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Making Choices for Childbirth after Caesarean Section

A randomised controlled trial of a decision-aid

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This thesis is submitted in fulfillment of the requirements for the degree of Doctor of Philosophy

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To my sons Benjamin and Matthew, I thank you for your patience and for the wonderful experience of motherhood.
Declaration of Authorship

I hereby certify that this thesis is the original work of the author, and that to the best of my knowledge and belief, it contains no material previously published and/or written by another person except where reference is made in the text of the thesis, or in noted appendices. This work has not been submitted for the award of any other degree at this or any other university or institution.

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Abstract

The desire to provide opportunities for women to make informed choices about childbirth has not previously been matched with practical methods to facilitate effective and consistent transfer of knowledge and involvement in decision-making. The clinical context of birth after caesarean is important due to the growing rate of caesarean section within Australia and overseas. In the absence of evidence-based strategies to facilitate ‘informed decision-making’ for birth after caesarean section, women may be left vulnerable to birth decisions that do not meet individual needs and to health outcomes that are not anticipated.

The aim of this study was to investigate the issue of informed choice within the context of birth after caesarean. To examine the effectiveness of strategies designed to facilitate informed birth choices, a decision support strategy was developed in the form of a decision-aid booklet, using the decision-aid format developed by O’Connor et al. The Birth Choices decision-aid was written for pregnant women who had experienced one caesarean birth, and who were medically eligible to choose between attempted vaginal birth or elective caesarean birth. Its purpose was to assist women, in consultation with their practitioner and family, to choose which method of birth was best for them.

The decision-aid was firstly piloted and then evaluated in a multi-site randomised controlled trial involving 227 women recruited from the antenatal clinics of three Australian public hospitals and four private obstetric practices. Women given the decision-aid at 28 weeks of pregnancy were compared to a control group of women who did not receive the decision-aid. All women received “usual” antenatal care as provided at their hospital or obstetric practice. Women completed surveys at recruitment (12-18 weeks gestation); 28 weeks gestation; 36-38 weeks gestation and then 6-8 weeks after the birth. Additional information about the birth was collected from the medical record. The major outcomes of interest were women’s level of knowledge about their options, women’s readiness
for decision-making, choices for mode of birth and actual outcomes of the birth. Women’s post-birth satisfaction with their birth experience was also compared.

The *Birth Choices* decision-aid was effective in improving women’s knowledge of their birth options. Women who received the decision-aid scored significantly higher on the knowledge test at 36-38 weeks when compared to women in the control group. Consistent with readiness for decision-making, women who received the decision-aid experienced a greater reduction in decisional conflict scores between 28 and 36-38 weeks, and were less likely to be unsure about the type of birth they wanted. Despite this, study site had the greatest effect on actual mode of birth experienced by women.

The *Birth Choices* decision-aid is potentially useful to assist women in becoming informed about their options for birth. This is of little value however without strategies to further support informed consumers. There appear to be practitioner-driven imperatives underpinning practice patterns within individual hospitals, which encourage women to comply with organisational norms. Therefore if decision-aids are to work effectively, further strategies are required to assist practitioners, midwifery and medical, to document and support informed consumer choices.
Glossary of Key Terms (Abbreviations)

**Birth Preference**: A preference is defined as a verbal or written statement referring to the type of birth that an individual considers to be most desirable or favourable to them.

**Birth Choice**: A birth choice is a verbal or written statement referring to the type of birth an individual has chosen to undertake. It is synonymous with making a decision. In the context of the study it means selecting a mode of birth from the two options of elective caesarean section and attempted vaginal birth.

**Caesarean Section (CS)**: Birth of the baby via a surgical incision made in the abdomen.

**Decision-aid**: A devise or strategy developed for the specific purpose of preparing an individual for decision-making. The format may be written, verbal or use a range of multi-media delivery mechanisms (O'Connor A, Drake E et al. 1999).

**Elective Caesarean Section (ECS)**: CS prior to the commencement of labour.

**Elective Repeat Caesarean Section (ERCS)**: CS that is elected when the previous birth was by CS.

**Emergency Caesarean Section (EmCS)**: CS that occurs after the onset of labour.

**Informed Choice**: A choice that is made whereby options have been clearly identified; accurate and relevant evidence-based information has been provided for all options; is consistent with personal values; and where an adequate opportunity to weigh up the probable outcomes of options has been provided. (Adapted from Marteau, Dormandy et al. 2001; Birthplace Support Group Inc 2004 Your Birthing Options <23/3/05>)

**Trial of Labour (TOL)**: When a woman who has experienced a previous CS undergoes labour in an attempt to have a vaginal birth. This is also referred to as a trial of scar or attempted **vaginal birth after caesarean section (VBAC)**.
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CHAPTER 1

INTRODUCTION

1.1 Introduction

Events that occur during pregnancy and childbirth can have significant and prolonged effects on women and their families. Surgical procedures associated with childbirth, such as caesarean section (CS), impact upon all future pregnancies and subsequent childbirth decisions. Consequently decision-making about mode of birth for women who have already experienced CS challenges women, their families and their healthcare providers. It is in acknowledging that both CS and vaginal birth are associated with risks and benefits for women, that supporting a process of informed choice for childbirth after previous CS becomes important.

Within this thesis the extent to which the notion of informed choice is a reality for women will be addressed in the context of a randomised controlled trial of a decision-aid designed to assist women in making decisions about mode of birth following previous CS. Contributions to the discourse regarding the role of women in making decisions relating to their pregnancy, the relative effectiveness of strategies designed to facilitate a process of informed choice for childbirth and the debate about the growing utilisation of CS in Australia and the issue of mode of birth after CS are also anticipated. The extent to which these debates and strategies are driven by women’s choice and to what degree this is informed, will also be an important focus of this work.

1.2 Caesarean section

The 1985 WHO consensus statement recommended a CS rate of between 10-15 percent, based on an estimation that higher rates would not provide benefits in maternal and perinatal morbidity and mortality (Senate Community Affairs
Despite the 1985 WHO recommendation for a rate no higher than 15 percent, in 1999 the Australian CS rate had reached 21.9 percent. According to historical figures from the Australian Institute for Health and Welfare (AIHW), the CS rate initially increased rapidly from 5 percent in the 1960's to 15 percent in the 1980's, with a gradual increase in the 1990's of a further 5 percentage points to a rate of over 20 percent (Senate Community Affairs References Committee, 1999), continuing upward to a rate of 27 percent in 2002 (Laws & Sullivan, 2004). This phenomenon is not exclusive to Australia. The international literature examines many issues associated with CS in search of determinants of high CS rates and strategies to reduce it. Recent examples include the National Sentinel Caesarean Section Audit (Thomas et al., 2001) designed to determine factors associated with high CS rates and wide variations in rates within the UK.

International and Australian literature is consistent in presenting the major clinical determinants of CS as dystocia (failure to progress), foetal distress, breech position and repeat CS. Other factors include organisational characteristics, including hospital type and size; obstetrician characteristics (including attitudes, experience and litigation concerns) and characteristics of women themselves (including insurance status, education level, parity, age, personal preferences) (Health Department of Victoria, 1990; Senate Community Affairs References Committee, 1999; Thomas et al., 2001). It is clear from the literature that the elective CS rate in particular is not determined by clinical/medical factors alone and that individual consumers and their practitioners appear to be considering a range of non-clinical factors in the process of making decisions about modes of birth.

1.3 Birth after caesarean section

The clinical issue of birth after CS is a significant one. Of the 55,550 Australian women who experienced CS in 1999 (Nassar & Sullivan, 2001), many will face a decision about method of birth in future pregnancies. Even though both options
are considered to be ‘safe’ for most women, the choice between attempted vaginal birth after caesarean (VBAC) and elective repeat CS is not straightforward. Both options entail some degree of risk for mother and baby (McMahon et al., 1996), although the weight of evidence favours trial of vaginal birth as an appropriate option that should be considered (Flamm et al., 1994; Perveen & Shah, 1997; American College of Obstetricians and Gynecologists, 1999 (ACOG)). The ACOG reviewed the issue of birth after CS and concluded that most women with one previous low-transverse CS are potentially eligible for VBAC in an institution equipped to respond to emergencies such as scar rupture. The review recommended that the decision should be made after consideration of individual risks and benefits, with the ultimate decision to be made jointly by the woman and the physician (American College of Obstetricians and Gynecologists, 1999). Studies have demonstrated that as many as 60 to 80 percent of women who attempt VBAC will achieve vaginal birth (Appleton et al., 2000). However, success is influenced by the indication for primary CS and attitudinal factors related to both women and practitioners (American College of Obstetricians and Gynecologists, 1999). Given the availability of clinical recommendations for birth after CS, one may ask why this decision scenario presents a clinical dilemma for women and their practitioners. Part of the clinical problem comes from the presence of a surgical scar on the uterus, which is associated with a risk of rupture. Although the rate of rupture of scar is small (less than 0.5% (Appleton et al., 2000)), the consequences are serious with possible complications including hysterectomy and neonatal death (Appleton et al., 2000). The statement “Once a caesarean always a caesarean”, however, is no longer clinically justified due to growing evidence about benefits of VBAC (Norman et al., 1993; Flamm et al., 1994; Perveen & Shah, 1997). Trial of VBAC, also referred to as trial of labour (TOL) is therefore considered to be a viable option for most women. However, TOL, if unsuccessful, leads to complications such as emergency CS, which produce inferior outcomes to an elective caesarean procedure in terms of associated morbidity (McMahon et al., 1996; Shorten et al., 1998).
For many women and their practitioners, the decision is not purely clinical. Women's choices are characterised by a difficult balance between family or social commitments and relationships. Obstetricians must consider women's individual risk profiles and assess the likelihood of complications requiring emergency caesarean occurring, within a context of potential litigation (McClain, 1985; McClain, 1987; McClain, 1990). Even when the decision to undertake TOL results in a vaginal birth, women will not necessarily feel satisfied with the decision or the outcome (Joseph et al., 1991; Abitbol et al., 1993). Women's views are important in determining method of birth after caesarean and attitudinal factors play a significant role in the choice and outcome (Fraser et al., 1997).

Previous studies have acknowledged the importance of women's views in the choice for birth after CS. Educational programmes both within Australia and overseas have been designed and implemented in an effort to encourage women to attempt VBAC and reduce overall CS rates, with limited success. The effect of facilitating informed choice rather than promoting one mode of birth over another, in terms of women's pattern of preference/choice, remains unclear (Eden et al., 2004; Horey et al., 2004). Reports such as the "Changing Childbirth Report" (Department of Health, 1993) and the "Rocking the Cradle Report" (Senate Community Affairs References Committee, 1999), communicate the importance of consumer information in pregnancy and childbirth with the aim of facilitating 'informed decision-making'. Informed decision-making requires that women be presented with reliable information about the possible consequences of their choices, particularly when faced with a number of options (National Health and Medical Research Council, 1996). The challenge of communicating the risks and benefits of options to consumers has been acknowledged, although effective strategies for pregnancy are yet to be validated.
1.4 Making informed choices for childbirth after caesarean section

The desire to offer women informed choices for pregnancy and birth has not previously been matched with practical methods to facilitate transfer of knowledge and involvement in choices. The clinical context of birth after CS is an important one given the possible health effects for women and their babies. In the absence of evidence-based strategies to facilitate a process of ‘informed decision-making’, women may be left vulnerable to birth decisions that do not meet individual needs and health outcomes that were not anticipated.

One of the indicators that women may not be given equal opportunity to make informed and supported choices about the mode of delivery after a previous CS is that there is considerable variation in obstetric practice and opinion about mode of delivery after a single previous CS. This heterogeneity in approach creates significant challenges for pregnant women as consumers of healthcare. Informed decision-making requires that women be presented with reliable information about the possible consequences of their choices, particularly when faced with a number of options (National Health and Medical Research Council, 1996). The challenge of communicating the risks and benefits of options to consumers has been acknowledged, although effective strategies for facilitating this in relation to pregnancy are yet to be validated.

