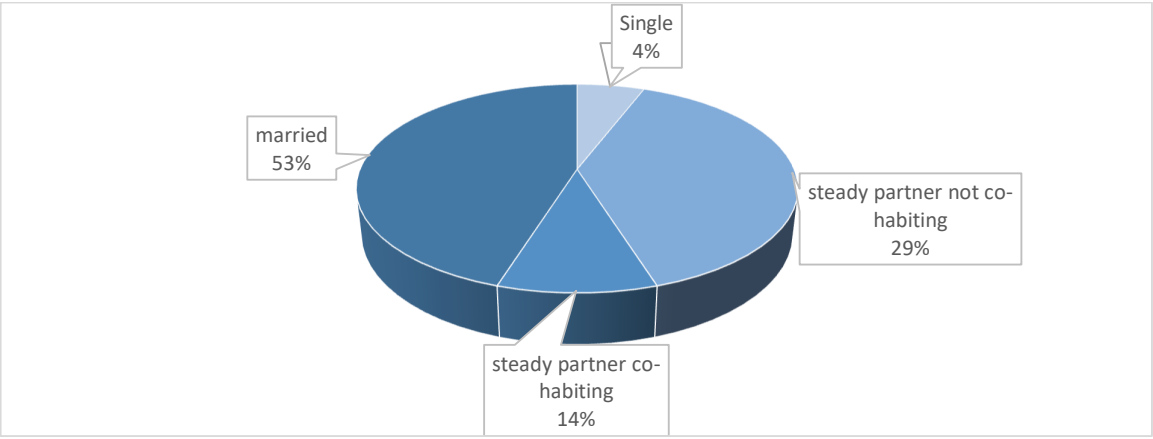
Figure 3: Comparison of preferred mode of delivery between different education levels



Of the study population, 55% were unemployed with either no income whatsoever (22%) or completely dependent on a child care grant as their source of income (33%). There was a further 45% of the study population employed with their income ranging from <R3 000 (18%), R3 000-R10 000 (21%) and >R10 000 (6%). Their preference for mode of delivery based on their income was not statistically significant (p=0.185).

Participants were asked about their relationship status. Figure 4 is a diagrammatic representation of their responses. The largest proportion of participants were married couples (53%). This was followed by steady relationships where couples were not co-habiting (29%), steady relationships with co-habitation (14%) and single participants (4%).

Figure 4: Distribution of relationship status



Single parents and those in a relationship without co-habitation more frequently chose ERCS. Married couples and those in a relationship and co-habiting more frequently chose VBAC (p=0.066). Couples had a four-fold higher chance of choosing VBAC if they were living together compared to those couples who did not live together. This was found to be statistically significant (Odds Ratio, 3.203; 95% CI, 1.337 to 7.675; p=0.011).

Details of the past obstetric history of the study participants was obtained from their recollection of their past obstetric history (Table 2A) and details of the current pregnancy was obtained from the current patient folder (Table 2B). Considering past obstetric history, the number of previous pregnancies and number of live births were directly comparable in the two study groups.

Table 2A: Past Obstetric History of Study Participants

	Preferred Elective CS N=51 (%)	Preferred VBAC N=49 (%)	Total N=100(%)
Number of Pregnancies			
Median	3	3	
Number of Live Births			
Median	3	3	
Previous vaginal delivery			
0	36 (70.7)	38 (77.6)	74 (**74**)
1	9 (17.6)	8 (16.3)	17 (**17**)
2	4 (7.8)	3 (6.1)	7 (**7**)
3	2 (3.9)	0	2 (**2**)
Previous Instrumental Delivery			
No	49 (96.1)	48 (98.0)	97 (**97**)
Forceps	0	0	0
Vacuum	2 (3.9)	1 (2.0)	3 (**3**)
Failed assisted delivery	0	0	0
Previous Successful VBAC			
0	49 (96.1)	47 (95.9)	96 (**96**)
1	2 (3.9)	0	2 (**2**)
2	0	2 (4.1)	2 (**2**)

Of all the participants who had a previous vaginal delivery, there was no statistically significant difference in their current mode of delivery preference (p=0.529). In the preferred ERCS group, only 3.9% had experienced one successful VBAC previously. In the preferred VBAC group, 4.1% had experienced two previous successful VBACs. In those participants who had never previously experienced a VBAC, 49% preferred an ERCS and 47% preferred VBAC. A previous instrumental delivery did not affect the participants' preference.

Assessment of the current obstetric history is tabulated in Table 2B. All the participants conceived their pregnancies spontaneously, except one couple who had in vitro fertilisation. This was conducted at a private healthcare institution and the couple were thereafter transferred to a state facility for their antenatal care and delivery due to financial constraints. This couple chose ERCS. Of the study population, 80% did not have any complications in their antenatal course (p=0.601).

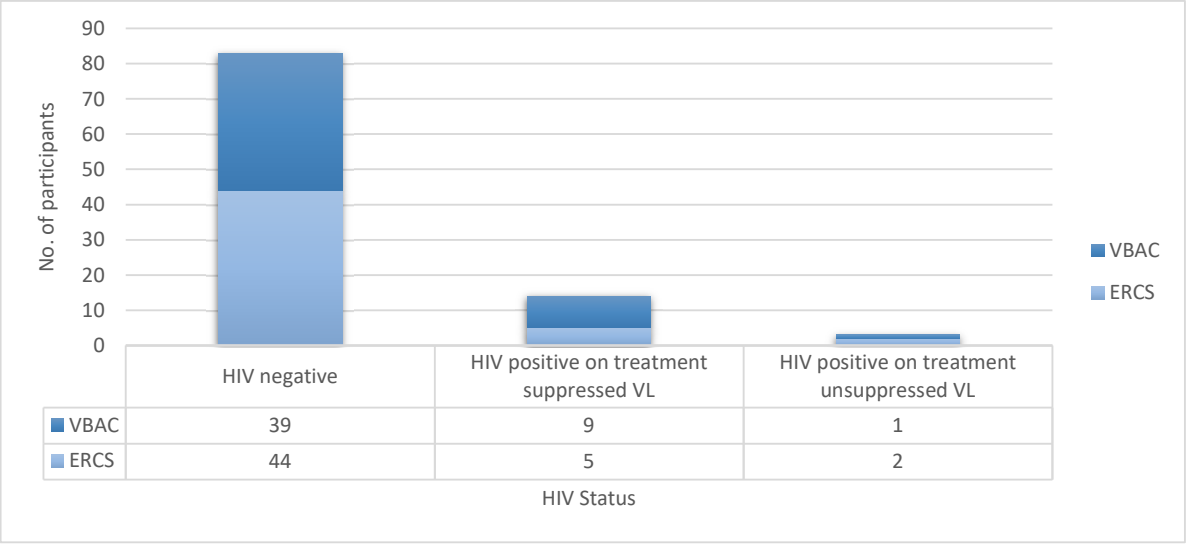
Table 2B: Current Obstetric History of Study Participants

	Preferred Elective CS N=51 (%0	Preferred VBAC N=49 (%)	Total N=100(%)
Gestational Age (at the time of the interview)			
Median (weeks)	37.5	37.6	
Number of future children planned			
0	38 (74.6)	28 (57.1)	66 **(66)**
1 more	9 (17.6)	16(32.7)	25 **(25)**
2 more	2 (3.9)	4 (8.2)	6 **(6)**
>3 more	2 (3.9)	1 (2.0)	3 **(3)**
How was this pregnancy conceived			
Spontaneously	50 (98)	49(100)	99 **(99)**
Fertility treatment	1 (2)	0	1 **(1)**
HIV status			
Unknown	0	0	0
Negative	44 (86.3)	39 (79.7)	83 **(83)**
Positive - not on treatment	0	0	0
Positive - on treatment with suppressed VL	5 (9.8)	9 (18.3)	14 **(14)**
Positive - on treatment with unsuppressed VL	2 (3.9)	1 (2.0)	3 **(3)**
Medical Condition			
None	47 (92.1)	48 (98)	95 **(95)**
Chronic hypertension	2 (3.9)	0	2 **(2)**
Asthma	1 (2.0)	1 (2.0)	2 **(2)**
Previous pulmonary TB	1 (2.0)	0	1 **(1)**
Diabetes	0	0	0
Antenatal Complications in Current Pregnancy			
None	41 (80.4)	39 (79.7)	80 (**80)**
Threatened preterm labour	1 (2.0)	2 (4.1)	3 **(3)**
Gestational hypertension	5 (9.8)	5 (10.2)	10 **(10)**
Antepartum haemorrhage	1 (2.0)	0	1 **(1)**
Anaemia	0	1 (2.0)	1 **(1)**
Growth restriction	1 (2.0)	0	1 **(1)**
Increased amniotic fluid	1 (2.0)	0	1 **(1)**
Pre-eclampsia	1 (2.0)	0	1 **(1)**
Pyelonephritis	0	1 (2.0)	1 **(1)**
Syphilis	0	1 (2.0)	1 **(1)**
Antenatal Booking Level of Care			
BANC	4 (7.8)	4 (8.2)	8 **(8)**
MOU	44 (86.3)	37 (75.5)	81 **(81)**
Hospital	3 (5.9)	8 (16.3)	11 **(11)**

In the 80 participants who did not report any antenatal complications, the two preference groups were so closely comparable, that the remainder of the complications listed in Table 2B did not surmount to any statistical significance. Of these participants, 41% nonetheless chose ERCS and 39% chose VBAC. The first antenatal booking visit was conducted at a MOU in 81% of participants.

Every participant knew their HIV status at the time of their interview and were all on anti-retroviral drugs. The study compared HIV status and preferred mode of delivery. An interesting finding was that participants who were on anti-retroviral drugs with a suppressed viral load were more likely to choose a VBAC than an ERCS compared to participants who were on anti-retroviral drugs with an unsuppressed viral load. This however was not statistically significant (Odds Ratio, 3.6; 95% CI, 0.262 to 49.342; p=0.536). This is demonstrated in Figure 5.

Figure 5: HIV status of study participants

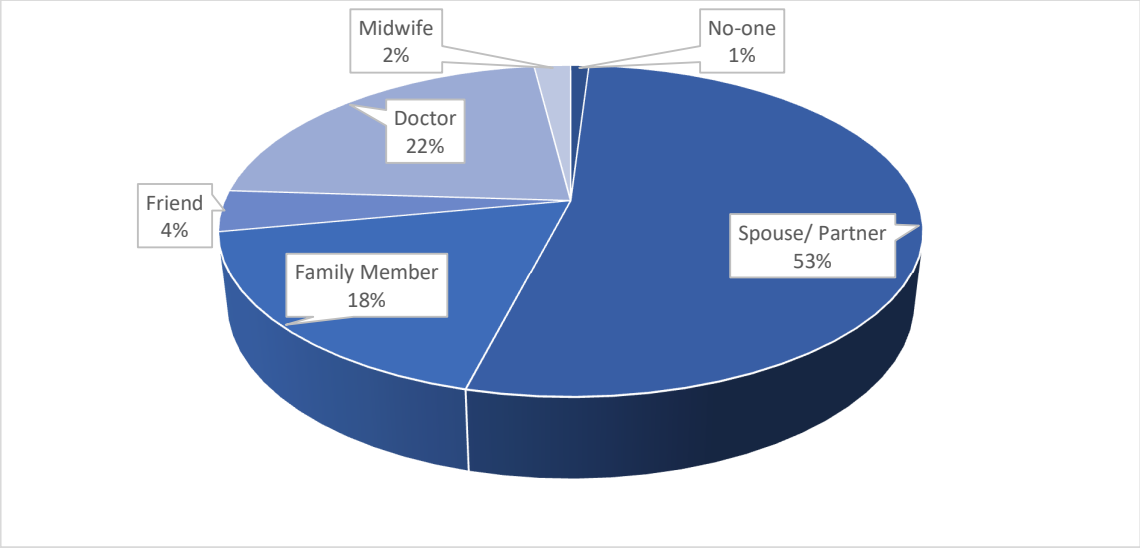


Most participants (66%) did not plan to have any more children. Within this group, 74.5% chose an ERCS compared to the 57.1% who chose VBAC. A further 25% of the study group were planning one more pregnancy of which 9% chose ERCS and 16% chose VBAC. Moreover, 3.9% of the participants choosing ERCS were planning to have more than three more children. It was found that 58% of participants who wanted no further children chose

ERCS compared with 38% who wanted more children. This was not statistically significant (Odds Ratio, 0.456; 95% CI, 0.196 to 1.060; p=0.091).

The person with whom the participants discussed their plans for delivery is depicted in Figure 6. Sine the absolute number of participants was one hundred (N=100), the number of participants and percentages were therefore the same as indicated in Figure 6.

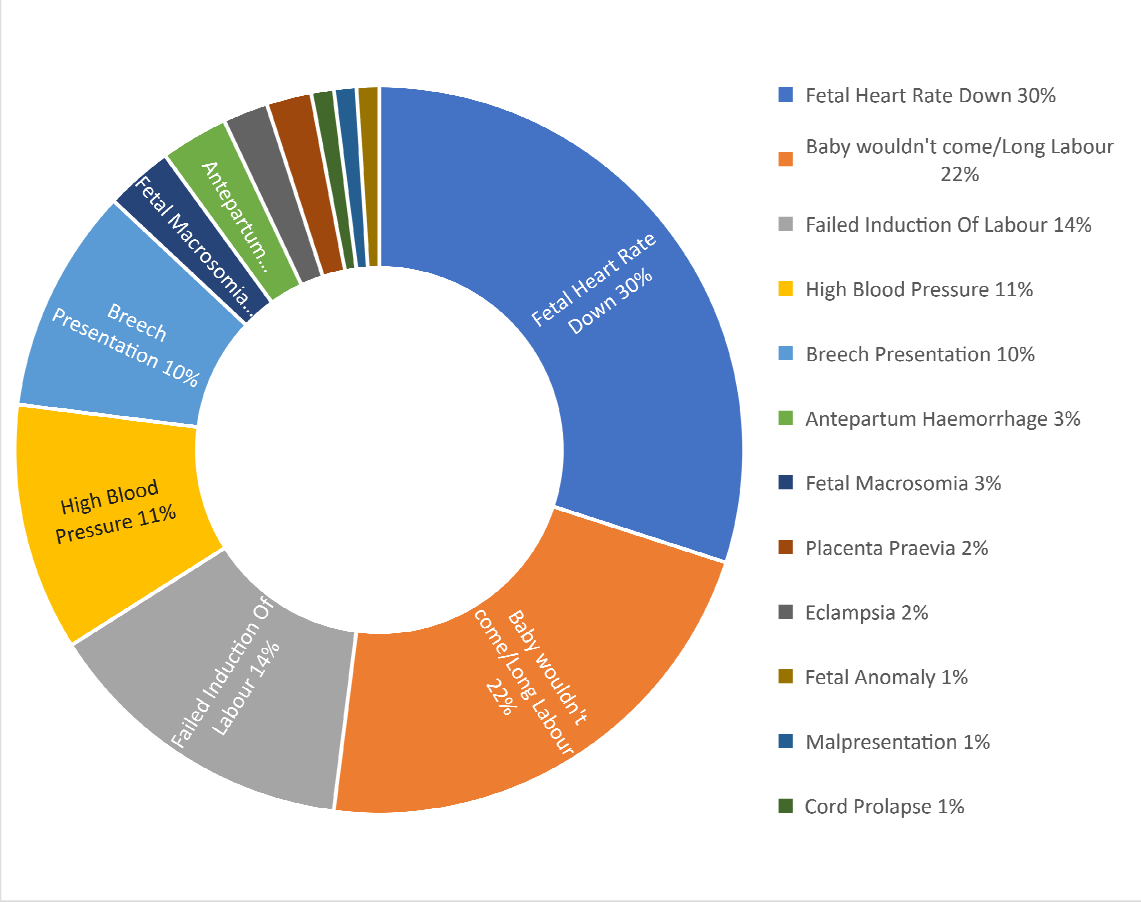
Figure 6: Person with whom you discussed your plans for delivery



Most participants discussed their delivery options with their spouse/partner ie. 54%. This was followed by their doctor (22%) and a friend/family member (18%). Furthermore, of the 22% of participants who discussed their delivery options with their doctor, 13% chose ERCS and 9% chose VBAC after receiving counselling. In relation to choosing an ERCS, those participants who discussed their delivery plans with their doctor and chose an ERCS, compared to those who discussed their delivery plans with their spouse/partner, family member or friend and chose an ERCS, the outcome was not statistically significant (Odds Ratio, 1.520; 95% CI, 0.582 to 3.972; p=0.472).

To better understand the participants' previous CS experience and whether it impacted on their mode of delivery choice, a series of questions were asked about their previous CS. Firstly, all participants were asked what the reason for their previous CS was. Of the 100 responses, 30% reported a concern with fetal heart rate dropping. This was followed by 22% who reported a prolonged/obstructed labour, 14% who had a failed induction of labour (for various reasons) and 10% who reported high blood pressure as a complication necessitating need for emergency CS. The remaining list of reasons quoted are represented in Figure 7A. Here too, the percentage indicated in Figure 7A is the same as the actual number of participants (N=100).

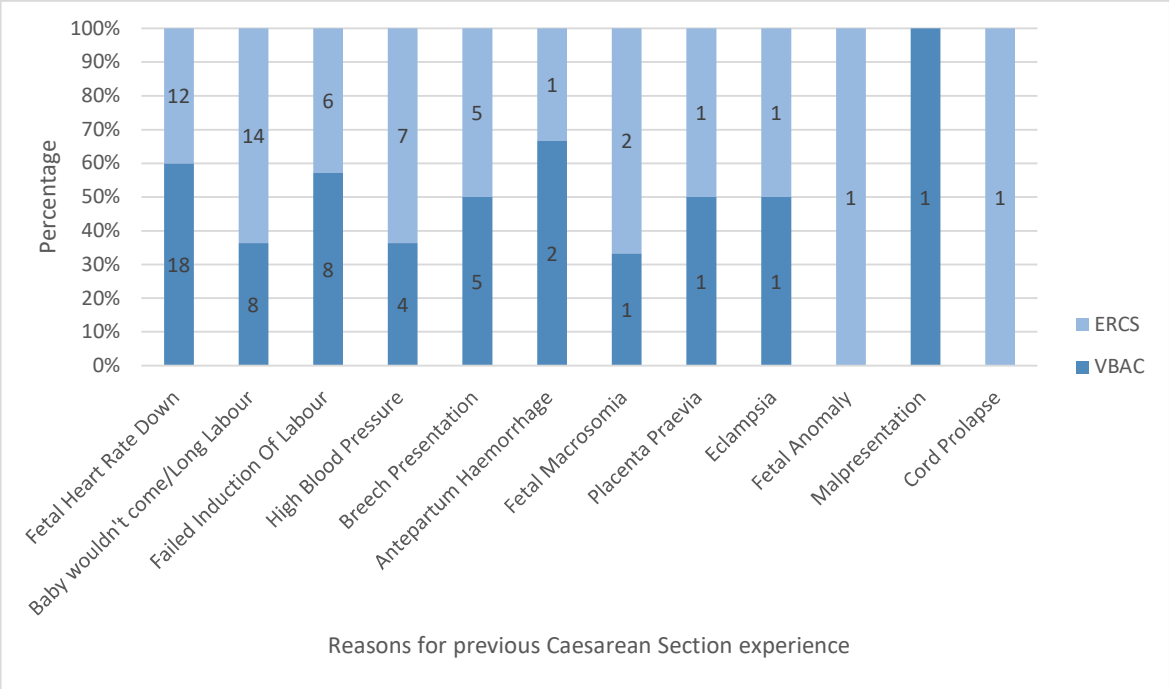
Figure 7A: Proportion of stated reasons for previous caesarean section



A subgroup analysis comparing the reasons for their previous CS and the subsequent preferred mode of delivery is shown in Figure 7B. It showed that 64% of participants had long or

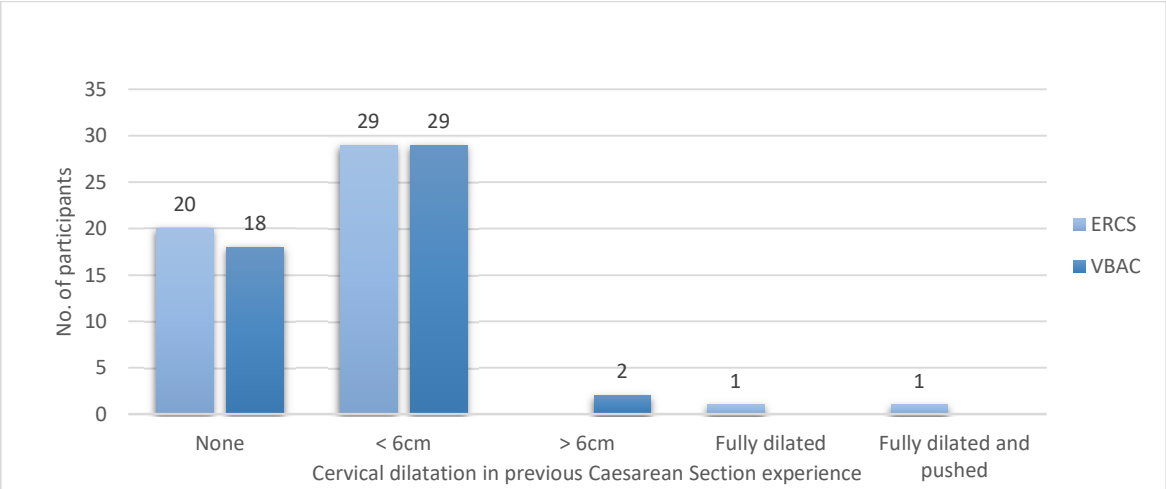
obstructed labours and they were more inclined to choose ERCS (Odds Ratio, 2.625; 95% CI, 0.845 to 8.159; p=0.159) with no statistical significance between the two groups. Interestingly, in instances where the indication for the previous CS was related to fetal heart rate dropping, 60% of participants opted for a VBAC.