Previously reported educational strategies have involved the promotion of VBAC or TOL over elective repeat CS (Abitbol et al., 1993; Fraser et al., 1997) but these have largely been aimed at reducing the rate of CS rather than facilitating informed choice by the women involved. For many women, however, the decision is not straightforward and may be the result of consideration of many factors including family and social issues, medical advice and previous birth experience (McClain, 1985; Eden et al., 2004). Women must weigh up advice from their midwives and doctors about relative risks and benefits of vaginal versus caesarean birth in the context of memories of their previous birthing experience and expectations of their current pregnancy.
The most recent Cochrane Collaboration Review of "Information for pregnant women about caesarean birth" (Horey et al., 2004) cites only two Randomised Controlled Trials (RCTs) in this area that met the inclusion criteria (Fraser et al., 1997; Saisto et al., 2001). Both of these trials were expressly aimed at reducing the incidence of maternal choice of elective CS and increasing the uptake of attempted VBAC. Given the value-sensitive nature of the decision, strategies are therefore still required to assist women to consider the risks and benefits of both options, and make informed decisions in partnership with healthcare providers regarding which method of birth is best for them (National Institute of Clinical Excellence (NICE), 2004).

Informed decision-making about VBAC versus elective CS requires a partnership between the woman and her caregivers, in which clear, culturally appropriate, non-biased information provides the basis for discussion and in which consumers are encouraged to recognise and articulate individual needs and values. Preferences for birth relate closely to needs, values, expectations and past experiences (McClain, 1985; Kirk et al., 1990; Kline & Arias, 1993). High quality decisions are made when patients have knowledge about options, have realistic expectations of outcomes, and are clear about their own personal values interacting with the decision (O'Connor, 1995; O'Connor et al., 1998).

In order to facilitate such a process, decision-aids have been developed and are currently recommended by the NHMRC as a means of communicating evidence-based information to healthcare consumers (National Health and Medical Research Council, 2000). Decision-aids are therefore appropriate when there is a need for careful deliberation of alternatives for care, where the decision involves making value judgments about the benefits relative to the risks and there is uncertainty in the outcome of options presented (O'Connor et al., 1998). They assist individuals who are undecided about choices to engage with objective information and hence reach a decision. Even for those who have existing strong preferences, their resulting decisions are more likely to be based on improved
knowledge, realistic expectations and be consistent with personal values (O'Connor et al., 1999).

The notion of partnership in healthcare decision-making is an important one for midwifery practice. The definition of midwifery, “with woman”, puts women at the centre of the care continuum and in partnership with the midwife (Australian College of Midwives Incorporated, 2001). This is in contrast to the paternalistic approaches that have dominated medicine and obstetric care (Charles et al., 1999).

The personal philosophy that underpins this thesis is as follows;

*Women must have the opportunity to make informed and supported choices about their pregnancy and childbirth, using the best available evidence about the probable outcomes of those choices.*

This concept of informed choice is consistent with a growing recognition of the need for partnership approaches in healthcare and is embedded in the practice of midwifery.

The concept of ‘informed choice’ will be defined for this study as;

*A choice that is made whereby options have been clearly identified; accurate and relevant evidence-based information has been provided for all options; is consistent with personal values; and where an adequate opportunity to weigh up the probable outcomes of options has been provided (Adapted from Marteau et al., 2001).*
1.5 Growing support for shared decision-making in healthcare

During the 1990's and into the new millennium, alongside the development of the 'evidence-based' health care movement in Australia, paternalistic approaches to medicine have been challenged by initiatives focused on 'shared decision-making'. Organisations such as the National Health and Medical Research Council, in their development of policies and guidelines relating to the formulation of clinical practice guidelines, feature the consumer in the process of information exchange (National Health and Medical Research Council, 2000). Crucial to a 'partnership' approach to medical decision-making is information that facilitates the process of consumer participation. Such initiatives are new in an Australian context and as such require careful evaluation.

Historically, imbalances in information between doctors and their patients (asymmetric information) have long been accepted as inevitable given the complexities of medical science. A paternalistic approach to medical care was thus justified in terms of protecting patients from their own ignorance. Control over knowledge and power in decision-making was therefore a prerequisite to this medical relationship (Charles et al., 1999). In addressing the information imbalance, the medical profession has moved towards a more inclusive decision relationship, with greater patient autonomy, which Nessa and Malterud (1998) consider to be a medico-ethical right. Informed consent when based on the ethic of patient autonomy, challenges practitioners to provide information about the risks and benefits of healthcare so that consumers are able to understand their options and make choices about them (Coulter, 1999).

The assumption that 'patients' cannot understand the complexities of their healthcare is slowly being eroded. Consumer organisations such as the Consumer Focus Collaboration (CFC) provide evidence that consumer participation, both as part of individual care and in healthcare services, leads to improvements in individual outcomes and to more accessible and effective healthcare services (Consumer Focus Collaboration, 2001). The suggestion that potential benefits to
healthcare outcomes come as a result of increasing consumer control over their own healthcare is thus raised for discussion (Breemhar & van den Borne, 1991; Consumer Focus Collaboration, 2001), with further evidence needed regarding the impact of initiatives involving partnership approaches to shared clinical decision-making.

The formulation of key consumer roles in the development and evaluation of health care has been acknowledged by national bodies such as the NHMRC (2000) and international bodies such as the Cochrane Collaboration. The Australasian Cochrane Centre, established in 1994 with NHMRC funding under the directorship of Chris Silagy, successfully melds the philosophy of evidence-based healthcare and the importance of consumer involvement in healthcare. Its aims reflect activities that:

“...promote the equitable provision of effective health care in Australasia by facilitating the preparation and maintenance of systematic reviews and their dissemination and application to influence service provision and clinical practice... relating to government, health professionals and consumer groups in Australasia ... facilitating the dissemination and application of information about the effects of health care to communities, health professionals and policy makers” (http://www.cochrane.org.au/8<24 Aug 1998>.

An important part of this is the Cochrane Consumer Network which serves to promote research that meets community priorities and to inform the community about results of healthcare research in a relevant way for consumer decision-making (http://www.cochrane.org.au/). Professional and government bodies, in embracing evidence-based approaches to care, have created a need and a niche for information development for both professionals in the form of ‘clinical practice
guidelines' and for consumers in the form of educational decision support strategies.

Strategies that are effective in supporting patient decisions extend beyond information and address the 'non-clinical' factors that impact upon an individual when faced with competing choices and uncertain outcomes. In addition to descriptive material, benefits and risks of options and likelihood of outcomes must be blended with personal values and individual clinical profiles. Decision support strategies developed and evaluated by researchers of the Ottawa Health Decision Centre Canada, and further endorsed by the NHMRC (2000), help to address these aims and will be further discussed in the literature review.

1.6 Thesis design

This research examines the effect of a decision-aid booklet for women who are faced with choices regarding mode of birth after primary CS by designing and implementing a RCT which, for those in the intervention group, supplemented usual pre-natal care with the decision aid. Chapter 2 examines the clinical literature on the issue of birth after CS by examining clinical and non-clinical determinants of birth choice. The current literature supporting the need for better evidence about the value of educational strategies to support the notion of informed choice for childbirth is addressed. Chapter 2 also examines the literature relating to the use of decision-aids in healthcare and the potential role for decision-aids in pregnancy care. The decision-support framework upon which the decision-aid is based will be discussed. Chapter 3 provides detail of the study methodology, including the development and piloting of the decision-aid and the RCT of the decision-aid. Results from the RCT are presented in Chapter 4. Chapter 5 discusses the significance of the results in light of current literature and Chapter 6 concludes with recommendations for future research and implications for clinical policy and practice.
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This literature review will initially address what is known about the multi-dimensional determinants of choice between caesarean section (CS) and vaginal birth. This discussion will then lead into the debate about mode of birth after CS. The role that information plays in the decision-making process will be addressed alongside the concepts of informed choice and consumer participation in healthcare decisions. The theoretical ideas underpinning the development of decision support strategies such as the Ottawa decision-aid and the potential effectiveness of decision-aids for individuals facing healthcare decisions will be addressed. The potential value of decision-aids for birth decisions specifically will also be discussed.

It is important to note that at the time this study commenced in 1998, some of the literature that will be discussed in this review was yet to be published. However, due to its importance in informing our understanding of the current debate about CS and mode of birth after CS, some has been included in this literature review to provide a contemporary understanding of the topic. The remainder of the relevant contemporary literature will be included in later chapters in light of the findings of this research.

2.2 Clinical context: Caesarean section and vaginal birth

Caesarean section is an obstetric procedure of international relevance, interest and debate. In fact approximately 19,000 articles have been published on the subject since 1964 and almost 400 published in 2002 alone (Cyr, 2003). A CS is a surgical procedure carried out under general or epidural anaesthesia. Ideally, it substitutes for vaginal childbirth in situations where it has been judged by a
medical practitioner, in consultation with the pregnant woman, that upon weighing the risk and benefits of attempting vaginal birth or conducting CS, the CS is likely to be superior in outcome for the baby and/or the mother.

Historically CS has been associated with obstetric emergency. In earlier times, the baby was often already dead and the maternal mortality rates were high due to inadequate wound suturing, haemorrhage and wound infection (Young, 1944; Churchill, 1995). Today, only approximately half of the CS performed in Australia are categorised as “emergency” procedures or more specifically as “CS after labour has commenced” (NSW Health Department, 2002). Common reasons given for CS categorised in this way include foetal distress, failure to progress, placenta praevia, malpresentation and antepartum haemorrhage (Senate Community Affairs References Committee, 1999). Over time, the risk of conducting CS has steadily decreased due to improvements in surgical technology and techniques (Senate Community Affairs References Committee, 1999), thus providing greater opportunities for the benefits of an elective CS procedure to be promoted against alternatives involving a vaginal birth.

Australia currently has one of the highest rates of CS in the world, with a rate of 21.9 percent recorded in 1999 and 27.0 percent in 2002 (Laws & Sullivan, 2004), continuing a trend towards increasing CS rates evident since at least the 1980’s (Senate Community Affairs References Committee, 1999). Large variations also occur between states and territories within Australia. For example, South Australia’s CS rate, often one of the highest, was 17.4 percent in 1982, rising to 20.6 percent in 1988 and 22.1 percent in 1992 (Connon et al., 1982; Chan et al., 1990; Lancaster et al., 1995). The CS rates rose more slowly for the Northern Territory where the CS rate was 14.9 percent in 1986, 14.5 percent in 1988, sharply rising to 18.1 percent in 1992 and then to 20.7 percent in 1995 (Markey et al., 1998).

Today, over 50 percent of CSs in Australia are elective procedures with over 35 percent of all CS either principally or secondarily the result of a prior CS (Senate
Community Affairs References Committee, 1999). Although evidence-based approaches regarding the use of CS have been sought and the World Health Organisation (WHO) recommendation of a caesarean rate of 15 percent acknowledged since the 1980s (Senate Community Affairs References Committee, 1999), significant variations still exist in the utilisation of CS in Australia and overseas. In 1999 the Australian Senate Inquiry into Childbirth Procedures, also known as the “Rocking the Cradle Report” (Senate Community Affairs References Committee, 1999) noted particular concern about high rates of CS in Australia, compared to other ‘comparable’ countries. Of particular concern were the largely unexplained variations in CS rates between hospitals of different types, between the private and public health sectors and between different states/territories within Australia. Suggestions that variations are due to as many non-clinical factors as clinical factors suggest a need for further exploration of the determinants of CS.

The focus of this thesis is about the choices women make about birth after CS. However, in attempting to better understand the context within which such choices are made, it is important to firstly consider the wider debate about the role of women in choosing between CS and vaginal birth.

2.3 Women’s role in the choice between caesarean and vaginal birth

It is a widely held belief within the general community that many more women are now considering elective CS as a reasonable option for birth, with public opinion accepting the relative safety of elective CS compared to vaginal birth (Walker et al., 2004). This position is presumably reinforced by the obstetric community where in their commentary entitled “Cesarean Delivery: Improving on Nature?”, Kirby and Hanlan-Lundberg acknowledge that CS is often considered an improvement on nature leading to the adage “when in doubt cut it out” (Kirby & Hanlon-Lundberg, 1999:259). The notion that CS was “developed to control, expedite, and ensure the safety of the birthing process” (Kirby & Hanlon-Lundberg, 1999:259) suggests an attitude whereby CS is considered a superior
mode of birth. Al Mufti et al. (1996) also noted similar support for CS when they found that 31 percent of female obstetricians surveyed would prefer elective caesarean to vaginal birth for themselves, mainly due to personal fears associated with perineal damage, despite the limited evidence to substantiate the benefits of CS for the pelvic floor (Al-Mufti et al., 1996). The current community perception, and to some extent professional perception, appears to be that there are gains in health outcomes provided by CS and that there is little medical risk attached to this surgical procedure (Kirby & Hanlon-Lundberg, 1999).

The notion of elective CS as an option for women without clinical indication has also been widely discussed in the popular media. Headlines such as “Mums opt for births by surgery” (Miloahanic, 2000:13); “Why I rejected a natural delivery” (Parsons, 2000:13) and “The miracle of birth – and it’s right on schedule” (Needham, 2002:5) appearing in the popular press portray elective CS as an acceptable option for well organised women such as “working women who are trying to time their delivery so it can fit in with work plans” (Needham, 2002:5). Such articles report views from mothers that elective caesarean is “…safer, more predictable and with less pain and suffering” and that “you have a date of delivery, everything about it is certain. You can come in, in the morning, have the caesarean, and tell visitors to come in at lunchtime” (Miloahanic, 2000:13). Such perceptions are not necessarily based on accurate information about the relative health consequences of CS or vaginal birth, but are more likely shaped by societal norms and trends. Kirby and Hanlon-Lundberg highlight the importance of perceptions about what is considered to be the optimal mode of birth in their commentary on the CS versus vaginal birth debate entitled “Cesarean delivery: Improving on Nature?” and conclude that whilst CS delivery is perceived to be an improvement on what nature can offer (in the form of vaginal birth), CS will be the birth mode of choice willingly provided by practitioners supportive of surgical birth (Kirby & Hanlon-Lundberg, 1999).

The notion that societal trends may have a significant impact on healthcare decision-making and ultimately health itself is important. In this context it
emphasises the need for strategies that enable pregnant women to access unbiased evidence-based information about their healthcare to assist them in making informed rather than ‘fashionable’ decisions about their pregnancy and birth.

‘Patient demand’ for CS is perceived by medical, community and media sources to be an important factor in the growth of CS in Australia (Senate Community Affairs References Committee, 1999). The degree to which patient demand contributes to the overall rate is largely unclear. An estimation that patient demand accounts for approximately 5 percent of CS has been provided (Senate Community Affairs References Committee, 1999). Data collection tools such as the NSW Midwives data collection (NSW Health Department, 2001) do not provide a classification for maternal request as a reason given for caesarean section. Attempts to further quantify this estimate can be found within two recent Australian cohort studies (Quinlivan et al., 1999; Gamble & Creedy, 2001), although determining the primary reason for CS was difficult. Maternal request for CS was noted to be 27 percent for the West Australian study (Quinlivan et al., 1999) and 5 percent for the Queensland study (Gamble & Creedy, 2001), emphasising the different estimates and variations between different study sites. The discussion to follow will further analyse these important studies.

The first was conducted in 1995–1997, with the aim of auditing the indications for caesarean sections performed at a Western Australian tertiary referral hospital (Quinlivan et al., 1999). In attempting to assess the extent to which women’s preferences were the determinants of CS, doctors were asked to complete an audit sheet after the birth of the baby, and indicate the primary, secondary and tertiary reason for the CS (Quinlivan et al., 1999). For all elective CS (n=170), 27 percent were categorised as a result of maternal request (Quinlivan et al., 1999). A common secondary reason was a reluctance to undergo ‘trial of scar’ (16.3%). It was stated that in each of these cases “the patient, the doctor performing surgery, and the reviewing medical staff, each agreed that maternal preference was the primary indication for the caesarean section” (Quinlivan et al., 1999:209). However the study protocol as described does not provide information about
whether the women were contacted to confirm this preference or whether they had confirmed that this was the primary reason for CS either pre-birth or post-birth. The use of the doctor performing surgery to state the primary reason is potentially questionable as this determination of primary reason does not appear to have been verified by the women being provided with an opportunity to document their perception of the main reason for their CS. This weakens the study and highlights the importance of prospectively gathering from women, during their pregnancy, information on their preference for birth and assessing the knowledge behind this preference. The issue of patient autonomy is raised as an important reason for supporting women’s choice, however the extent to which this is an informed choice was not investigated within this study (Quinlivan et al., 1999:209).

Gamble and Creedy (2001) also attempted to gain a clearer picture on the extent of preference for CS within Australia (Gamble & Creedy, 2001). In their study of 310 Australian women attending two Brisbane hospitals in 1998/1999 between weeks 36 and 40 of pregnancy, they found that most women (93.5%) preferred a normal vaginal birth (Gamble & Creedy, 2001:101). Of the 20 women who preferred a CS, only four were primiparas and therefore had no prior personal birth experience to influence their preference. Three of these women were expecting breech babies and one was requesting CS under general anaesthetic due to fears about labour. Of the 16 multiparas preferring CS, 13 had experienced previous CS and two had experienced previous instrumental vaginal birth (Gamble & Creedy, 2001:107). An important distinction can be made between women who preferred caesarean birth in the absence of obstetric risk factors or previous complicated birth, because there was little evidence to suggest that women preferred CS without a perceived medical reason or previous experience to explain the choice. There was no significant association between preference and demographic factors such as age, education, occupations, ethnicity, and health insurance (Gamble & Creedy, 2001). Of the 20 participants who preferred caesarean birth, few knew about the risks of the procedure, citing the benefits to be associated with the perceived increase in safety for the mother and the baby. The degree to which women are making informed choices about mode of birth is
not clear in Gamble and Creedy's study.

Patient demand has also been raised as a possible determinant of growing CS rates in Italy, however evidence suggests again that this is not necessarily the case. In a multicenter Italian study, wide variations in CS rates were ultimately found to be influenced by individual obstetricians practice patterns (Signorelli et al., 1995; Donati et al., 2003). Evidence that non-medical factors were determinants of many elective CS was thought by the authors to evolve from the medicalisation of birth. The authors suggest that the system of obstetric care in Italy means that obstetric decision-making is trusted and goes unquestioned by patients. This is thought to be particularly the case when continuity of care and carer, through use of private obstetrician, is provided, with a large number of pregnancy visits encouraging a close doctor-patient relationship (Signorelli et al., 1995).

Continued concern about the high rates of CS in Italy (33% in 2000) and interest in determinants of mode of birth, has driven a more recent multicentre study examining women's preferences for mode of birth, within hospitals across 12 Italian regions (Donati et al., 2003). Despite claims that women demand CS, women's overall preference was for vaginal birth. Of those who had experienced vaginal birth (n=654), 90 percent (n=588) responded that they would prefer vaginal birth. Of the 365 women who had undergone CS, 77 percent (281) responded that they would prefer vaginal birth (Donati et al., 2003:91). This study does not provide evidence about whether women who had already experienced CS, would attempt vaginal birth in any subsequent pregnancy. However the suggestion is that the patient demand for CS may have only a small impact on the overall determinants of mode of birth and it is clear that important factors in determining CS rates in the study were the geographic region (hospital location) and maternal age. Donati et al (2003) did not indicate the extent to which patient demand for CS influenced mode of birth, but do recommend that the views of women and practitioners be obtained to better understand the factors associated with decision-making process.
2.4 The role of information in choice between caesarean and vaginal birth

The degree to which Australian women are informed of the risks and benefits of different modes of childbirth is largely unknown. Aside from Gamble & Creedy’s (2001) conclusion that women preferred CS mainly for reasons associated with previous birth experience, it is important to consider that women’s self-identified preference for a CS was not necessarily based on an informed assessment of the risks and benefits of CS or a comparison with those associated with vaginal birth. Gamble & Creedy (2001) indicate that many women perceived the risks of a CS to be minor. Of the women who had experienced previous CS and who preferred vaginal birth (27/40), most indicated that the post-birth recovery was a significant factor in the preference (Gamble & Creedy, 2001). The extent to which these women were informed of the risks and benefits of this preference is unclear from the study due to the small numbers of women in the previous CS group and limited information provided about the ‘knowledge test’.

To further explore the issue of knowledge and decision-making it is important to examine an earlier Australian study that addressed women’s perceptions of their role in the decisions surrounding the choice of CS (Turnbull et al., 1999). The study concluded that women were not all satisfied with the information they had received and that some did not perceive they had participated in the birth decision at all (Turnbull et al., 1999). The study involved 278 women who had experienced CS within a six month period in 1996 at a major obstetric referral hospital in Adelaide. A self-administered survey was mailed to women seven weeks after the birth. The 278 women who responded represented 76.4 percent of the total population of women undergoing CS during this period. Approximately one third of the sample had an elective CS with the remainder performed as emergency procedures.

Of the 171 women (61.5%) who indicated that they were involved in the decision to have a caesarean, a higher proportion of women who experienced elective CS (81.4%) rather than emergency (53.2%) CS reported that they felt involved with the decision-making process (Turnbull et al., 1999:581). Given the nature of an
emergency this is perhaps understandable, however almost 20 percent (16/86) of those involved in an elective procedure, also did not perceive that they were involved in the decision making process (Turnbull et al., 1999). Modes of care identified in the analysis included a range of publicly-funded models (including midwifery care) as well as private obstetric care (private obstetric specialist doctor). The least likely to report involvement in the decision however, were women attending private obstetric care, where only 52 percent versus 67 percent for other modes of care, felt involved (Turnbull et al., 1999:581). This translates to almost 50 percent (37/77) of women in the sample attending private obstetric care perceiving that they were not involved in the decision to have a CS. This may reflect the different degree to which women may wish to be involved in the decision about mode of birth, and possibly indicates a level of trust that the obstetrician (as continuous carer) will make a choice that is in the woman’s best interest. Levels of satisfaction with the decision support this analysis, as only 1.1 percent of women strongly disagreed with the statement about satisfaction with the decision itself.

Analytical difficulties associated with the concept of satisfaction, however, influence the analysis by Turnbull et al (1999) which is complicated further by their inconsistent analysis of the 5-point Likert scale (ranging from strongly agree to strongly disagree) (Turnbull et al., 1999). The strength of the findings appears to be sensitive to whether or not response categories are combined. For example, one of the major conclusions is that “about 20% reported they needed more information on other options” for birth (Turnbull et al., 1999:583). To actually obtain this figure (19.1%) the responses in the Strongly Agree, Agree and Unsure categories must be combined. The figure would drop to 7.3 percent if only the Agree or Strongly Agree responses are combined, therefore 92.7 percent of women did not report a desire for further information about their options. This would then be consistent with 91.3 percent of women either Agreeing or Strongly Agreeing with the statement that they were given good information about why cesarean was necessary. The authors report that only 58.2 percent of women were satisfied with this aspect of care (Turnbull et al., 1999:582). The results appear to
be very sensitive to the assumption that women who answered anything other than strongly agree to positively worded items were not entirely satisfied, and although this is a difficult area conceptually, there is no discussion of other possible alternative conclusions.

What is clear is that for the small number of women who were facing the decision about birth after previous CS (50/209), only 17 (34%) reported that their doctor had talked about the possibility of vaginal birth, but they did not undergo trial of vaginal birth. The study was not able to determine whether the gap in information in this case was due to ineligibility for trial of vaginal birth or practitioner variations in belief about VBAC. The conclusion that a broad based information strategy is required, perhaps including all women potentially facing CS, is not strongly justified by the results reported. What does appear to be important is the data obtained from the elective CS population, including women with breech positioning and previous CS, where gaps in information appear to exist. The Turnbull et al (1999) study contributes to the examination of the role of women as prospective mothers, in the growing rate of CS in Australia and provides an illustration of the fact that even within one major tertiary hospital the access to information and choice varies widely. What is still unknown is the degree to which women are informed of the risks and benefits of their options for birth.