Figure 7B: Participants' reasons for previous caesarean section and preferred mode of delivery



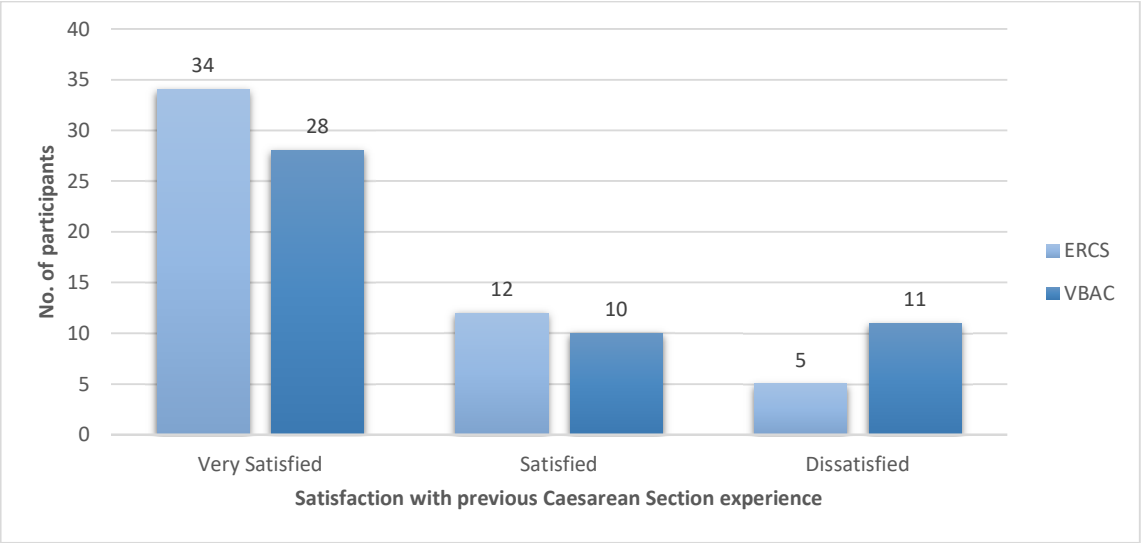
Furthermore, a comparison was made between the cervical dilatation in their previous labour experience and preferred mode of delivery in current pregnancy. This is shown in Figure 8. There were no major differences between the cervical dilatation and the preferred mode of delivery (Odds Ratio, 1.111; 95% CI, 0.487 to 2.530; p=0.837). This was not statistically significant. The two participants who were >6cm dilated (but not yet fully dilated) however, preferred a VBAC.

Figure 8: Comparison of cervical dilatation in previous labour experience and preferred mode of delivery



Moreover, the study compared participants' satisfaction about their previous CS experience with their preferred mode of delivery (Figure 9).

Figure 9: Comparison of participants' satisfaction with their previous caesarean section experience and preferred mode of delivery



It was found that the satisfaction from the previous CS experience did not affect the current choice in a statistically significant manner (p=0.226). Despite this however, more participants who were dissatisfied, chose VBAC. A repeat analysis of all those who were satisfied (ie. "satisfied" and "very satisfied") compared to those who were dissatisfied did not reach statistical significance (p=0.272).

Table 3 represents the participants' recollection of previous CS events. They were asked a series of questions which assessed their pain control after their primary CS, recovery after surgery and their perceived difficulties. Participants were also asked whether they were bothered by their abdominal scar from their previous CS.

Table 3: Participants' Recall of Previous Caesarean Section Events

	Preferred Elective CS N=51 (%)	Preferred VBAC N=49 (%)	Total N=100 (%)	P value
Pain control after surgery				**0,703**
Very well	30 (58.9)	29 (59.2)	**59 (59)**	
Moderately well	15 (29.4)	11 (22.4)	**26 (26)**	
Poor	4 (7.8)	7 (14.3)	**11 (11)**	
Very Poor	2 (3.9)	2 (4.1)	**4 (4)**	
Recovery from surgery				**0,234**
As hard as expected	1 (2.0)	2 (4.1)	**3 (3)**	
Harder than expected	9 (17.6)	15 (30.6)	**24 (24)**	
Easier than expected	41 (80.4)	32 (65.3)	**73 (73)**	
Bothered by belly scar				**0,835**
Very much	2 (3.9)	1 (2.0)	**3 (3)**	
Somewhat	8 (15.7)	7 (14.3)	**15 (15)**	
Not at all	41 (80.4)	41 (83.7)	**82 (82)**	

Interestingly in instances where pain was previously poorly controlled post operatively, 63.6% of participants chose VBAC. Of the participants who had a very easy recovery from their previous surgery 56% opted for ERCS. There was no difference in their opinion about their abdominal scar from previous surgery. None of these findings above were statistically significant.

For the 51% of participants who preferred an ERCS, the reasons given for their preferences are listed in Table 4. The main reason cited was the fact that they had previously had a CS (88.2%). Other common reasons for their choice was their belief that a CS was safer for them (86.3%) as well as safer for the baby (80.4%). Fear of vaginal birth was cited as their reason for preferring a CS in 78.4%. This was later followed by the predictability of a planned ERCS and knowing when the baby will be delivered (76.5%). Furthermore, 68.6% believed that an ERCS would not be as painful as VBAC. Participants chose ERCS in 58.8% if they were convinced that it was their doctor's opinion. The fear of losing bladder or bowel control as well as concern about better sexual function in the future was cited by 45%. The less common reasons given were concern about future vaginal prolapse (39.2%) and wanting a sterilisation (35.3%).

Table 4: Participants' perception of why ERCS may be preferable

	ERCS N=51 (%)		
Participants' perception of why ERCS may be preferable	**Yes**	**No**	**Unsure**
I had a CS previously	45(88.2)	5 (9.8)	1 (2.0)
CS is safer for me	44 (86.3)	5 (9.8)	2 (3.9)
CS is safer for my baby	41 (80.4)	4 (7.8)	6 (11.8)
I am afraid to give birth vaginally	40 (78.4)	8 (15.7)	3 (5.9)
I can plan when the baby will be born	39(76.5)	10 (19.6)	2 (3.9)
It is not as painful as vaginal birth	35 (68.6)	7 (13.7)	9 (17.7)
I don't want tears or cuts to my vagina	33 (64.7)	15 (29.4)	3 (5.9)
Doctors opinion	30(58.8)	20 (39.2)	1 (2.0)
Fear of losing bladder or bowel control	23 (45.1)	18 (35.3)	10 (19.6)
Better sexual function in the future	23 (45.1)	20 (39.2)	8 (15.7)
Worry about vaginal prolapse in future	20 (39.2)	20 (39.2)	11 (21.6)
I want a sterilisation	18 (35.3)	32 (62.7)	1 (2.0)

For the remaining 49% of participants who preferred VBAC, the reasons for their preferences are listed in Table 5. The most common reasons cited was their belief that a VBAC would allow them to recover faster (89.9%) and be home sooner (87.8%). The desire for a "natural" birth experience was cited by 85.7%. Their perception was that a VBAC was safer for themselves as well as their baby.

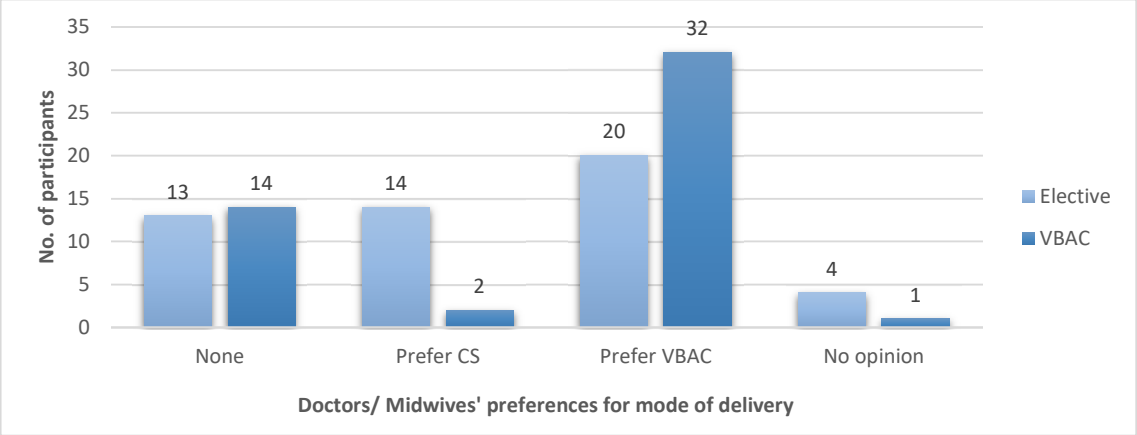
Table 5: Participants' perception of why VBAC may be preferable

Participants' perception of why VBAC may be preferable	VBAC N=49 (%) Yes	No	Unsure
I will recover faster	44 (89.9)	4 (8.1)	1 (2.0)
I will be home sooner	43(87.8)	6 (12.2)	0
VBAC is safer for me	42 (85.7)	4 (8.1)	3 (6.2)
VBAC is safer for my baby	42 (85.7)	2 (4.1)	5 (10.2)
I want a "natural" birth experience	42(85.7)	6 (12.2)	1(2.0)
I will be able to care for my baby better	37 (75.6)	11 (22.4)	1 (2.0)
I will be able to breastfeed sooner	34(69.4)	15 (30.6)	0
I am afraid to have another operation	33 (67.3)	16 (32.7)	0
VBAC not as painful as another operation	32 (65.3)	13 (26.6)	4 (8.1)
I plan to have a large family	27 (55.2)	21 (42.8)	1 (2.0)
Doctors opinion	26 (53.1)	21 (42.8)	2 (4.1)
I do not want another scar	26 (53.1)	21 (42.8)	2 (4.1)

Another frequent reason given by 75.6% of the participants in this group was the perception that she would be able to care for her baby better after VBAC compared to ERCS. An equal proportion of participants who preferred VBAC over ERCS did so because they were afraid to have another operation and believed that a VBAC was not as painful as another operation (65.3%). Other reasons listed were the desire to breastfeed sooner (69.4%) as well as their plan to have a large family (55.2%). The two least frequent reasons for preferring VBAC cited by 53.1% of participants was their reluctance to have another abdominal scar as well as it being their doctor's opinion. Interestingly, in the group who preferred ERCS, 60.7% chose ERCS even though they were advised by their doctor to have a VBAC.

Regarding the participants' perception of the doctor or midwife's opinion regarding their mode of delivery, all participants were asked whether they felt that their doctor or midwife preferred one method of delivery over another during their antenatal counselling. Of all the participants who had engaged with their doctor/midwife by the time of the interview about mode of delivery, it was clear that participants were greatly influenced by their opinion (p=0.001). Particularly if the doctor suggested a CS, the participants were likely to choose a CS. This is represented in Figure 10.