The research-based literature highlights the possibility that women may not be making what could be considered informed choices about childbirth. The extent to which this is the case is not clear. The consequences of adverse decision-making for birth are yet to be determined from long-term studies. Research on the short-term psychological impact of adverse birth experiences demonstrates that this is a potentially important public health issue due to problems associated with postnatal health, resumption of previous functional status and psychological consequences including depression (Senate Community Affairs References Committee, 1999).
The review of the literature has therefore raised further questions for research:

- To what extent are women informed about the risks and benefits of vaginal and caesarean birth?
- If women were fully informed of the health benefits and risks of their options for mode of birth, what choice would they make about mode of birth?

2.5 The decision cascade: Choices about birth after caesarean section

Primary CS begins a cascade of future choices in subsequent pregnancies relating specifically to mode of birth. As the rate of CS increases, the number of women faced with choices about future mode of birth also increases. The presence of a permanent scar in the uterus appears to be an important factor associated with options historically offered to women in subsequent pregnancies. The scar of a century past was a “classical incision”, which had a greater tendency to rupture than the lower segment scars of today (Enkin, 1989). Fear regarding rupture of the scar led to the dictum “Once a cesarean, always a cesarean” (Cragin, 1916) which dominated obstetric clinical practice at that time and has continued to influence the thinking of women and their practitioners. Until the commencement of clinical evaluations in the USA and Canada and production of consensus statements about the relative safety of Vaginal Birth after Caesarean (VBAC), in the 1980’s, CS was the principle approach for the clinical management of previous CS (Enkin, 1989)

The change from a position of certainty “once a caesarean always a caesarean” to a position of choice between attempted vaginal birth and elective repeat CS has been driven by both the availability of clinical evidence to support the use of attempted vaginal birth for most women and a desire to reduce the growing rate of CS. The rationale has been that in addressing unnecessary repeat CS the overall CS rate (at least 35 percent of which was due to repeat procedures in subsequent pregnancies) could be reduced (Paul & Miller, 1995; Hanley et al., 1996;
Melnikow et al., 2001). Concomitant with the development of the concept of TOL, the overall rate of attempted VBAC in the USA increased from 18.9 percent in 1989 to 28.3 percent in 1996 (Melnikow et al., 2001:421). The rate of attempted VBAC then dropped to 23.4 percent in 1999 (Curtin & Martin, 2000; cited in Melnikow et al., 2001:421). During the same time period, concern had grown about the variation in practices surrounding TOL, including the use of induction of labour and the selection criteria for attempted VBAC (Agency for Healthcare Research and Quality (AHRQ), 2003). Highly publicised articles such as the McMahon et al (1996) study published in the New England Journal of Medicine added to the controversy by stating that the risks of TOL were higher ("almost twice as likely") (McMahon et al., 1996:689) than for elective CS. This conclusion was made on the basis of analysis of a small minority (1.2%) of the total sample who experienced "major complications", including rupture of the scar (0.3%)(McMahon et al., 1996:692). This approach allowed McMahon et al (1996) to overlook the potential benefits experienced by the majority of women who achieved vaginal birth (60% of those attempting TOL experienced vaginal birth). Detailed analysis indicated that so-called "minor" morbidities, including puerperal fever, blood transfusion and abdominal wound infection were in reality 20 percent less likely to occur in the group of women who underwent TOL. Despite this, adverse publicity for TOL associated with this and other publications (Sachs et al., 1999) may have contributed to an increasingly evident reluctance to use TOL over elective CS in the USA.

In the USA, there has been an overall drop in the attempted VBAC rate to 27 percent alongside an increasing rate of CS between 1996-2000, reaching 22.9 percent in 2000 (Kozak & Weeks, 2002; Agency for Healthcare Research and Quality (AHRQ), 2003). A study published in the New England Journal of Medicine by Lydon-Rochelle et al (2001) again resulted in adverse international media attention on VBAC, largely due to the editorial by Greene that accompanied the study. Greene (2001) concluded that if asked "But doctor, what is the safest thing for my baby? My unequivocal answer is: elective repeated cesarean section" (Greene, 2001:55). Flamm (2001) in his commentary about the
article and editorial emphasises that this conclusion had little to do with the results of the study, and led to media headlines such as "A Risk Is Found in Natural Birth after Caesarean" following with text stating that "a new study has found that VBAC was riskier to both mother and baby than a second cesarean" (Flamm, 2001:278). The overall result of such media attention has quite possibly been an increase in fear amongst practitioners and women, and ultimately reduction in the available options women had for birth after previous CS, despite the numerous research-based consensus statements that trial of labour is an acceptable option for most women including after previous CS.

In gathering the best available evidence it must be acknowledged that there are no randomised controlled trials in the literature to address the specific issue of maternal and neonatal outcomes for attempted VBAC and elective CS (American College of Obstetricians and Gynecologists, 1999). The most recent systematic review of evidence surrounding VBAC and elective CS conducted by the Agency for Healthcare Research and Quality confirmed the findings of most consensus bodies such as the ACOG and emphasised that more rigorous research is required to provide robust and direct evidence of the risks and benefits of VBAC and elective CS with a need for standardisation of outcome measurement (Agency for Healthcare Research and Quality (AHRQ), 2003). Currently there are no recommendations for the most appropriate delivery choice for a given individual woman who has experienced previous CS. Similarly, no one can predict the outcome of a given birth prior to the event with certainty, which adds weight to the recommendation that health care practitioners have a responsibility to provide women with balanced information about the risks and benefits of all options for birth so that women can make an informed choice (American College of Obstetricians and Gynecologists, 1999; National Institute of Clinical Excellence (NICE), 2004).

Fear associated with the small but significant risk of rupture of the uterine scar during labour (0.2% to 0.5%) (Appleton et al., 2000; Stone et al., 2000) still appears to be a major influence on clinical decision-making. This is especially so
When associated with the power of the dictum "once a cesarean always a cesarean" (Cragin, 1916; Cited in American College of Obstetricians and Gynecologists, 1999:202). The likelihood of "failed" VBAC necessitating an emergency caesarean also appears to be a major factor considered in determining mode of birth, however it is widely acknowledged that there is no accurate predictive tool for determining the likelihood of this event. The uncertain nature of the outcome makes for difficult clinical decision-making, however the benefits and risks must be acknowledged rather than practitioners forming opinions based on impressions and biases.

The following literature addresses the research surrounding the risks and benefits of VBAC (or TOL) or elective repeat CS and the clinical recommendations that have been formulated to address the issue of evidence-based obstetric care for women who have experienced previous CS.

2.5.1 Risks and benefits of birth choices after caesarean section

The American College of Obstetricians and Gynecologists, in discussing the clinical management of women who have previously undergone a CS, acknowledge that;

"Although there is a strong consensus that trial of labor is appropriate for most women who have a previous lower transverse cesarean delivery, increased experience with vaginal birth after cesarean delivery (VBAC) indicates there are several potential problems" (American College of Obstetricians and Gynecologists, 1999:201).

The document that follows this introduction reviews the risks and benefits of VBAC and provides "practical management guidelines" for practitioners, with the caveat that "These guidelines should not be construed as dictating...Variations in practice may be warranted based on the needs of the individual patients, resources, and limitations unique to the institution or type of practice" (American
College of Obstetricians and Gynecologists, 1999:201). In summarising, the document reaches the recommendation based on good and consistent scientific evidence that;

"Most women with one previous cesarean delivery with a low-transverse incision are candidates for VBAC and should be counseled about VBAC and offered a trial of labor" (American College of Obstetricians and Gynecologists, 1999:205).

In addition, based on consensus and expert opinion;

"After thorough counseling that weighs the individual benefits and risks of VBAC, the ultimate decision to attempt this procedure or undergo a repeat cesarean delivery should be made by the patient and her physician" (American College of Obstetricians and Gynecologists, 1999:205).

Therefore, according to the best available evidence, ACOG recommends that women who have experienced one previous caesarean and are eligible according to their criteria, should be provided with an opportunity to weigh the risks and benefits of VBAC or elective CS, and to make an informed decision in consultation with their doctor.

Despite the existence of such recommendations, clinical practice variations continue. Concern over the hesitation of many obstetricians to encourage VBAC, despite the growing evidence of its safety, led to the Australian multi-centre study by Appleton et al (2000), which examined the rate of rupture and the maternal and infant outcomes of rupture within Australia between 1992-1997 (Appleton et al., 2000). The study was limited by its retrospective nature as it only involved a review of medical records. In addition, all 11 hospitals who participated were either major regional or large teaching hospitals with support from emergency obstetric services with on-site anaesthetic and neonatal services. Therefore the
results reflect a specialist level of obstetric care not available to many women in Australia (Appleton et al., 2000). VBAC rates within the hospitals studied varied from 11 to 44 percent. It was also not possible to detect how many women actually attempted VBAC, rather figures reflect those who succeeded as a percentage of all eligible women (Appleton et al., 2000). Therefore it is not possible to calculate the VBAC (TOL) success rate for the study. Appleton et al. (2000) conclude that the risk of rupture was 0.5 percent overall, with the risk of perinatal death 0.05 percent and hysterectomy 0.07 percent (Appleton et al., 2000). It is important to note that in highlighting the factors considered for a decision between elective CS and attempted VBAC, Appleton et al (2000:90) state that

"The primary concern is usually not about potential surgical complications or the relative cost, but the risk of uterine rupture and serious harm to the mother and infant" (Appleton et al., 2000:90).

Failure to acknowledge the morbidity and mortality associated with CS is contrary to the recommendation that caregivers have an obligation to provide women with "accurate relevant information" to help them make a decision (Appleton et al., 2000:90).

Risks associated with CS itself are also significant and directly linked to the fact that it involves major abdominal surgery under either general, epidural or spinal anaesthetic. International reviews confirm morbidity associated with caesarean section is greater than for vaginal birth. Risks relate to infection, anaesthetics, bleeding, blood clots, and post-surgical pain (McMahon et al., 1996; Mastrobattista, 1999; Enkin et al., 2000). The McMahon study found that elective CS was associated with a one and a half times greater risk for abdominal wound infection when compared with TOL and higher rates of puerperal fever (25% higher) (McMahon et al., 1996). Longer postnatal recovery time is expected for women who undergo caesarean compared to vaginal birth (Astbury et al., 1994; Glazener et al., 1995). Average length of stay for vaginal birth is 2-3 days, almost
half that for caesarean birth (Commonwealth Department of Health and Ageing, 2001) with lower overall morbidity and quicker postnatal recovery (Mutryn, 1993; Glazener et al., 1995; Enkin et al., 2000). Vaginal birth allows earlier initiation of breastfeeding when compared to caesarean birth (Rowe-Murray & Fisher, 2002), meaning that women who have a caesarean section may experience more difficulty in establishing breastfeeding.

Emergency CS, especially that associated with failed TOL, is associated with greater morbidity in terms of operative injury, need for blood transfusion and wound infection (McMahon et al., 1996). Therefore when comparing TOL and elective CS, likelihood of successful VBAC is an important clinical factor.

Neonatal outcomes are also an issue of concern and the condition of transient tachypnoea of the newborn occurs more frequently in caesarean births than vaginal births (Hook et al., 1997), often leading to temporary separation of mother and baby whilst more intensive neonatal care is provided. Studies have suggested rates of 6 percent for elective caesarean births versus 3 percent for vaginal births (Hook et al., 1997; Mastrobattista, 1999). Iatrogenic prematurity has also been suggested to contribute to this phenomenon (Boyers & Gilbert, 1998), although improved estimation of gestational age may reduce this problem.

Research-based evidence to date indicates that there is no ‘ideal’ choice of birth method for women who have experienced previous CS. Both trial of vaginal birth and elective CS are considered to be ‘safe’ and appropriate options for most women with the caveat that women need to be fully informed of the risks and benefits when making their choice between these options. Obstetricians argue that women are demanding CS, however available data does not make it clear if a process of informed decision-making occurs in reality and hence whether women are given the opportunity to weigh up their options. A greater understanding of the determinants of women’s choice for method of birth is required to answer this question and clarify to what extent women are ‘informed’ of their healthcare choices and the consequences of resulting health care decisions.
2.5.2 Women’s choices for birth after caesarean: Are they informed?