Figure 10: Doctors/midwives' preference and participants' preferred mode of delivery



All participants were asked a series of questions to assess their general knowledge about ERCS and VBAC. Their responses are tabulated in Table 6. It was found that the more the participants believed that a VBAC may be successful, the more they chose VBAC. In the group that chose VBAC, 32.6% were of the perception that there was a 90% chance of successful VBAC. Furthermore, the higher the presumed percentage of VBAC success the higher the uptake of VBAC. Conversely, the lower the presumed VBAC success rate, the higher the selection of ERCS as their preferred mode of delivery. ERCS was preferred in 23.5% of participants, based on their perception that they had only 1-5% success rate of VBAC. The participants who did not have any knowledge about the VBAC success rate had a huge difference in their preferred mode of delivery. This group were three times more likely to choose ERCS than VBAC. 75% chose ERCS whilst 25% opted for trial of VBAC ($p<0.001$). This finding is statistically significant.

The risk of uterine rupture followed the same pattern as seen with regards to VBAC success rate above. The more the study participants assumed the risk of uterine rupture with VBAC was high, the more they chose ERCS ($p= 0.023$). This was statistically significant. The group of participants who believed there was a severe risk of uterine rupture (20%) chose ERCS except 5% who nonetheless still opted for VBAC. Those participants who believed there was little or no risk, overwhelmingly chose VBAC above ERCS in both instances. The group who believed there was only a moderate risk of uterine rupture with VBAC had a relatively equal percentage for both modes of delivery options.

Table 6: Participants' general knowledge about ERCS vs VBAC

	Preferred Elective CS N=51 (%)	Preferred VBAC N=49 (%)	Total N=100 (%)
Trial of VBAC success rate			
1-5%	12 (23.5)	2 (4.1)	14 **(14)**
20-40%	9 (17.7)	3 (6.1)	12 **(12)**
40-60%	6 (11.8)	7 (14.3)	13 **(13)**
60-80%	1 (2.0)	14 (28.6)	15 **(15)**
90%	2 (3.9)	16 (32.6)	18 **(18)**
Don't know	21 (41.1)	7 (14.3)	28 **(28)**
Risk of Uterine Rupture with VBAC			
No risk	4 (7.8)	9 (18.4)	13 **(13)**
Low risk	4 (7.8)	12 (24.5)	16 **(16)**
Moderate risk	5 (9.8)	4 (8.1)	9 **(9)**
Severe risk	15 (29.4)	5 (10.2)	20 **(20)**
Don't know	23 (45.2)	19 (38.8)	42 **(42)**
Recovery Time After VBAC vs ERCS			
Same	11 (21.6)	2 (4.1)	13 **(13)**
Longer for ERCS	30 (58.8)	38 (77.5)	68 **(68)**
Longer for VBAC	3 (5.9)	2 (4.1)	5 **(5)**
Don't know	7 (13.7)	7 (14.3)	14 **(14)**
Increased Risk of Complications			
Yes	34 (66.7)	34 (69.4)	68 **(68)**
No	4 (7.8)	2 (4.1)	6 **(6)**
Don't know	13 (25.5)	13 (26.5)	26 **(26)**

The last interesting statistic from the participants general knowledge was related to the recovery time after VBAC vs ERCS. Five times more participants preferred an ERCS even if they thought the recovery time was the same for both delivery options (p= 0.062) but this was not statistically significant. VBAC was preferred by 77.5% if they perceived that the recovery was longer for ERCS. There was no statistically significant difference in the participants' general knowledge about the increased risk of complications with regards to ERCS (p= 0.650).

The participants were all asked about their knowledge of the adverse complications associated with ERCS compared to VBAC. Their responses are depicted in Table 7.

Table 7: Participants' knowledge about adverse complications of ERCS vs VBAC

Risk of ERCS vs VBAC	Preferred ERCS N=51 (%)			Preferred VBAC N=49 (%)			P Value
	Yes	No	Unsure	Yes	No	Unsure	
Death of the mother	17 (33.3)	17 (33.3)	17 (33.3)	14 (28.5)	12(24.5)	23 (47)	**0.365**
Death of the baby	9 (17.6)	30 (58.8)	12(23.6)	8 (16.3)	22(44.9)	19 (38.8)	**0.243**
Injury to organs in the mother	30 (58.8)	9 (17.6)	12(23.6)	20 (40.8)	11(22.4)	18 (36.8)	**0.186**
Excessive bleeding in the mother	27 (52.9)	10 (21.6)	13 (25.5)	30 (61.2)	7 (14.3)	12 (24.5)	**0.699**
Infection in the mother	28 (54.9)	12 (23.5)	11(21.6)	28 (57.1)	11(22.4)	10 (20.4)	**0.975**
Difficulty breathing in the baby	6 (11.8)	29 (56.9)	16 (31.3)	10 (20.4)	25(51)	14 (28.6)	**0.499**
Admission of the baby to NICU	13 (25.5)	22(43.2)	16(31.3)	14 (28.6)	19(38.8)	15 (32.6)	**0.741**
Risk of hysterectomy	24 (45.1)	10 (21.6)	17 (33.3)	21(42.)	10 (20.4)	18 (36.7)	**0.910**

Most participants (52%) did not believe that the neonate would be negatively impacted by a CS delivery and furthermore did not believe that there was a neonatal mortality risk associated with CS delivery (p= 0.243). Another large group of participants (54%) did not believe that there was any risk of difficulty with breathing in the baby (p= 0.499) nor did 41% believe that a CS delivery would necessitate the need for neonatal intensive care unit admission (p= 0.741). None of these reached statistical significance.

The maternal mortality associated with CS delivery was not clear to 40% of participants. In this group, 31% perceived that an ERCS could lead to their death, however, 17% chose this delivery option regardless of that. Due to their fear of death, 14% chose VBAC instead. Overall there was no statistically significant difference between those preferring ERCS or VBAC (p=0.365).

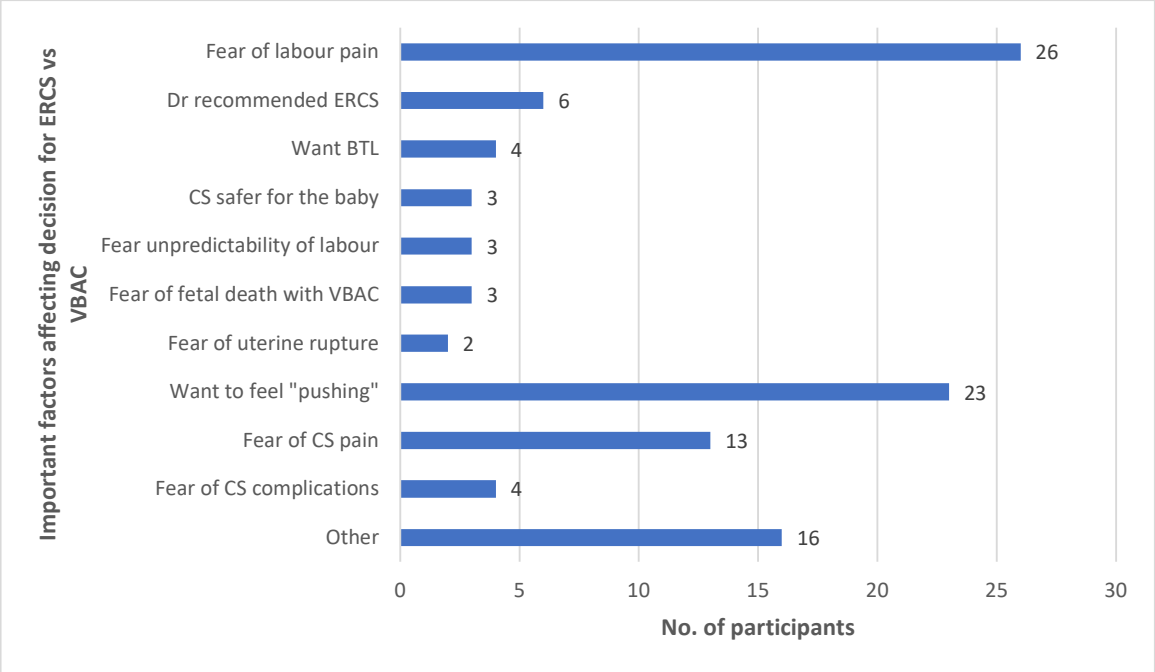
Half of the participants (50%) believed that CS could lead to injury of maternal organs intra-operatively whilst 56% of participants were aware of the greater risk of maternal infection associated with an operative delivery. Majority of participants (57%) were mindful of the risk of excessive bleeding during surgery and 45% of these participants were under the impression that this risk of heavy bleeding had the potential to lead to an emergency hysterectomy. Interestingly, 24% of these participants were still willing to proceed with their ERCS even with the knowledge of bleeding risk as well as the risk of proceeding to hysterectomy.

Participants were lastly asked what the most important factor was in their decision to try for VBAC or ERCS. This was an open-ended question where they were free to offer their own personal responses and were not prompted by the questionnaire. It was found that the largest percentage of responses was in relation to fear. Figure 11 represents a summary of the main participants' responses individually as well as a grouped category for the remainder of the less commonly quoted responses. The top 7 horizontal columns referred to the main reasons stated by the group that preferred ERCS and the subsequent 3 horizontal columns referred to the group that preferred VBAC.

Fear of the pain of labour stood out as the most commonly reported motivation for choosing ERCS in 26% of participants. Conversely, the intense desire to experience natural child birth and the act of pushing out their baby was the sentiment expressed by 23% of those participants who chose VBAC, as well as the fear of the pain of a CS (13%). A small proportion cited fear of the risk of uterine scar rupture (2%) with VBAC, whilst the fear of the risk of CS complications was a concern for 4%. Lastly, 3% of participants reported the fear of the unpredictability of labour as their main reason for choosing ERCS with a further 3% citing

their fear of fetal death with VBAC as the reason for their preference for ERCS. Interestingly 4% of participants chose ERCS due to their desire to have a bilateral tubal ligation.

Figure 11: Participants' most important factors affecting their decision to attempt ERCS vs VBAC



The remaining 16% comprised a variety of less commonly reported responses. Some of these included reduced risk of HIV transmission with ERCS in HIV positive participants with an unsuppressed viral load (2%), short interpregnancy interval making VBAC dangerous (3%), faster recovery after VBAC with less pain (2%) and prolonged pregnancy with contra-indication to induction of labour therefore necessitating ERCS (2%).

8. DISCUSSION

The topic of women's preferences for mode of delivery after a previous CS is an extremely complex one to analyse, as the determinants of their preferences are often multifactorial. In 1916, Dr Edwin Cragin, coined the phrase, "Once a caesarean, always a caesarean."[21] In current medical practise however, there has been a complete shift to the near universal recommendation to attempt a VBAC.[14] The pendulum these days swings between two safe birth options available after a previous CS:

1. A trial of VBAC
2. A planned ERCS[31]

In the South African public health care sector, CS on maternal request is not routinely offered in the general obstetric population unless there is a relevant medical or obstetric contra-indication to vaginal birth. However, in women who have had a previous CS for whom the possibility of repeat CS is close to 40%, their preference for mode of delivery is considered. This should ideally be based on them having the correct information, being adequately counselled about the above-mentioned birth options and not simply on patient's request.