Limited understanding of how women choose between elective repeat CS and TOL led McClain (1985) to conduct a prospective in-depth exploration of women’s decision-making for mode of birth after caesarean. Pregnant women (n=50) in the San Francisco Bay Area who had experienced one previous caesarean birth and who were medically eligible for TOL in the current pregnancy, were interviewed during the last month of their pregnancy and again two months postpartum (McClain, 1985). Women’s choices reflected a combination of connected variables including social expectations and goals and medical information such as risk and safety factors. It is interesting to note that in this sample of women, medical risks and benefits (including probabilities of events occurring) were not discussed in terms of anticipated outcomes. Despite being encouraged to do so respondents did not use the language of probabilities when comparing CS birth with vaginal birth. Women, who were claimed to have access to such information, did not overtly use statistical information to make their decisions (McClain, 1985). Women’s choices were characterised by scripts and scenarios formulated from past experience and goals or expectations for the current birth. Their choice of method of birth was made to align with the opportunity for resumption of ‘normal’ social roles and outcomes extended to relationships, child-care, employment and social activities (McClain, 1985). The decisions were then reinforced by “defining multiple benefits”, both social and medical, for the preferred alternative. In McClain’s view information about medical risks was incorporated into scripts related to past experience or experiences of friends and not considered as statistical information upon which an optimal decision would be made (McClain, 1985).

McClain did not measure the degree to which these decisions were informed or knowledge-based and did not comment on whether women were making decisions in a way that could be described as optimal (McClain, 1985). Hence, this study raises the question of whether the quality of decision-making can be influenced by a supported process of information provision that facilitates women incorporating values, past experiences, fears and expectations with probabilistic information.
This study was extended and further reported on for a group of 100 women who were interviewed and for whom birth outcomes were analysed (McClain, 1987). The conclusion remained the same, with no respondents engaging in discussion about the probabilities of medical risks and benefits (eg. rupture of the uterus) with the emphasis on social issues as the major factors affecting birth choice. Further discussion of these women in a later paper (McClain, 1987) continued to highlight the social, cultural and demographic influences on choice about birth after CS. Personal ideologies and cultural ‘standards’ associated with motherhood are molded further by experience of birth and consultation with health care providers (McClain, 1987).

Kirk et al (1990) undertook a questionnaire-based study, also in the USA, using a woman’s perspective, in an attempt to understand some of the reasoning behind decisions regarding method of birth after CS. The intention was to obtain a census of all women who had experienced previous caesarean birth in any of their previous pregnancies rather than restricting it to women who were only medically eligible for VBAC. A questionnaire was sent to women during the postnatal period, whilst they were still in hospital. Those who did not complete the survey at that time were posted surveys at a “later time” not specified. There are several potential problems with this. Firstly the responses may have been influenced by the fact that the women were still affected by the physical and psychological nature of the childbirth experience. Secondly, given a tendency for patients to be uncritical of healthcare providers whilst still under their care, when comments may be attributed to them, responses may not closely reflect their true perceptions. This has been referred to as the “Halo” effect (Lumley, 1985; Turnbull et al., 1999). The use of responses from women at different intervals in the postnatal period (pre versus post discharge) may also reduce comparability within the sample. The analysis also made no distinction between women who completed the surveys prior to leaving hospital and those who completed them at some time after discharge, and it is difficult to estimate the degree to which this occurred. There is also no statistical analysis conducted to determine the significance of results. Kirk et al (1990) reported, however, that women chose VBAC due to the
anticipated shortened recovery period and from wanting the experience of natural birth, whereas women who chose repeat elective CS did so because they knew what to expect (decreasing uncertainty), could avoid labour pain and it was more convenient to time the birth (Kirk et al., 1990). These reasons are consistent with McClain’s work (1985; 1987), aligning choice with a social rather than a medical model of decision-making. Aside from the analytical issues the difficulty with Kirk et al’s (1990) work, as with McClain, is that it was impossible to tell how ‘informed’ women were and what type of information about options for birth they had received during their pregnancy. Kirk et al (1990) acknowledged this and concluded that a truly informed consent can only be provided when there is understanding of the medical probabilities (risk and benefits) as well as an acknowledgment of the social influences affecting the process of decision-making in this context. It is impossible to determine from this study whether women’s choices would have been the same had they been provided with a consistent package of information about both of their options for birth. These results were considered to be of an exploratory nature, pointing to the necessity for a study that is specifically designed to evaluate the impact of information on decision-making for birth after CS, in a homogeneous sample, in order to determine if women are making choices after considering both the medical and social dimensions of birth after CS.

Kline and Arias (1993) attempt to examine further the process of decision-making for women faced with the choice of attempted VBAC or elective repeat CS. They studied 241 women who had experienced one or more previous CS between 1988 and 1990. Initially 121 women planning VBAC were recruited for the study and then another 120 women scheduled for elective CS were identified for comparison. Each woman was asked to describe their reason(s) for selecting either VBAC or elective CS. Women’s preference was the motivation behind 75.2 percent of VBAC and only 31.6 percent of CS (difference significant, p <0.01)(Kline & Arias, 1993:290). Although only 19 percent of women with prior CS attempted VBAC in the hospital studied, 74.5 percent of these were actually successful, perhaps due to being highly motivated to achieve VBAC (Kline &
Arias, 1993:291). Kline and Arias (1993) conclude that the most frequent indication for elective caesarean was a medical or obstetric indication, of which two thirds were commonly used indicators for elective CS. This poses difficulties for the comparison because many women included in the study were not actually eligible for attempted VBAC. Being considered eligible to choose either VBAC or elective CS is an important issue in research on preference for mode of birth. In order to effectively examine women’s preferences and decision-making about mode of birth, having ‘permission’ to make a choice is crucial. Women’s preference for a particular birth is also strongly influenced by the reasons for the previous CS and must be taken into account when examining women’s preference for birth. The degree to which women were informed about options, risks and benefits was not measured or recorded in this study, therefore although women’s preference was thought to have influenced the mode of birth, one cannot determine whether women’s preferences were actually ‘informed’ (Kline & Arias, 1993). This study hence leaves open questions which relate to being ‘informed’ and whether this would make an impact on women’s preferences or choices about birth. If women were fully aware of the risks and benefits of the options for birth after a CS, would they choose vaginal or caesarean birth?

At the time Abitbol et al (1993) were observing women attending a special VBAC programme at their hospital, the assumption was that women would prefer vaginal birth over CS if given the option. Physicians and social workers were surprised by the fact that women were either enthusiastic about vaginal birth and adhered to the programme or were hesitant and refused to attempt VBAC (Abitbol et al., 1993). Despite extensive counseling of women opposed to VBAC, the rate of VBAC did not increase. Abitbol et al (1993) report on an 18-month study of 312 pregnant women who participated in a VBAC programme, to clarify the issue of motivation for or against VBAC and to help ascertain the reasons behind women’s attitudes and choices about VBAC. The programme itself consisted of an initial group session and further personal sessions conducted for those who were either opposed to VBAC or still unsure about VBAC. The authors indicate that the women were free from pressure but report that content was delivered to
specifically promote the uptake of VBAC. A social worker, rather than a midwife or physician conducted the first session and provided information to women about risks and benefits of VBAC. Depending on the women’s attitudes towards VBAC, either one or two future sessions were conducted on an individual basis by both a social worker and doctor. Women were asked detailed questions about their reasons for their choices and their understanding of the associated complications and prognosis of each method of birth. The women were followed up on the day prior to discharge from hospital (day 2-5) to elicit information about how they had met their expectations, feelings about the birth and satisfaction. Although a convenient time to collect data from a ‘captive’ audience, one may argue that this was too soon after the birth to avoid any potential Halo effect (Lumley, 1985; Turnbull et al., 1999) which could relate to the immediate impact of the birth itself as well as being interviewed whilst still hospitalised.

Despite these limitations, some important results were reported. The majority (93%; 116/125) of women who selected elective CS (40% of the sample n =312) were satisfied with the birth experience(Abitbol et al., 1993:123). It was not surprising that women who experienced complications with their attempted VBAC were least satisfied, as were those who actually indicated that they wanted a CS but attempted VBAC. There were also 20 percent of women who had uncomplicated successful VBAC who were dissatisfied with the birth experience. The authors conclude that it is important to recognise that successful VBAC does not equate to a satisfying birth experience and that some of the reasoning behind women’s preferences is not always obvious to their doctors. Freedom from uncertainty, and a preference for predictable post-operative pain over contractions, as well as perineal trauma, was viewed to be important enough to influence choice by this group of women. This paper thus adds to the growing argument that women require opportunities to make informed choices that are consistent with individual needs, values and expectations.

The most recent Cochrane Collaboration Review of “Information for pregnant women about caesarean birth” (Horey et al., 2004) cites only two Randomised
Controlled Trials (RCTs) that met the inclusion criteria for this area (Fraser et al., 1997; Saisto et al., 2001). Both of these trials were expressly aimed at reducing the incidence of maternal choice of elective CS and increasing the uptake of TOL (VBAC). Furthermore, these studies both focused on comparing two different approaches to the provision of information. Fraser et al (1997) compared face-to-face education and support with the provision of a brief informational pamphlet. Saisto et al. (2001) compared obstetrician led cognitive therapy/childbirth psychology sessions with a strategy involving both obstetrician led sessions and additional face-to-face information sessions with a midwife (Saisto et al., 2001). Although this review occurred subsequent to the commencement of the current study, it emphasises that important gaps still exist in the evidence and that the research questions for this study remain unanswered. Horey et al (2004) concluded that due to limitations of the research reviewed, evidence regarding the effectiveness of information given to women on caesarean birth remains inconclusive. The review suggests that information to encourage women to attempt vaginal birth after caesarean had little effect on caesarean section rates. Horey et al (2004) acknowledge that women need information in order to assist them in decision-making about caesarean birth, however further research is needed to determine the effect of information on women facing birth after caesarean.

Fraser et al and the Childbirth Alternatives Post-Cesarean Group (1997) conducted a randomised controlled trial on a prenatal VBAC education and support program between 1992 and 1994 in 12 hospitals in Canada (n=11) and the US (n=1). Promotion of the choice of VBAC over elective CS was explicit in the aims and methodology of the study. Women were eligible for the study if they were eligible for trial of labour and less than 28 weeks pregnant. A total of 1275 women were included in the analysis (98% of women recruited). However, only 19 percent of eligible women were recruited into the study, with the percentage of eligible women recruited varying between participating hospitals from 8 to 43 percent (Fraser et al., 1997:423) . The RCT did not have a true control group receiving standard care, rather an intervention of printed information “pamphlet”
outlining the benefits of VBAC, was compared to a verbal support programme promoting VBAC. There did not appear to be any knowledge test or evaluation of the degree to which women were informed about their options for birth and the primary outcome measure was rate of successful VBAC.

Motivation towards VBAC was measured at 28 weeks using a 10cm visual analogue scale and women were stratified by hospital and motivation level. Women were surveyed 12-72 hours after the birth using a Birth Experience Rating Scale to determine sense of control of the process. Results were similar for both groups (Fraser et al., 1997). It could be argued that this was too soon after the birth due to potential ‘Halo’ effect (cited in Turnbull et al., 1999) from the immediate impact of the birth itself. Women were asked to reflect on their participation in the study and the ease of making the decision about type of birth, however it is possible that women at this point in the postnatal period had not had adequate time to reflect in a meaningful way. An important reported conclusion was that the data supported the notion that women’s views are important in determining method of birth after CS. Despite the intervention achieving some gains in attempted VBAC for women with low motivation for vaginal birth, overall women who were motivated to have VBAC were more likely to achieve VBAC, and those who were not motivated to do so were more likely to have CS. The resources associated with running a verbal support strategy may not therefore be justified for all women given that overall 73 percent attempted VBAC in the verbal group compared 69 percent in the pamphlet group (Fraser et al., 1997:422). For those with high motivation stratum, both groups had an 82 percent attempted VBAC rate. The greatest difference was found in the low motivation stratum, where attempted VBAC was seen in 50 percent of the verbal group compared to 44 percent in the pamphlet group (Fraser et al., 1997:422). The authors felt that due to the limited effect exerted by the verbal program, that in developing future strategies to support women, it was important to better understand the process of women’s decision-making in terms of information needs and values assigned to birth outcomes (Fraser et al., 1997).
The assumptions underpinning Fraser et al’s (1997) RCT have led researchers to design an RCT that assumed that all women who are eligible for attempted VBAC (TOL) require education to promote attempted VBAC, rather than focusing on the development and testing of strategies directed towards assisting women to make informed choices. An informed choice that takes into account health-related costs and benefits of birthing options as well as individual attributes, values and needs, will not necessarily lead to increased VBAC rates. It may, however, lead to better decisions. This important research question is yet to be answered in the VBAC and CS literature. This is consistent with Dilks and Beal (1997) who concluded that women’s decision-making about birth involved both external factors such as support and information, and internal factors such as beliefs and reasons, where levels of self-efficacy for instance had an impact on birth outcomes. The issue of improving quality of health-related decision-making will be discussed in relation to development of decision-aids later in this chapter.

Saisto et al (2001) studied 176 pregnant women in Finland, to evaluate the effectiveness of two different strategies for reducing the request for CS. Cognitive therapy/childbirth psychology sessions conducted by an obstetrician was compared with a strategy involving both these sessions and additional face-to-face information sessions conducted by a midwife. Fear of vaginal birth was the issue of specific interest for the intervention. The information provided in the study was not specified and knowledge about birth appears to be related to addressing fears associated with feelings, experiences and individual misconceptions about childbirth. It is interesting that the researcher was also the obstetrician responsible for providing the psychotherapy intervention sessions and for assessing the primary outcome for the study. Whether or not this biased the results in any way or represented a conflict of interest is unclear.

Attempted vaginal delivery rates during the study, for both the intervention and control group, was over 70 percent, which is already high when compared with previously discussed international rates for VBAC. The stated aim to reduce the CS rate by 50 percent through the intervention also appears optimistic given the
relatively high rate of uptake of the vaginal birth option within the study. The control group was not a useful control in that it served as an intervention group in its own right and provides little opportunity for comparison with 'routine' antenatal care in contexts outside the hospital site where the study was located. Aside from the limitations in design, the study adds little to the evidence for any role that consumer-centred information may play in decision-making about the choice between CS and vaginal birth. Consequently, no comparison of the effects of a balanced information strategy versus routine care on choice of TOL versus elective CS has been conducted. Methodological limitations in these two previous RCTs directly relating to this issue, mean that the effects of giving women balanced information about elective CS and VBAC remain speculative. Addressing this issue is the primary focus of the present study.

2.6 A strategy to facilitate informed and supported choices

In attempting to address the growth of CS, there has been a recognised need for information for women to better assess their options for birth (Turnbull et al., 1999). Although several studies have attempted to ascertain determinants of women's preference for mode of birth (Kirk et al., 1990; Gamble & Creedy, 2001) and perceptions of being informed and involved in the decision about their mode of birth (Turnbull et al., 1999), little objective information is available relating to the level of knowledge women have when faced with birth options and the role knowledge plays in the process of decision-making.

Assuming that society supports a more participative role for consumers in healthcare decision-making, challenges exist in the development of strategies to facilitate this change in approach to medical care. Clearly consumer information alone is unlikely to be effective in achieving this. If such change is to be effectively implemented, consumers must also be equipped to participate in the exchange of information, and supported as they attempt to meld individual needs, values and concerns together with scientific evidence about healthcare options.
Clinical uncertainty and variations in common practice surrounding the decision to opt for a CS or vaginal birth create significant challenges for pregnant women as consumers of healthcare. There is uncertainty within the medical profession about whether women should be encouraged to make informed decisions in partnership with their doctors about which method of birth is best for them. The concept of ‘physician acting as the patient’s agent’ in health care, based on the principle that the patient delegates the authority to the physician with the expectation that they will act in the patient’s best interests in clinical decision-making (Phelps, 2003:242), has been a traditional approach within medicine. This is based upon the assumption that consumers of healthcare do not possess the expertise and experience held by medical practitioners, who can better steer the most appropriate clinical decision (Campbell et al., 1997:18). However some commentators argue that a partnership approach could, and should, be adopted over a paternalistic one (Smith et al., 1994; Charles et al., 1999; Coulter, 1999). Such partnership models require that information be presented in a non-biased and useful way for consideration by women, taking into account their individual needs. This approach assumes that both the woman and the practitioner share the treatment decision and both declare their preferences coming to a consensus about appropriate treatment, or in this case method of birth (Charles et al., 1999).

Expectations such as this are unrealistic without the use of effective strategies to assist both women and their practitioners in this process. One cannot assume that all women wish to participate in the process in the same manner and to the same degree (Robinson & Thomson, 2001). For difficult healthcare decisions, however, it is recommended that patients understand the probable outcomes of their options, that they understand the benefits and risks of those options and incorporate individual values with that evidence (O'Connor et al., 1999b). In addition they should be able to participate with their practitioner in the process of decision-making about their options for care (O'Connor et al., 1999b). For this to occur a framework of decision support that goes beyond ‘patient education’ is needed.
The Ottawa Decision Support Framework, in the form of a patient decision-aid, was promoted during the 1990's as a potentially valuable tool for use by consumers in healthcare decision-making. Although it had not yet been adopted for birth decisions, due to its success in other healthcare decision scenarios, it was considered to be potentially useful in the context of decision-making about mode of birth after CS. The justification for the adoption of the Ottawa Decision Support framework for this birth decision scenario will be discussed in terms of the potential value of decision-aids for pregnancy.

2.6.1 Decision theory underpinning a framework for support

Decision theory is based on an amalgamation of concepts and empirical information that helps to predict or describe the behaviours or actions of individuals when faced with choices. The notion of rational decision-making comes from a prediction about what human beings will do in circumstances of decision-making (Lee, 1971). 'Rational' decisions cannot be made without an understanding of the choices in terms of probable objective and subjective outcomes and information relevant to the decision (Lee, 1971). It is thought that individuals will value consequences of their decisions in different ways. Theorists use the term utility to note the expected value of an option, that is the weighted sum of payoffs or benefits for the individual, given a balancing of subjective probabilities of risks and benefits (Lee, 1971; Beach & Beach, 1982). The development of the science of decision-making behaviour, under conditions of uncertainty, although applied in the context of contemporary healthcare, has its foundations in disciplines such as psychology (Tversky & Kahneman, 1981) and economics (Arrow, 1965; Arrow, 1983).

Social psychologists in particular have studied the interaction between values, attitudes and behaviour in the context of decision-making. Fishbein and Ajzen (1975) in their 'expectancy-value' model acknowledge the relationship between individual attitudes and behaviours and the weighting of subjective probabilities,
importance of perceived consequences of behaviours and expectations as well as subjective norms (influence of social environment) (Feather, 1982). The important issue to note here, in the context of healthcare, is that individuals will value outcomes of their healthcare options differently and will use information in different ways to guide their decisions. In acknowledging this complex process it is therefore important that values are in some way incorporated into the process of decision-making, which strengthens the argument that ‘patient information’ alone is likely to be inadequate for facilitating patient decision-making under conditions of uncertainty.

Conflict theory is also relevant in the context of healthcare decisions, because it is concerned with how individuals behave when faced with decision-making and how they can be actively involved in decision processes. Compatible with expectancy value theory, it acknowledges that individuals will avoid states of conflict or stress and move towards more pleasurable or desirable psychological outcomes. The manner in which this occurs is again an individual one and is influenced by individual coping styles or ‘coping patterns’. This is believed to be especially important in conflict resolution and the possible impact of strategies to facilitate this process. It is thought that high quality decisions come from a strategy of ‘vigilance’, where the decision-maker searches for information that is relevant to the decision, assimilates information in an unbiased manner and then appraises the alternatives before making a choice (Feather, 1982). This is different to adaptive and defensive patterns which are thought to be less desirable as they involve a range of behaviours such as unquestioned acceptance, responsibility shifting, rationalisation, bolstering of the least stressful alternative and inattention to additional information that would involve change (Feather, 1982).

The aim of strategies to modify the way individuals cope with decisions is therefore to generate a vigilant approach and to counteract less effective patterns of coping (Feather, 1982). It follows then that interventions that involve information as well as procedures to modify decision-making behaviours may reduce decisional conflict (Feather, 1982). In aiming for an ideal such as
'vigilance' in decision-making, individual characteristics and past behaviours may still be difficult to counteract. In providing strategies to prevent the tendency to make a choice and 'bolster' that choice using defensive tactics such as minimising risks to promote the benefits of the choice (Janis & Mann, 1977), it should be acknowledged that individuals may still use these strategies to cope with decision stress. Therefore any evaluation of such strategies for improving the process of decision-making should acknowledge such behaviours in their evaluation. In fact 'real-life' decisions may evoke different behaviours to hypothetical decisions which are often made during research. Therefore analysis of 'real-life' decision-making is important in assessing the effectiveness of strategies designed to assist individuals in this process. The issue of adequate time as well as social or organisational environment on decision behaviours should also be acknowledged as having a potential effect on individual decision-making, and should always be taken into account.

In searching for an appropriate strategy to assist women in making choices for birth that are both informed (evidence-based) and consistent with personal values, the Ottawa Decision Support Framework was selected. The framework will be discussed in terms of its potential value in assessing the effect of information on women's choices for birth after CS, and facilitating a process whereby information and values could be combined.

2.6.2 The Ottawa decision support framework

The Ottawa Decision Support Framework (DSF) acknowledges that many health care decisions are not straightforward and that non-medical factors influence consumer preferences and choices. Healthcare decisions are often made in a context of uncertainty about the outcome. There is an imbalance in information between the 'expert' provider of care and the consumer. Research provides varying degrees of evidence about the relative benefits and risks of many health care interventions. Reliance upon the healthcare provider to make all decisions in cases where comparable options exist carries the risk that the decision will not be
appropriate to the individual or that it is influenced by the bias of the practitioner and their interpretation of research, without consideration of the values and beliefs of the individual consumer. The DSF facilitates a more evidence-based approach to information sharing in a consumer-centred format.

O'Connor et al (1998) base the DSF on expectancy value, decisional conflict and theories of social support with the purpose of addressing health decisions that are;

"(1) stimulated by a new circumstance, diagnosis, or developmental transition; (2) require careful deliberation because of uncertain and/or value-sensitive nature of the benefits and risks; and (3) need relatively more effort during the deliberation phase than the implementation phase." (O'Connor et al., 1998b:268).

The framework itself addresses three key areas including assessment of the determinants of decisions, a decision support strategy and evaluation of the decision support strategy. According to O'Connor's 1996 DSF (O'Connor et al., 1998a) determinants of decisions include sociodemographic and clinical characteristics, perceptions of the decision (knowledge, expectations, values, decisional conflict), perceptions of significant others and resources for decision-making (including personal skills and characteristics). Decision support varies in format and structure but includes research-based information about risks and benefits of options, values clarification exercises, opportunities for modifying expectations and enhancement of personal resources to cope with pressure from others in implementing decisions.

Evaluation focuses on the quality of decisions and the process of decision-making. Therefore indicators of good decisions include "knowledge, realistic expectations, clear values, congruence between values and choice, low decisional conflict, decision implementation, satisfaction with the decision and decision making process" (O'Connor et al., 1998a:271). With the uncertainty in outcome associated with many health decisions however, it is important to acknowledge that although
a decision may contain the components of what may be considered to be a "good quality decision", the actual outcomes may be adverse or negative in nature. Health may have deteriorated or the prognosis may have worsened. There are no guarantees that clinical outcomes will be better as a result of using a decision-aid. Given the element of chance associated with uncertain outcomes it has been suggested that it is unfair to judge the quality of decisions by the clinical outcome (Ratliff et al., 1999). Rather, the process used to make the decision is crucial and a 'good decision' reflects principles of shared decision making including the acceptance of the patient's decision by the practitioner (Ratliff et al., 1999).