South African literature on women's preferences for mode of delivery after a previous CS is extremely limited, making the study unique and the first of its kind. The study included 100 participants who were eligible for VBAC. After the interview-based WHO-adapted questionnaire was conducted, 51% of participants preferred ERCS whilst 49% preferred VBAC. This fortuitous outcome allowed for these two groups to be compared with ease due to the similarity in their numbers and characteristics.

When comparing the difference between preference for mode of delivery between the two institutions where participants were recruited (ie. MMH and NSH), proportionately more participants (66.7%) at NSH chose ERCS compared to MMH, where more participants (51.8%) chose VBAC. This discrepancy raises the question of standardised antenatal counselling and obstetric practices at the different public sector hospitals, however, was not found to be statistically significant (Odds ratio 2.146 [95% CI 0.684 – 6.729] p=0.264).

The determinants which were found to be significant included relationship status, health care worker influence and previous long/obstructed labour. There were more determinants not found to be statistically significant eg. age, level of education, income, obstetric history, HIV status etc. However, some trends observed may have been significant if the study had a larger and more diverse number.

The determinants investigated which the investigators had thought might influence the participants' decision-making are divided into 6 main categories.

1. Socio-demographics
2. Past/ current obstetric history
3. Previous CS/ labour experience
4. HCW/ other influence
5. Perceived knowledge or lack thereof
6. Fear

This analysis breakdown is directly comparable to a systematic review by Black et al (2016). It also showed that women's attitudes towards birth after CS, may be shaped by distinct clusters of influences.[19] The above-mentioned determinants will each be discussed in further detail, in relation to the current study findings and compared to international literature.

8.1 SOCIO-DEMOGRAPHICS

The study compared women's preferences for mode of delivery against several socio-demographic characteristics. There was no statistically significant association between age, ethnicity, home language, level of education, monthly income and preferred mode of delivery. The findings are comparable to an American study by Bernstein S.N et al (2014). Their study included a total of 155 women, 56.1% who chose VBAC and 43.9% who preferred ERCS. Their analysis also showed no statistically significant difference in the socio-demographic characteristics of the population.[21]

Although not significant, the current study found that more women over the age of 30 years chose ERCS over VBAC. This could be due to participants being more certain about their future family size, being in more established relationships and having greater financial security (either personal income or support from a partner or spouse). This may have motivated them to choose an ERCS as often they were certain that this would be their last pregnancy and would not be exposed to the morbidity of a third ERCS. In contrast, Bernstein's study had more than 75% of their participants over the age of 30 years in both groups ie. VBAC and ERCS.

In SA, ethnicity is very closely linked to socio-economic status. The population served by the institutions where the participants were recruited are from poor, historically disadvantaged backgrounds and this is reflected by the two ethnic groups represented in the study. There is also a large black foreign refugee population frequenting these institutions for antenatal care. The most notable finding was that the non-SA participants chose a VBAC in 68.2% compared to the SA participants who chose VBAC in 43.6%. This may be explained by the personal wishes, cultural norms, religious beliefs and spouse recommendations in these groups. Vaginal birth is often seen as a rite of passage and an integral part of being a woman. Many non-SA participants were reluctant to have an ERCS due to the stigma associated with their inability to give birth vaginally and their intense desire to experience the natural act of pushing out their baby. Similarly, an Australian cohort of women choosing VBAC also considered it a more natural way to work with their bodies.[32]

Knowledge and education both play key roles in decision-making. Although not a significant finding, more participants (56%) who had access to higher education ie. completed high school and tertiary education, preferred VBAC over ERCS (p=0.110). Their decisions may have been based on knowledge acquired through higher education and therefore most likely access to resources such as internet, magazines, social media etc contributing to their informed decision-making.

Interestingly, a significant association in the relationship status of participants was found (p=0.011). Married couples and those in a co-habiting relationship, more frequently chose VBAC compared to single participants and those in a non-co-habiting relationship, who more

frequently chose ERCS. This may be explained by the support system offered by a relationship to attempt a VBAC with more shared knowledge, assistance with confinement and combined decision-making. Leone et al (2008) showed that women who exchange reproductive health information with friends and family are less likely to experience a CS than their counterparts.

Even though the study did not demonstrate a significant association between most of the socio-demographic characteristics and preferred mode of delivery, it is possible that a larger and more diverse study number would have further explored these differences. Leone et al (2008) showed that socio-economic status affected mode of delivery. Women who had better access to antenatal care due to their higher socio-economic backgrounds, were more likely to undergo a CS. These findings were from the review of over 20 000 births from six developing countries (viz. Bangladesh, Colombia, Dominican Republic, Egypt, Morocco and Vietnam).[33]

8.2 PAST/CURRENT OBSTETRIC HISTORY

The past obstetric history of the study population was expected to have an impact on their preference for delivery in the subsequent pregnancy. The study was conducted in a seemingly low risk population of which 80% did not have any antenatal complications. Majority of participants (81%) had their first antenatal booking visit at a MOU in their community and were suitable to follow up there up to 36 weeks gestation. Thereafter the participants were referred to MMH and NSH (which are secondary level obstetric units) for the remainder of their pregnancy and delivery, in view of the risks associated with previous CS. Higher-risk participants and those known with complex medical diseases were referred to a tertiary obstetric unit from the time of their first antenatal booking visit. Furthermore, participants were excluded from the study if they had an indication for repeat CS (eg. two previous CS, multiple pregnancy or breech), making all those interviewed eligible for VBAC. In the 80 participants who had no antenatal complications, there was no difference in those who preferred ERCS (N=41) vs those who preferred VBAC (N=39).

Participants discussed their delivery options with their spouse/partner in 54% of cases (p=0.260). Most participants had already made up their mind about their preference prior to

consultation with a HCW. Only 22% of participants discussed their delivery options with their doctor at a routine antenatal visit. This was followed by family members (18%) and friends (4%). There was no significant difference in preference for mode of delivery between those participants who discussed their birth options with a doctor compared to those who discussed their options with their spouse/partner, family member and friends. All participants at their initial antenatal booking visit are offered voluntary HIV counselling and testing. Those already known to be HIV positive and on treatment had their routine anti-retroviral drugs continued. All those newly diagnosed or not already on treatment were initiated on the same day. A viral load is checked every three months antenatally to ensure adequate viral load suppression prior to delivery. This practise is in keeping with the Western Cape Consolidated Guidelines on HIV Management (2018).[34]

All the participants knew their HIV status at the time of the interview and 17% of the population who were HIV positive, were all on anti-retroviral drugs. Participants who were on anti-retroviral drugs with a suppressed viral load were more inclined to choose VBAC compared to ERCS, although this association was not found to be statistically significant (p=0.536). Participants have become more knowledgeable regarding HIV transmission and this is steering their decision making. The role out of anti-retroviral treatment has had a positive influence on the population and the delivery choices they feel empowered to make.

The local practice of viral load monitoring antenatally is well outlined in the above-mentioned guideline.[34] In SA however, it is not policy to perform ERCS for women with unsuppressed viral loads alone, but instead to treat the neonate as high-risk HIV exposure post-delivery. Intensive adherence counselling is offered throughout the antenatal course if there is a concern regarding lack of viral load suppression. Conversely in America, where unsuppressed viral load is an indication for ERCS, a recent ACOG Committee Opinion reported that women should have the option to undergo VBAC despite an unsuppressed viral load, provided they make an informed decision.[35]

8.3 PREVIOUS CS/ LABOUR EXPERIENCE

To fully appreciate the reasons for the participants' birth preferences, a series of questions were asked related to their previous CS experiences as well as their previous vaginal deliveries where relevant. The data obtained from their responses was completely reliant on participants' recall of events of their previous birthing experience, as their old medical records documenting their delivery history was not accessed. A total of 27% of participants had experienced a previous vaginal delivery as well as a previous CS compared to 73% who had experienced a previous CS alone. It was found that 59.3% of the participants who had experienced both modes of delivery, chose ERCS compared to 40.7% who chose VBAC and did not previously experience a vaginal birth (p=0.529). Whether or not the participants had a previous vaginal delivery or VBAC, did not affect their preference for mode of delivery in a statistically significant manner. An online survey by Bonzon et al (2017), investigating women's preferences for birth after a previous CS in Western Switzerland also showed no significant difference between birth options, regardless of having a previous vaginal birth.[36]

Fourteen percent of the participant's previous CSs were done electively. The indications included breech presentation, fetal anomaly, fetal macrosomia with hydrocephalus and placenta praevia. The remaining 77% had an emergency CS for various reasons viz obstructed labour, delayed second stage, fetal heart rate concern, failed induction of labour, high blood pressure etc. A subgroup analysis compared the reasons for the participants' previous CS and their subsequent preferred mode of delivery. It was found that participants with a previous difficult labour were more inclined to choose an ERCS, but this was not significant. In instances where the indication for the previous CS was related to "fetal heart rate dropping", 60% of participants preferred VBAC. This indicates that the intrapartum complication of fetal heart rate concern was thought by participants to be a non-recurring indication, compared to prolonged/obstructed labour. Moreover, some participants believed that they did not need the initial CS in the first place, as they had a good neonatal outcome.

A comparison was made between cervical dilatation in previous labour and preferred mode of delivery. There were no statistically significant differences between cervical dilatation and

preference for mode of delivery (p=0.837). The two participants who were >6cm dilated (but not yet fully dilated) however, preferred a VBAC.

A further comparison was made between participants' satisfaction with their previous CS experience and their preferred mode of delivery. Their responses in terms of satisfaction were two-fold. They recalled their satisfaction with regards to the indication for their primary CS as well as the CS process ie. surgery itself, pain control post operatively and recovery time. It was found that the satisfaction from the previous CS did not affect the current choice in a statistically significant manner (p=0.226). Despite this however, more participants who were dissatisfied, chose VBAC. A repeat analysis of all those who were satisfied (ie. "satisfied" and "very satisfied") compared to those who were previously dissatisfied, did not reach statistical significance when comparing preference for current delivery (p=0.272).