### 2.6.3 Decision-aid development

The Decision Support Framework from which decision-aids have been developed, is derived from disciplines of economics and psychology including theories and models such as 'expected utility decision-theory' 'conflict theory' and 'expectancy-value models' (Janis & Mann, 1977; O'Connor & Pennie, 1995). The structure of the framework acknowledges that decisions are made according to an individual judgment of options and a balancing of benefit and risk. Individuals have the capacity to incorporate personal values into judgments about benefits and risks using information including probabilities of outcomes or consequences (O'Connor et al., 1999a). The following discussion will address the potential value of decision-aids in providing the necessary information and support to address the need for consumer involvement in healthcare decisions.

#### 2.6.3.1 Decision-aids as shared decision strategies for health

Decision-aids are more than providers of patient information, they are multi-dimensional tools that focus on decisions and the decision process. Decision-support strategies, although evolving from the field of 'patient education', can be distinguished from the discrete action of 'informing' because of the combination of detailed descriptions of evidence-based benefits and risks of options, use of explicit probabilities of risks and benefits (such as illustrated or numerical),
inclusion of overt values identification and clarification exercises, personal identification of the importance of individual values in the decision, emphasis on the notion of 'choice' and the underpinning principle of shared decision-making (O'Connor, 1997). Items which are excluded from the decision-aid criteria include passive material (such as for informed consent), interventions designed to promote compliance to a recommended option or material not focused on making a decision (O'Connor et al., 1999a; Ottawa Health Decision Centre, 2001).

Better quality decisions are thought to be made when patients have knowledge about options, have realistic expectations of outcomes, and are clear about their own personal values interacting with the decision (O'Connor et al., 1999a). This includes the additional aspects of environment, emotion and culture. Decision-aids are therefore appropriate when there is a need for careful deliberation of alternatives for care, possibly because the decision involves making value judgments about the benefits relative to the risks and there is uncertainty in the outcome of options presented (O'Connor et al., 1998a).

This is true for the choice of birth after CS, given the need for careful consideration of associated risks and benefits within the context of each woman's own clinical scenario. Women's preferences for birth relate closely to their individual needs, values, expectations and experiences, therefore information alone would be inadequate support for the decision-making process.

2.6.3.2 Decision-aids and the evidence of effectiveness

It is important to emphasise that decision-aids have been undergoing development and evaluation whilst this current study has been undertaken. The decision-aid developed specifically for this study was modelled (with permission) on a decision-aid on the topic of breast surgery for cancer (Institute for Clinical Evaluative Sciences, 1998; Sciences, 1998) published for research purposes in 2000. Research has been published in the decision-aid literature since that time regarding the effectiveness of various decision-aids, and this literature will be
Evidence of decision-aid effectiveness, in terms of fulfilling the theoretical underpinnings of the DSF, is mixed, with some decision-aids performing better than others. Specific methodological limitations have been identified in studies of decision-aids and these limitations were used to help inform the design of this research (Molenaar et al., 2000). The identified methodological limitations included lack of adequate controls meaning that effects of decision-aids were suggestive and could not be confidently attributed to the intervention; inadequate sample sizes; use of participants not actually facing ‘real life’ decisions and overall lack of homogeneity in desired outcomes and in the measures used to evaluate effectiveness (Molenaar et al., 2000). It was clear that decision-aids assisted ‘patients’ to make decisions that were consistent with personal values and were stable over time and there were some improvements in knowledge and in lowering decisional conflict (Molenaar et al., 2000). The extent to which decision-aids contributed to satisfaction was mixed and inconsistent results have been demonstrated between studies.

Molenaar et al’s (2000) review included recommendations for future studies of decision-aids in order to strengthen methodology and improve understanding of the impact of decision-aids. It was thought that future research should include ‘patients’ actually facing treatment decisions rather than simulated decision scenarios, and that design should ensure randomisation and use an experimental design (Molenaar et al., 2000). As it is accepted that there are many variables that will influence decision-making behaviours it was thought important that sociodemographic variables, baseline preferences for treatments, baseline information needs or levels of knowledge be analysed and that validated instruments be utilised (Molenaar et al., 2000).

The systematic review of decision aids for people facing health treatment or screening decisions also addressed the areas of methodology within contemporary
studies of decision-aids (O'Connor et al., 1999b). This was later published as a Cochrane Systematic Review (O'Connor et al., 2002). The systematic review concluded that decision aids are better than 'usual' care in improving knowledge and realistic expectations of the risks and benefits of options, facilitating a more active role in the decision process and reducing decisional conflict specifically in the area of 'feeling informed' (O'Connor et al., 1999b; O'Connor et al., 2002).

Improvements in knowledge scores have been as high as 25 points out of 100 in the decision scenario of ischaemic heart disease (Bernstein et al., 1998) and 21 out of 100 for treatment decisions related to benign prostatic disease (Barry et al., 1997) when compared with usual care. More intensive decision-aids, including values clarification strategies and comprehensive information, appear to have a greater effect than less intensive ones by 0.9 to 6 points out of 100 (O'Connor et al., 1999b:732). What makes it difficult to compare the knowledge gained in decision-aid studies is that each knowledge level is based on different knowledge tests specific to the decision being investigated. Therefore, although improvements in knowledge may be expected through the use of a decision-aid given the evidence, it is important to acknowledge the possible limitations of the knowledge measurement tools and to explore indicators of clinical impact of knowledge improvements in terms of congruence with outcomes and other measures such as decisional conflict.

Decision-aids have shown promise in reduction of decisional conflict as measured by a Decisional Conflict Score (DCS). The Ottawa Decisional Conflict Score (DCS) has been widely utilised in decision-aid evaluation. It is a 18-item scale using 5-point Likert format, including subscales on Certainty, Feeling Informed, Values Clarity, Decision Quality and Feeling Supported. It measures the degree of uncertainty about a course of action with scores of 2 or less out of 5 being associated with decision-making, therefore discriminating between decision delay and decision-making (O'Connor, 1995; O'Connor, 1999). Reduction in DCS has been consistent when decision-aids were evaluated in the context of clinical issues such as prostate screening, treatment of ischaemic heart disease (O'Connor et al., 1999b) and use of hormone replacement therapy (O'Connor et al., 1998a). The
subscale of *feeling informed* was consistently improved for decision-aid users and overall reduction of DCS was between 0.2-0.4 out of 5 (O'Connor et al., 1999b:732). It is important that this scale, although an apparently useful tool in decision-aid research, be considered alongside other objective data including knowledge measurement and clinical outcome data.

Satisfaction with the decision and the decision process could be hypothesised to improve through use of a decision-aid, however this is not necessarily the case. Although satisfaction with the decision process has been noted (Barry et al., 1997), the difference appears to be small and inconsistent. Satisfaction is a measure of outcome often used to express notional quality of medical care and should be used with caution as a measure of effectiveness. Despite the possible limited clinical effect on satisfaction using a range of satisfaction measures, it still may be useful to use a range of satisfaction measures in the process of evaluating new decision-aids. This could include visual analogue, Likert scale and open questions, to provide opportunities for triangulation of data in future work.

Decision-aids, although not designed to be directional in terms of choice, have been evaluated according to the effect on preferences elicited between invasive and non-invasive healthcare procedures (Barry et al., 1997; Bernstein et al., 1998; Sawka et al., 1998) as well as towards participation or non-participation in screening activities (Michie et al., 1997). In a before and after study of a decision-aid to assist women considering hormone replacement therapy, it appeared that when consumers are not sure about what to choose, decision-aid users are more likely to make a choice, rather than remain unsure (O'Connor et al., 1998a). The direction of that movement ie. towards one choice or another, does not seem to be influenced by the use of a decision-aid, although there was no control group in this study. Overall, it is unclear what effect information has, if any, on consumers preferences for different types of treatment or options for care, whereby we could predict movement in one direction or the other. Some of this is partly due to small sample sizes (under-powering of studies) (O'Connor et al., 1999b) and use of hypothetical scenarios in some studies, which may not reflect the true decisions
made under ‘real life’ conditions. In addition, the level of adherence or persistence with choices is also uncertain (O'Connor et al., 1999b). In understanding the impact of decision-aids on the choices individuals make in given healthcare scenarios, it is important to examine change in preferences and actual choices.

In essence, it is thought that the potential benefits of decision-aids are that they are capable of assisting individuals who are undecided about their choices to be objectively more informed and reach a decision. For those who already have strong preferences, decisions are more likely to be based on improved knowledge, realistic expectations and be consistent with personal values (O'Connor et al., 1999a). Decision aids appear to have little effect on levels of satisfaction with the process and do not appear to increase anxiety, however their impact on actual choices vary depending on the decision context (O'Connor et al., 2002). It is clear from the review that decision aids vary in format and that it is still difficult to compare many decision aids due to the variations in methods used to study their effectiveness. Future research should examine measures that enable comparison with studies so far, such as knowledge, decisional conflict and perhaps satisfaction, in addition to filling the gaps in terms of persistence with choices and resulting decision outcomes for those using decision-aids. Adequately powered randomised controlled trials involving participants actually facing treatment decisions, are likely to reveal better information about the effect of decision-aids in facilitating active participation in informed choices for healthcare consumers.

2.7 Summary

In exploring the literature on determinants of method of birth the choice appears to be multi-dimensional, involving non-clinical as well as clinical factors and varied involvement of women and their practitioners in the decision-making role. The notion that practitioners are acceding to women’s demand for CS over vaginal birth is not quantitatively justified. The degree to which women are informed of the risks and benefits of CS and vaginal birth is still unclear. The effect of increasing women’s knowledge of their options for birth remains
speculative, with some suggestions that women may prefer vaginal birth if given the choice. The degree to which this is the case in birth after CS has not been fully explored. The questions still to be addressed are;

- To what extent are women informed about the risks and benefits of vaginal and caesarean birth?
- If women were informed of the risks and benefits of options for birth, what choice would they make?
- In what way can the process of decision-making for birth be facilitated to promote informed and supported choices?

The literature supporting the use of decision support strategies, indicates that healthcare decision-aids have a potential benefit for women in pregnancy. Their strength lies in improving knowledge levels of users and reducing the decisional conflict experienced when faced with actual decisions. Although the evidence suggests that decision-aids have limited effect on satisfaction and preferences, when compared with usual care, they can play a role in preparing consumers for being actively involved in decision-making. Women faced with a choice of birth after CS are in particular need of such a strategy to facilitate a process of informed choice about subsequent birth. This dilemma faces increasing numbers of women in Australia and overseas. This research will examine the impact of a decision-aid on women faced with a choice about mode of birth after CS and in doing so assess the degree to which women are informed about their options and the effect that decision support can have on their choices for birth. If effective, such a tool may be useful for a range of decision scenarios in pregnancy, and help to meet the professional recommendation supporting consumer involvement in healthcare decisions. Chapter 3 provides detailed information about the methodology used to develop and pilot a decision-aid for women making choices about birth after caesarean. The randomised controlled trial for evaluating the effect of the decision-aid is then discussed.
CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will outline the methods used to develop, pilot and evaluate the decision-aid booklet designed for women making choices about birth after CS. The research hypotheses will be stated and the rationale behind the selected RCT methodology will be outlined. The RCT protocol will be outlined in terms of measures and timing in addition to logistic processes undertaken to ensure effective recruitment, high participant retention rates and quality data collection.

3.2 Research questions

The literature review identified key research issues relating to uncertainty regarding the role of women in making choices about mode of birth, particularly after previous CS. Information and support for women faced with choices about birth is deemed important, however effective strategies have yet to be identified for use by women in pregnancy. In answering the questions about what role information plays in the choices made for birth, and in determining how best women can be supported in decision-making, the decision-aid strategy was selected.

The study was designed to address these issues by providing evidence about the potential effectiveness of a decision-aid booklet in improving the 'quality' of decision-making for women who have experienced one caesarean birth. The parameters of quality in this context were derived from the Decision Support Framework (DSF) developed by the Ottawa Health Decision Centre (O'Connor et al., 1998a) discussed in Chapter 2 and include such elements as preparation for decision-making by improving knowledge, reducing uncertainty so that a decision
can be reached, clarifying values and improving value congruence with the actual
decision, reducing delay in decision-making, improving adherence to decisions
and increasing satisfaction with both the decision and the process of decision-
making (O'Connor et al., 1998a).

Therefore the research questions addressed by this study are;

• Does a decision-aid increase level of knowledge about the risks and
  benefits of trial of labour (TOL) and elective caesarean section (CS)?