Participants' pain control in labour was not assessed in the study. It is possible that their satisfaction from their CS experience may be attributed to the relief offered from the pain of labour. In addition, fear of a repeat difficult labour could influence preference for ERCS. At MMH and NSH participants are provided the opportunity to have a birth companion present as their value in diminishing the pain of labour has been recognised. This may be a spouse, relative, friend or doula if the fore-mentioned persons are not available. A large Cochrane Systematic Review done in 2013 showed the benefits of having a birth companion. Not only did it prove a reduction in the duration of labour but a reduction in the need for CS as well.[37]

The medical pain relief options in labour include the use of Entonox gas via face mask (a mixture of nitrous oxide and oxygen to help take the edge off pain during a contraction), intramuscular Morphine or epidural anaesthesia. The availability of epidural anaesthesia is unfortunately very limited by a shortage of trained nursing staff and the constant demand for the anaesthetist in the operating theatre. This was identified by Horak et al (2012) in which an analysis was performed of the CS rate at MMH.[38] A designated anaesthetic team purely available to provide epidurals for women in labour is not available in the institution. A shared duty exists to provide anaesthetic cover for all CS performed as well. It is therefore virtually impossible to provide a dedicated epidural service due to the huge theatre demand.

Van Zyl et al (2006) highlighted the increased CS rate at MMH and reported that fetal distress, failure to progress and malpresentations contributed the most to the increased rate. It also emphasised the importance of the correct indication for the primary CS. This was shown to contribute to the challenge in decision-making regarding subsequent deliveries.[39]

The current study assessed the participants' recollection of their pain control after their previous CS. In instances where pain was perceived as being poorly controlled 63.6% chose VBAC to avoid the level of pain previously experienced. In those who had a very easy recovery from their previous surgery 56% opted for ERCS. There was no difference in their mode of delivery preference with respect to unhappiness about an abdominal scar (p=0.835).

8.4 HEALTHCARE WORKER INFLUENCE

All participants were asked whether they felt that their doctor or midwife preferred one method of delivery over another during their antenatal counselling. Of all the participants who engaged their doctor/midwife by the time of the interview about mode of delivery, it was clear that participants were greatly influenced by their opinion. Particularly if the doctor suggested a CS, the participants were likely to choose a CS (p=0.001).

These findings are in keeping with a recent Israeli study in 2017. A total of 197 women were interviewed to try to assess the factors influencing their decision-making regarding mode of delivery after a previous CS. Those who chose VBAC amounted to 51.3% compared to those who preferred ERCS (48.7%). The latter group of participants were notably more influenced by their physicians.[40]

Participants in the current study perceived that HCWs recommended VBAC in 52% overall. This appears to be surprising, as all the participants recruited were eligible for VBAC. Therefore, it would be safe to assume that all HCWs would have encouraged a VBAC but the participants' perception of the interaction with the HCW did not translate into an overwhelming preference for VBAC. In the group who did in fact perceive that VBAC was recommended by

the HCW, the majority chose VBAC. Furthermore, 16% of the participants perceived that HCWs recommended ERCS and in this group, the majority chose ERCS. Of all the participants who engaged their doctor by the time of the interview about mode of delivery, it was clear that participants were greatly influenced by their opinion in a statistically significant manner (p=0.001).

These findings are comparable to an American study by Bernstein et al (2012). They found that participants who perceived HCWs preferred ERCS, 86% chose ERCS. Furthermore, when they perceived that HCWs preferred a VBAC, 78% chose VBAC. Of their participants who stated their doctor had no preference or did not know their doctor's preference, 50% chose VBAC and 50% chose ERCS respectively.[21]

This highlights the strong influence that HCW opinion has on participants' preferences. It is therefore important to try to understand what the opinions of the HCWs are when counselling participants and to understand what drives their recommendations. For example, a survey regarding VBAC administered to fellows of the ACOG in 2005 indicated that doctors were performing an increasing number of CS. The risk of liability and patient preference were the primary reasons cited.[41]

The RCOG, the NICE, as well as the American and Canadian Colleges of Obstetricians and Gynaecologists all have clear guidelines as to the management of women with one previous CS.[13,42] This provides an excellent evidence-based advisory to HCWs. In the local context, the National Department of Health has its own set of guidelines for maternity care in SA, which similarly recommends VBAC in the absence of any contra-indications.[43] Furthermore, research papers globally have data to support the safety of VBAC in an attempt to reduce the steady increase in CS rates worldwide.[4]

Even though VBAC is a suitable birth option for most women, the rising concern, particularly in the private practise arena, is the fear of litigation. In a government facility such as MMH and NSH, there is 24-hour access to an operating theatre, anaesthetist and paediatrician on duty.

The same cannot be said for private practitioners in SA who need to call upon all the stakeholders if an emergency CS needs to be performed for a failed VBAC at an unpredictable hour. Herein lies the fear of the practitioner together with the risks of a VBAC, making them vulnerable to medico-legal action.

There has been an exponential increase in the cost of indemnity insurance for private specialists in obstetrics. Even though the fear of litigation is a non-medical reason to curb the practice of a VBAC, it has become more reported recently due to medical malpractice concerns. In the last ten years between 2005 and 2015 the rate that private obstetricians are expected to contribute has gone up by 382% totalling close to one million rand per annum.[44] The former SA Minister of Health Mr Aaron Motsoaledi commented on the above-mentioned in 2015, noting that the expense of indemnity insurance would be likely to discourage young doctors in choosing obstetrics as a career in the future.[45] This is certainly not a phenomenon unique to SA as many obstetricians in America, London and Canada are also reporting the same occurrences abroad. Dr Graham Howarth, Medical Protection Society's Head of Medical Services for Africa has been quoted on many occasions regarding obstetrics in private practise and his concern that fewer specialists are choosing to practise obstetrics once they enter the private arena.[46]

HCW fear of VBAC is further evidenced by a 2016 study. Focus group interviews with clinicians and women in three countries with high VBAC rates (Finland, Sweden and the Netherlands) and three countries with low VBAC rates (Ireland, Italy and Germany) are part of "OptiBIRTH", an ongoing research project. The study reported that fear was a key inhibitor of a successful VBAC ie. women's fear of childbirth, including clinicians' fear of VBAC and the ways that clinicians' fear can be transferred to women.[47] Furthermore, a large European study compared the attitudes of obstetricians in eight countries viz. Luxembourg, Netherlands, Sweden, France, Germany, Italy, Spain and UK. It was found that legal liability and cultural practices played a role in their decision making rather than concrete medical indications.[48]

This body of evidence has made it quite apparent that the uptake of VBAC is dependant on multiple factors, but the HCW choice seems to be the one of the most important determinants.

It is therefore important to try and address why they are so fearful of VBAC when managing their patients according to nationally accepted guidelines.

A higher rate of adverse maternal outcomes has been observed in women following emergency CS ie failed attempt at VBAC, particularly uterine rupture (0.2%), uterine scar dehiscence, need for blood transfusion, hysterectomy and maternal morbidity. It also includes a prolonged hospital stay, higher incidences of wound infection, fever, haemorrhage and urinary tract infection.[47] Emergency CS is also associated with a higher risk of poor neonatal outcomes including poor Apgar scores, hypoxia, admission to neonatal intensive care unit, neonatal morbidity and mortality.[50] These are some of the reasons HCW fear the consequences of a failed VBAC, particularly in private practise where the delay to facilitate an operative delivery may worsen the outcome.

8.5 PERCEIVED KNOWLEDGE OR LACK THEREOF

All participants were asked a series of questions to assess their general knowledge about ERCS and VBAC. The more the participants perceived a VBAC to be successful, the more they were inclined to choose this option. VBAC was chosen by 89% with the perception that there was a 90% chance of a successful outcome. The higher the perceived VBAC success, the higher the uptake thereof. This finding was statistically significant ($p<0.001$). Conversely, the lower the perceived VBAC success, the lower the uptake and the preferred selection of ERCS instead. As their perception of VBAC success likelihood decreased, their preference for ERCS increased. This was identified in 86% of participants who chose ERCS with the perception that VBAC success was limited to 1-5%.

The participants who did not have any perceived knowledge about VBAC success rate had a huge difference in their preferred mode of delivery. This group were three times more likely to choose ERCS than VBAC. This further supports the hypothesis that participants' knowledge and perceptions directly influence their decision making regarding their preferred mode of delivery.

Participants were also asked about their perceived knowledge of the risk of uterine rupture with VBAC and recovery time after VBAC vs ERCS. The more the participants assumed the risk of uterine rupture with VBAC was high, the more they chose ERCS. Conversely in the participants who assumed the risk of uterine rupture to be low, then VBAC was their choice of preference. This finding was statistically significant (p=0.023).

Participants' perceptions of recovery time after ERCS and VBAC did not appear to influence their mode of delivery preference. In addition, there was no statistically significant difference in the participants' general knowledge about the risk of complications with regards to ERCS (p= 0.650). It is therefore quite clear that knowledge significantly influences their decision-making, which is based on their personal experience, word of mouth, HCW advice and general media resources.

In an American study assessing the relationship between personal knowledge and preference for mode of delivery after a previous CS, it was found that more knowledge about the risks and benefits of VBAC vs ERCS was positively associated with the decision for VBAC.[51] Another study supporting this finding by Ghotbi et al (2014) in Iran, showed that poor knowledge scores were found to have a higher incidence of choosing ERCS.[52] Lastly, an Australian study by Chen et al (2012) further showed that poor knowledge relating to risks and benefits of birth options after previous CS also affected their choices in subsequent pregnancies. This study found that most women chose ERCS rather than VBAC if their knowledge about the birth options were poor.[53] These findings are important for HCWs to take heed of when counselling women about their birth options antenatally. The knowledge imparted will have a direct impact on their future birth preferences.

8.6 FEAR

Most participants in the study preferred ERCS (51%). There were several reasons cited for their preference, primarily a history of previous CS (88.2%) and fear of the risks associated with VBAC. This groups main perception was that an ERCS was safer for them (86.3%) but not necessarily for the baby (0.07%) (p=0.741).

Fear was identified as a major determinant as 78.4% cited fear of vaginal birth as their reason for preferring a CS. Fear of the unpredictability of VBAC and allowing for the planned timing of ERCS was preferred in 76.4%. A further 68.6% believed that an ERCS would not be as painful as VBAC and 58.8% chose ERCS if they were convinced that it was their doctor's opinion. Lastly, 45% cited fear of losing bladder/bowel control and fear regarding future sexual function respectively. The least cited reasons for their preference for ERCS was concern about future vaginal prolapse (39.2%).

In a European study assessing the clinicians' views of determinants for improving VBAC uptake, fear was identified as a major role player. Seventy-one clinicians participated in nine focus group interviews in Ireland, Italy and Germany. They found that fear was identified as a major inhibitor of preference for VBAC. This included fear of labour pain on the part of the patients as well as fear of risks of VBAC on the part of the clinician. It also addressed the likelihood of transferring their own fear to the patients they were caring for.[47]

The main reason cited by the group of participants who preferred VBAC (49%), was the perception that VBAC would allow them to recover faster (89.8%). Their fear of delayed healing and recovery was a huge motivation to avoid ERCS. Their desire to be home sooner (87.7%) also favoured their choice, compared to prolonged hospitalisation with ERCS. These findings are very similar to a much larger study reviewing the literature on this topic from the Cochrane Database (1980-2002). It was found that women were more likely to choose VBAC if they had a previous vaginal delivery compared to those who did not. The overall reason for selecting VBAC was easier recovery and desire to be home sooner to care for other children.[54]

Amongst participants who preferred VBAC, 85.7% stated that they did not want to be denied a "natural" birth experience. They also perceived that VBAC would be safer for them as well as their baby. An equal proportion of participants who preferred VBAC, did so because they were afraid to have another operation and believed that a VBAC was not as painful as another operation (67%).

Other reasons cited for their preference for VBAC was their desire to breastfeed sooner (69.3%) and planning a larger family (55.1%). These participants were quite certain that they would

plan another pregnancy and were aware of the morbidity associated with multiple CS therefore choosing VBAC. The least frequent reason cited by participants was their reluctance to have another abdominal scar (53%) and a further 53% chose a VBAC if it was their doctor's opinion.

In an Australian study by Toohill et al (2014) assessing the prevalence of childbirth fear, it was found that their fear determinants were internationally comparable. Previous delivery mode, parity and employment all contributed to the fear experienced. A previous vaginal delivery however, was found to be protective of childbirth fear.[55]

The participants were asked a series of questions to assess their knowledge about adverse complications of ERCS compared to VBAC. A large proportion (40%) were uncertain about maternal mortality associated with ERCS. The group of participants who perceived that an ERCS could lead to their death totalled 31%. These findings are in keeping with Bernstein et al (2012) where the same question was asked. Only 30% or fewer knew that an ERCS is associated with an increased risk of maternal death.[21] Interestingly, 17% of participants in this study still chose ERCS regardless of that. Due to their fear of death, 14% chose VBAC instead.

On further enquiry 50% of participants believed that CS could lead to injury of maternal organs intra-operatively whilst 56% of participants were aware of the greater risk of maternal infection associated with an operative delivery. Majority of participants (57%) were mindful of the risk of excessive bleeding during surgery and 45% of these participants were under the impression that the risk of heavy bleeding had the potential to lead to an emergency hysterectomy. Of these participants, 24% still preferred ERCS. Once again, these findings are directly comparable to Bernstein et al (2012). They also found that at least 50% of women in both groups (those who preferred ERCS and VBAC) were aware that there was a greater risk of damage to organs, excessive bleeding, and infection.[21]

Fear regarding the well-being of the neonate did not appear to be a major determinant in the participants' preferences ($p=0.243$). The majority (52%) did not believe that there was a neonatal mortality risk associated with ERCS. However, 31% of participants were unsure

thereof. A further 54% did not believe that there was any risk of difficulty with breathing in the neonate nor did 41% believe that an ERCS would necessitate the need for neonatal intensive care unit admission. This contrasts with Bernstein et al (2012) who found that 30% or fewer knew that an ERCS was associated with an increased risk of neonatal respiratory compromise and admission to the neonatal intensive care unit.[21]

9. STRENGTHS AND LIMITATIONS

The main strength is that it is one of the first studies to be done in SA on preferences for mode of delivery amongst women with a previous CS and endeavoured to understand the reasons for these preferences. The relatively equal number of participants in each group of preference for mode of delivery (ERCS 51% vs VBAC 49%) made the analysis of their responses very easy to interpret. All eligible participants, based on the inclusion criteria, were suitable for a VBAC minimising the risk of selection bias. Furthermore, all high-risk pregnancies were excluded.

The questionnaire was interview-based and standardised. The strength herein lies in the fact that all the interviews were conducted by one interviewer eliminating any inter-observer bias. Conversely this may have contributed to a limitation of the study. Participants may have felt pressured to answer questions in a way they perceived the HCW conducting the interview expected. This theoretical pressure could have been avoided if the questionnaire was self-administered. However, having the interviewer present alleviated any misinterpretation of questions and more importantly, leaving questions unanswered. Participants were reassured that the questionnaire was anonymous and that their responses would neither impact on the antenatal care they received nor attempt to influence their decision-making regarding their preferred mode of delivery.

In current obstetric practice, there is no standardisation in the timing of HCW counselling regarding mode of delivery. Since the inclusion criteria spanned from 36-41 weeks gestational age, many participants had already received counselling regarding the two birth options and their associated risk factors at the time of the interview. It is now evident the influence that

HCWs have on women's preferences, so their responses may have been altered once counselling was received.

The major limitation was that the overall sample size may have been too small to be able to identify all statistically significant determinants of women's preferences. This was related to time constraints given that this study was performed for an MMED.

Another limitation was the reliance on participants' recollection of events from their previous pregnancy. Past medical records were not accessed in order to verify the details of their previous delivery, as this would have required additional research staff to record the data. There is therefore the likelihood of recall bias in some participants. With regards to their previous delivery experience, participants weren't asked about their pain control during labour. The questionnaire was limited to pain control and recovery after CS only.

Since the study findings confirm that fear of labour pain is a large determinant in their preference for mode of delivery, perhaps if participants' pain in labour was better controlled, they would be more inclined to attempt VBAC. Fear driven by personal experiences or the experiences of relatives or community members was not explored. Furthermore, participants were not followed up after their interview to ascertain whether their preferred mode of delivery was in fact successful and to review their satisfaction with their choice postnatally.

The study did not thoroughly explore the degree of external influence exerted by the spouse, parents, in-laws and friends of the participants on their preference for mode of delivery, beyond briefly discussing it with them. Lastly, the main resource participants utilised, besides word of mouth, to acquire information regarding birth options, associated risks and adverse complications was not confirmed. This limits our health promotion ability as the source of media participants are frequenting should be utilised to promote knowledge regarding birth options in the future.

10. IMPLICATIONS FOR FUTURE RESEARCH

Expanding the current study into a larger sample may identify more statistically significant determinants of women's preferences. This study has highlighted fear, in several respects, as a large determinant. In the future more detailed information about the precise elements of fear should try to be elicited and the conditions under which fear influences their preferences for mode of delivery.

Fear of pain in labour stood out as a prominent deterrent against VBAC. Since the study did not address pain control in labour in their primary CS experience, a very useful follow-up study could assess pain relief options in labour whilst attempting VBAC, including more liberal use of epidurals. It would be interesting to compare participants having a VBAC, with and without an epidural by their choice, and analysing which proportion of them proceed to deliver vaginally compared to those who require an emergency CS.

Furthermore, another follow-up study using a similar adapted questionnaire could interview participants antenatally, as well as at the six-week postnatal visit and compare their perceptions pre-delivery and post-delivery respectively. This longitudinal study could compare their preferences for mode of delivery indicated antenatally and the actual successful outcome of their preference thereafter.

Moreover, knowledge about mode of delivery after a CS has not been adequately assessed. Another study could implement an educational tool to provide information about ERCS vs VBAC. Thereafter two comparison groups, those who received the antenatal educational tool compared to those who did not could be analysed. The counselling styles of HCWs and the impact the education tool provided on patient preference could be assessed to see whether it made a significant difference to their decision-making.

Lastly, it would be innovative to apply the same research study as in this one, to a private sector cohort in Cape Town. Comparisons can be drawn between patient preferences as well as HCW preferences between the state and private sectors and the reasons for their preferred mode of delivery. It would be enlightening to analyse the study findings and compare the differences and similarities between the public and private sector cohorts.

11. RECOMMENDATIONS

1. **An antenatally administered assessment tool to address the background knowledge and fears of women with previous CS.**

Fear was identified as a major determinant in woman's preferences for mode of delivery. Therefore, an assessment tool to address the background behind these women's fears is recommended. This could be in the form of a self-administered questionnaire at their initial booking visit, so the lines of communication may be opened early on, in the HCW-patient relationship. This will steer the counselling required at the MOU level and by the time they are referred to secondary level care, many fears may have been allayed. The HCWs contribution at the initial consultation at 36 weeks can then address any remaining fears (as opposed to starting the dialogue regarding delivery preferences and risks), share further information as required and offer further support to the women's decision-making.

2. Improve, standardise and use on line technology for sharing information to women with previous CS at their antenatal visits.

The study did not ascertain the source of participants' knowledge regarding their preferred mode of delivery. This gap provides an antenatal opportunity to offer standardised sharing of education to women at their antenatal visits. It is often very difficult to provide talks, demonstrations or video footage to large groups in busy waiting rooms. Instead, information pamphlets can be provided to all women sharing information about the birth options and associated risks. Furthermore, a free on-line platform can be designed which will send regular messages to patients' cell phones providing easily accessible information in the comfort of their own home to read whenever they find convenient. All participants had access to a cellphone and we recommend that this medium be utilised as a highly valuable resource in providing access to education to our patients.

3. A designated multi-disciplinary "VBAC team" comprising an anaesthetist, obstetrician, midwife and paediatrician.

This is highly recommended and will require buy-in from all the respective specialities to reduce the ever-increasing CS rate and in so doing, reduce the maternal and neonatal morbidity associated with CS delivery simultaneously. An epidural service in the labour ward would go a long way to women's uptake of VBAC and address many of the fears that have been highlighted in the study findings.

12. CONCLUSION

This study which explored knowledge, attitudes and preferences of women who had had one previous CS, concerning their preference for mode of delivery, is one of the first to be done in SA. Despite all participants being medically eligible for VBAC, only 49% preferred this option, the remaining 51% preferring ERCS. Significant determinants of their choice were unstable relationships, influence of the HCW, concern about uterine rupture and fear of labour and unpredictability. Knowledge of the complications of ERCS and VBAC was very limited. This information is useful to design further research to improve understanding of these issues and to design services in a way to overcome the identified problems. In particular, women must be provided non-biased evidence-based information in order to foster a relationship of trust with the health care worker, in assisting her to make an informed decision. Similarly improving respectful competent care of women in labour will assist in reducing fear in the future.

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14. APPENDIX

APPENDIX A: ROBSON'S TEN-GROUP CLASSIFICATION

GROUP	CLASSIFICATION
1	Nulliparous, single cephalic, ≥37 weeks, in spontaneous labour
2	Nulliparous, single cephalic, ≥37 weeks induced (including pre-labour CS)
3	Multiparous (excluding previous CS), single cephalic, ≥37 weeks, in spontaneous labour
4	Multiparous (excluding previous CS), single cephalic, ≥37 weeks, induced (including pre-labour CS)
5	Previous CS, single cephalic, ≥37 weeks
6	All nulliparous breeches
7	All multiparous breeches (including previous CS)
8	All multiple pregnancies (including previous CS)
9	All transverse/oblique lies (including previous CS)
10	All preterm single cephalic, <37 weeks, including previous CS

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APPENDIX B: QUESTIONNAIRE

TRIAL OF LABOUR OR ELECTIVE REPEAT CAESAREAN SECTION IN WOMEN WHO HAVE HAD ONE PREVIOUS CAESAREAN SECTION:

AN ASSESSMENT OF WOMEN'S ATTITUDES, KNOWLEDGE AND PREFERENCES

Patient Study Number

_____

Date of interview

_____

Interviewer

_____

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Home language?
   1= English
   2= Afrikaans
   3= Xhosa
   4= Other (please specify)

2. Highest level of Education:
   1= primary school incomplete
   2= primary school complete
   3= high school incomplete
   4= high school complete
   5= tertiary

3. What is your monthly income?

   1= <R3 000

   2= R3 000 – R10 000

   3= >R10 000

4. Are you in a relationship?

   0= Single

   1= Steady partner (not co-habiting)

   2= Steady partner (co-habiting)

   3= Married

   4= Divorced

   5= Widowed

SECTION B: OBSTETRIC HISTORY

5. How was this pregnancy conceived?

   1= Spontaneously

   2= Fertility treatment

6. How many more children are you planning to have after this child?

   0= none

   1= 1 more

   2= 2 more

   3= 3 or more

7. The person with whom you discussed your plans for delivery was?

   1= Spouse/partner

   2= A family member

   3= A friend

   4= Other (please specify)

SECTION C: PREVIOUS CAESAREAN SECTION EXPERIENCE

8. What was the reason you had a caesarean section?

   1= The baby would not come

   2= Long labour

   3= The baby's heart rate dropped or was concerning

   4= The baby was in the breech position

   5= Failed induction of labour

   6= Elevated blood pressure

   7= Antepartum haemorrhage

   8= Other (please specify)

9. How far did you dilate?

   1= Not at all

   2= No more than 6cm

   3= I was fully dilated

   4= I was fully dilated and pushed

   5= The doctor attempted a vacuum/forceps delivery but failed

10. How satisfied are you with your previous caesarean section experience?

    1= Very satisfied

    2= Satisfied

    3= Dissatisfied

11. How well was your pain controlled after the surgery?

    1= Very well controlled

    2= Moderately well controlled

    3= Poorly controlled

    4= Very poorly controlled

12. Recovery from the surgery was:

    1= As hard as I expected

    2= Harder than I expected

    3= Easier than I expected

13. I am bothered by the scar on my belly:

    1= Very much

    2= Somewhat

    3= Not at all

SECTION D: PREFERENCES AND PERCEPTIONS ABOUT MODE OF DELIVERY

14. I would prefer a vaginal birth after caesarean section (VBAC) because…….(every question must be answered)

	1= Yes	2= No	3= Unsure
It is safer for me			
It is safer for my baby			
I am afraid to have another operation			
It will not be as painful as an operation			
I want a "natural" birth experience			
I do not want another scar			
I will be able to care for my baby better			
I will be able to breastfeed sooner			
I will be home sooner			
I will recover faster			
I plan to have a large family			
My doctor's opinion			
Other: please specify			

15. I would prefer a repeat elective caesarean section because……..(every question must be answered)

	1= Yes	2= No	3= Unsure
It is safer for me			
It is safer for my baby			
I am afraid to give birth vaginally			
I had a caesarean section previously			
It is not as painful as giving birth vaginally			

I can plan when the baby will be born			
I want a sterilisation			
I don't want tears or cuts to my vagina			
I am worried that I won't be able to control my bladder or bowel in the future			
I am worried that I will have a vaginal prolapse in the future			
I think it is better for my future sexual function			
My doctor's opinion			
Other: please specify			

SECTION E: COUNSELLING / GENERAL KNOWLEDGE

16. Do you feel your doctor/midwife preferred one method of delivery over another?
    1= My doctor/midwife did not have a preference
    2= My doctor/midwife preferred that I have a repeat caesarean section
    3= My doctor/midwife preferred that I try for a vaginal delivery
    4= My doctor/midwife did not express an opinion one way or another

17. If I were to try for a trial of vaginal labour, my overall chances of success are:
    1= 1-5%
    2= 20-40%
    3= 40-60%
    4= 60-80%
    5= 90%
    6= Don't know

18. If I try for a vaginal delivery (VBAC), the risk that my uterus will rupture (opening of the uterine scar) is:
    1= No risk
    2= Low risk
    3= Moderate risk
    4= Severe risk
    5= Don't know

19. My recovery from a successful vaginal delivery (VBAC) versus a repeat caesarean section is:

    1= The same

    2= Longer for a repeat caesarean section

    3= Longer for a vaginal delivery

    4= I don't know

20. The risk that I have a complication increases each time I have another caesarean section:

    1= Yes

    2= No

    3= I don't know

21. The reason for my previous caesarean section is an important factor in determining my chances of a successful vaginal delivery:

    1= Yes

    2= No

    3= I don't know

22. Which of the following risks are **greater for a woman having a repeat caesarean section** compared to a vaginal delivery after a caesarean section (VBAC)?

	1= Yes	2= No	3= Unsure
Death of the mother			
Death of the baby			
Injury to organs (in the mother)			
Excessive bleeding (in the mother)			
Infection (in the mother)			
Difficulty breathing (in the baby)			
Admission of the baby to NICU (intensive care nursery)			
Risk of hysterectomy (removal of the uterus)			

23. Please state the most important factor in your decision to try for a vaginal delivery (VBAC) or elect for a repeat caesarean delivery_____
    _____
    _____

Thank you very much for participating in this study.

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APPENDIX C: MATERNITY CASE RECORD DATA

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age?_____
2. Ethnicity?_____
3. Antenatal clinic at booking?_____

SECTION B: OBSTETRIC HISTORY

4. Gestational age?_____
5. No. of pregnancies (this pregnancy included)?_____
6. No. of live births?_____
7. Previous vaginal delivery? If yes, how many?_____
8. Previous instrumental delivery? If yes, forceps or vacuum?_____
9. Previous successful VBAC?_____
10. Any antenatal complications in the current pregnancy?_____
    _____

SECTION C: MEDICAL HISTORY

11. HIV status?_____
12. Any medical conditions?_____

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APPENDIX D: PATIENT INFORMATION LEAFLET

TRIAL OF LABOUR OR ELECTIVE REPEAT CAESAREAN SECTION IN WOMEN WHO HAVE HAD ONE PREVIOUS CAESAREAN SECTION:

AN ASSESSMENT OF WOMEN'S ATTITUDES, KNOWLEDGE AND PREFERENCES

INTRODUCTION

You are invited to take part in a research study. Participation in this study is completely voluntary and you may choose to withdraw at any time. This leaflet will give you information about why the study is being done, who can take part in it, as well as any risks and benefit to you.

You will be asked to answer a questionnaire with the help of an interviewer. The questions will be divided into 5 categories:

a. Social circumstances, education, employment
b. Past obstetric history
c. Previous caesarean section experience
d. Preferences and perceptions about mode of delivery (ie. Trial of vaginal birth after caesarean section or elective repeat caesarean section) and why
e. Counselling/ general knowledge about risks of delivery after a previous caesarean section

STUDY TITLE

Trial of labour or elective repeat caesarean section in women who have had one previous caesarean section: An assessment of women's attitudes, knowledge and preferences

RESEARCHERS

Dr Tasneem Ahmed, Prof Susan Fawcus and Dr Gregory Petro

This study has been approved by the Human Research Ethics Committee of the Faculty of Health Sciences of the University of Cape Town. If you would like any further information, please feel free to contact us. After reading this information leaflet you will be asked to sign an informed consent form to take part in the study. You will also be given a copy of this consent form.

WHY IS THIS STUDY BEING DONE?

There are very few South African studies about women's preference for mode of delivery after a previous caesarean section. The number of caesarean sections performed every year is increasing and along with it, the risk of complications. In order to ascertain why women choose their preferred mode of delivery, we may be able to initiate a plan of action in order to reduce the number of repeat elective caesarean sections performed. We hope that the information gained will allow us to improve our obstetric services in the future, enabling better birthing experiences and patient satisfaction.

STUDY PARTICIPANTS

- Any woman attending antenatal care at Mowbray Maternity Hospital or New Somerset Hospital from 36 weeks gestation with a previous caesarean section is invited to take part in this study
- Participation in this study is completely voluntary and you can choose to opt out at any time
- To be part of the study we will ask you to complete a questionnaire with the help of a trained interviewer in a language of your choice. This should take fifteen minutes
- If you do not wish to answer any of the questions, you may skip them
- If you don't understand any questions, we will take time to explain it to you
- Not choosing to participate in the study or opting out during the study will not impact on the health care that you are receiving in any way

RISKS

This study involves a questionnaire about your previous caesarean section experience and your preference for mode of delivery thereafter, which does not pose any risk to you.

BENEFITS

There is no financial reward in taking part in this study. You may not benefit directly from participating in this study however, the information acquired during the study will assist us in finding out why women choose their preferred mode of delivery after caesarean section.

CONFIDENTIALITY

- The questionnaire will be completed in a private area.
- The questionnaire will have a number on it instead of your name. Only the researchers will know what your number is and this information will be kept in a secure office in Mowbray Maternity Hospital and New Somerset Hospital respectively.
- Only the researchers will have access to the completed questionnaires and research data.
- When the study is completed the research data will be stored in the Department of Obstetrics and Gynaecology of the University of Cape Town.
- This research forms part of work towards a Master's degree at the University of Cape Town and will be submitted for examination within the university. The results of this study will be anonymous and you will not be identified in any results.
- You will be asked to sign a consent form for yourself

CONTACT INFORMATION

If you have any further questions, comments or queries regarding this study please feel free to contact Dr Tasneem Ahmed (Principal Investigator) at 0823130229.

If you need any further information regarding your rights as a research participant, you can contact the Faculty of Health Sciences Human Research Ethics Committee at 021 406 6338.

Thank you for your time.

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Department of Obstetrics and Gynaecology

APPENDIX E: PATIENT CONSENT FORM

TRIAL OF LABOUR OR ELECTIVE REPEAT CAESAREAN SECTION IN WOMEN WHO HAVE HAD ONE PREVIOUS CAESAREAN SECTION:

AN ASSESSMENT OF WOMEN'S ATTITUDES, KNOWLEDGE AND PREFERENCES

I have agreed to participate in a research study about women's preferences for mode of delivery after one previous caesarean section. The study is being conducted by members of the Department of Obstetrics and Gynaecology. The study has been approved by the Faculty of Health Sciences Research Ethics Committee of the University of Cape Town. The purpose of this study has been explained to me in a language of my choice by a member of the research team.

I understand the study involves the completion of a questionnaire with the help of a trained interviewer in one of the three languages of my choice (ie. English, Afrikaans, isiXhosa). My participation is voluntary and I have the right to withdraw from this study at any stage. I may choose not to answer any question if I so wish. It has been explained to me that this will not affect my medical care and that the study poses no risk to me.

I understand that I may not benefit directly from this study and that there is no financial reward for taking part in this study, but the information collected may benefit other pregnant women in the future.

I agree to my responses being used for education and research. It has been explained to me that confidentiality will be maintained where possible and that I will not be personally

identifiable in the database or any manuscripts that may subsequently be produced for publication.

I have been given adequate opportunity to ask questions about this study and have been provided with an information leaflet about the study as well as a copy of the informed consent form. I have read this consent form and the information it contains and had the opportunity to ask questions about them.

_____ _____

NAME OF PARTICIPANT SIGNATURE

_____ _____

NAME OF INVESTIGATOR SIGNATURE

DATE: ___/___/___

APPENDIX F: TURNITIN PLAGIARISM REPORT

(See complete report document attached below)