• Does a decision-aid reduce decisional conflict during pregnancy for
  women making a choice between TOL and elective CS?

• Does a decision-aid influence the pattern of preference for mode of birth.

• Does a decision-aid increase adherence to choice about mode of birth, for
  women making a choice between TOL and elective CS?

• Does a decision-aid improve levels of satisfaction with the birth
  experience, for women who have made a choice between TOL and
  elective CS?

A three phase research study was developed to address these questions. The first
phase was the development of an evidence-based decision-aid using the Ottawa
Decision-aid Framework. The second phase was a pilot study to determine
whether the decision-aid was potentially efficacious and warranted evaluation.
The third phase was a randomised controlled trial to evaluate the effectiveness of
the decision-aid in facilitating a process of informed choice for women faced with
the decision about birth after CS.
3.3 Phase 1: Developing a decision-aid

On commencing phases 1 and 2 (development and piloting), it was hypothesised that a decision-aid would benefit women faced with the decision about birth after caesarean by facilitating a process of ‘informed’ decision-making, in the context of improved knowledge about the risks and benefits of vaginal birth and elective caesarean birth and overt consideration of women’s individual fears, values and needs surrounding birth.

Phase 1 of the decision-aid development involved an initial draft being written using the format of the Ottawa Health Decision Centre. In order to utilise the DSF for this study, permission was obtained from Annette O’Connor of the Ottawa Health Decision Centre prior to the development of the decision-aid. (Appendix A)

At the time of the decision-aid development there were no specific protocols for development although resources were available from the Ottawa Health Decision Centre. The National Health and Medical Research Council (NHMRC) had also endorsed a handbook on “How to present the evidence for consumers: preparation of consumer publications” which was utilised during the drafting phase and prior to the piloting phase of the decision-aid (National Health and Medical Research Council, 2000). The most recent Cochrane review protocol (developed since the writing of this decision-aid) uses 16 pre-set criteria (Ottawa Health Decision Centre, 2001) grouped into six categories with the acronym CREDIBLE:

*Competent developers and development, Recent update, Evidence-based, Devoid of conflict of Interest, BaLanced presentation of options (benefits and harms) and Efficacious.*

Despite the fact that the criteria were published in September 2001, the recommendations for the development and evaluation of decision-aids had been
met during the design of this decision aid and the evaluation of this aid will contribute to the evidence-base upon which decision-aid development rests. The following section thus outlines the development process for the decision-aid for women facing birth after CS and leads to the conclusion that the decision-aid was indeed “Credible” for the research purposes.

3.3.1 Competent developers and development process

The process of development must promote components of quality decision-making and part of that process is to include review by a panel of experts and the inclusion of potential users of the decision-aid (Ottawa Health Decision Centre, 2001).

A panel was formed to read and comment on the content and design of the decision-aid. In order to ensure that both providers of care and consumers were able to assess the content and format of the decision-aid the panel included obstetricians (5), midwives (5), educational specialists (2) and women who had already experienced caesarean birth (2). Participants were individually provided with a hard copy of the draft decision-aid and asked to provide written comments within the text of the decision-aid and in summary on the contents, readability, and their overall impression of the decision-aid.

The piloting process also involved women faced with a ‘real-life’ birth decision, adding to the value of the process and facilitating the identification of potential strengths and weaknesses of the decision-aid prior to its use in the RCT. This will be outlined in discussion of phase 2 (section 3.4).
3.3.2 Recently updated and Evidence-based Information

The development criteria suggests that information should be continuously updated in the process of development or at least have a schedule of review every two years (Ottawa Health Decision Centre, 2001). The material must be evidence-based including support from systematic reviews and scientific studies (Ottawa Health Decision Centre, 2001).

Key content areas and major risks and benefits were identified using evidence-based practice principles. Best available evidence included the most recent clinical management guidelines (with documented systematic review protocols) as well as additional review of primary research and published meta-analyses. These were sourced from MEDLINE, CINAHL and The Cochrane Library (including the Cochrane Database of Systematic Reviews, The Cochrane Central Register for Controlled Trials and associated linked data bases). Limited evidence was available from randomised controlled trials, with much evidence gained from cohort studies and meta-analysis of cohort studies. Research on the determinants of women’s choice for birth was also reviewed to identify significant non-medical issues for inclusion in the decision-aid. As new literature became available a process of ongoing review occurred in light of the information included in the decision-aid during the development process.

The details of the specific content areas (risks and benefits) featured in the decision-aid, including probabilities, sources of evidence, examples of how these were stated in the decision-aid as well as the numerical references within the table can be found in Appendix B. In summary major advantages of trial of vaginal birth (referred to as trial of labour (TOL)) over elective CS included good success rates for attempted VBAC (60-80%), shorter hospital stay and recovery time, greater opportunities to establish breastfeeding and avoidance of risks related to surgery (Mutryn, 1993; Flamm et al., 1994; Glazener et al., 1995; American College of Obstetricians and Gynecologists, 1999; Appleton et al., 2000; Enkin et al., 2000; Commonwealth Department of Health and Ageing, 2001) .
Disadvantages included potential for complications such as rupture of uterine scar, possible instrumental vaginal birth (forceps/vacuum), vaginal trauma and emergency caesarean (American College of Obstetricians and Gynecologists, 1999; Senate Community Affairs References Committee, 1999; Nassar & Sullivan, 2001). Major advantages of elective CS included the ability to plan or book in advance therefore reducing uncertainty or labour fears, and reduction in risks associated with emergency CS (McClain, 1990; Rosen et al., 1991; McMahon et al., 1996; American College of Obstetricians and Gynecologists, 1999; Enkin et al., 2000). Disadvantages included surgical risks such as infection, anaesthetic problems, bleeding, blood clots (lung and legs) and longer postnatal recovery time, as well as increased likelihood of transient tachypnoea of the newborn (Astbury et al., 1994; Glazener et al., 1995; McMahon et al., 1996; Hook et al., 1997; Mastrobattista, 1999; Enkin et al., 2000).

The “Birth Choices” decision-aid entitled “Birth Choices: What is best for you...Vaginal or Caesarean Birth” was produced as a 20-page, A5 size self-administered booklet consisting of two main parts (Appendix C). The introductory section (p. 1) states that the booklet is for women who have already had a caesarean, are currently pregnant and for whom, after consulting with their doctor or midwife, it has been decided that they may choose between a trial of vaginal birth or elective caesarean birth. The instructions indicate that the women should read the booklet from start to finish, writing down any questions as they go and then complete the exercise at the end of the booklet.

The first part includes descriptive information about the two options for birth (trial of vaginal birth or elective caesarean birth), incorporating visual presentations of the probability information regarding risks and benefits of each mode of birth. The word ‘birth’ was used throughout the decision-aid for both options (vaginal birth and caesarean birth) to ensure consistent language for both birth options. The information for each birth choice is described in turn, with headings posed as questions. For example; “What is a trial of vaginal birth? What happens at the
time of labour? What happens after the vaginal birth? What happens if I need to
have a caesarean once labour has started?" For each birth choice the possible
benefits and possible problems are outlined, for both mother and baby. The review
of birth choices then summarises advantages and disadvantages already outlined
for trial of vaginal birth and elective caesarean birth on the same open page, so
that women can review their options without searching through the text.

The second part involves a values clarification exercise to guide women through a
summary of major pros and cons, based on the discussion within the body of the
decision-aid. To assist women to consider how important each of these issues was
to their individual situation, a scale using the terms "Not Important", "Some/Moderately Important" and "Very Important" is listed beside each issue
and women were instructed to rank each accordingly. Examples are used to
explain the process. Women are asked to write down any additional thoughts or
ideas they wished to add to the lists under the heading ‘Your Ideas’. A 15-point
Birth Preference Scale is utilised to elicit birth preference at the end of the
activity. A space is provided for women to note any additional ideas or concerns
about the options as well as for future consultations with the doctor or midwife.

The development was Devoid of conflict of Interest in terms of booklet
development and the names and professional appointment of the major
contributors was listed inside the booklet cover.

3.3.3 Balanced presentation of risks and benefits

A crucial element of the decision-aid is that information is balanced and that
benefits and risks of both choices are presented in a balanced way (Ottawa Health
Decision Centre, 2001). It is also important that readers of the decision-aid find it
to be balanced (Ottawa Health Decision Centre, 2001).
A critical review of the draft decision-aid was conducted by an expert in decision-aid development and an expert in CS utilisation. A revised draft was then evaluated by a panel described earlier (section 3.3.1). The reviewers were selected from the area health services where the tool was to be tested, to ensure the content was relevant to their particular hospitals and reflected clinical reality. For the purposes of decision-aid development, it was anticipated that the midwives and obstetricians would review the content according to their philosophical and professional viewpoints, thus identifying possible biases in the draft decision-aid. Education specialists and childbearing women were involved to assess the degree to which content was comprehensible and relevant to consumers. Feedback was requested and provided on format, reading ease, length, accuracy, relevance and balance of content for each option. For example, the midwives on the panel suggested more specific discussion in the trial of vaginal birth section about risks of perineal trauma and postnatal bleeding, and the obstetricians on the panel requested more detailed information on risks and consequences of uterine rupture. Consumer feedback identified a need to provide more information on emergency caesarean section during attempted vaginal birth.

The final draft for pilot purposes was assessed as having a Flesch (reading ease) score of 63.7 and grade level of 7.8. This was considered appropriate for the reading needs of most women and consistent with other decision-aids (O'Connor et al., 1998a). The recommended score for Flesch Reading ease is between 60 and 70 and the Flesch-Kincaid Grade level score is between 7 and 8 (reading age of approximately 12-13 years of age) (Microsoft, 2000; National Health and Medical Research Council, 2000). These scores represent sentence length and syllables per word and therefore reflect estimated expected literacy levels of readers within the community.
3.4 Phase 2: The pilot study: Efficacious for decision-making

The main aim of the pilot project was to evaluate women’s reactions to the decision-aid and assess its acceptability to women faced with the actual birth decision. This was an important step in demonstrating the decision-aid was potentially efficacious for decision-making. The findings support the potential value for a well-designed RCT to test a number of research hypotheses.

3.4.1 Pilot protocol

Women who met the inclusion criteria (section 3.6.4.1) and were attending the pre-natal clinic for pregnancy care at two participating hospitals were approached by the clinic midwives and asked whether they were prepared to participate in the pilot study. Each woman was requested to complete a questionnaire prior to and after reading the decision-aid. The ‘before’ and ‘after’ decision-aid design was primarily used to assess the ease of reading of the decision-aid and to gain an impression about the extent to which women found the information and values clarification process useful to them when faced with the decision. It also provided an assessment of possible effect of the decision-aid on preference for birth and enabled a comparison between what was preferred and what happened. Women either returned the completed questionnaire along with the decision-aid booklet to the midwife at the time of the clinic visit or, if they did not have time, they used a postage-paid envelope.

The ‘pre-decision-aid’ questionnaire requested information about their previous caesarean birth and their preference for birth with the current pregnancy. The ‘post-decision-aid’ questionnaire asked women to indicate a preference for method of birth and explain their reasons for this preference. An open-ended section requesting comments on the acceptability and usefulness of the decision-aid was also included.
3.4.2 Pilot sample

A convenience sample of 21 pregnant women who had experienced a CS and were attending prenatal clinics at one of the two hospital sites, was recruited between March 1st and May 31st 2001. Of the 21 women surveyed, most (18/21) indicated that their previous CS was an emergency procedure. The most common justification was a combination of ‘fetal distress’ and ‘failure to progress’ in labour (9/18), the remainder due to a single indicator such as ‘fetal distress’ (3), ‘failure to progress’ (2), breech (2) and two others not specified. All of the elective CSs (3) were due to breech presentation.

The hospitals used for the pilot are referred to as H1 and H2. The policy and practice patterns of these two hospitals are very different in terms of pre-study rates of trial of vaginal birth (referred to as TOL) and elective CS. TOL rates approach 80 percent in H1, whilst in H2 they approximated 20 percent. This may suggest differences in the practice patterns of the obstetricians working within these hospital sites or in the preference patterns of the women, favouring elective CS in H2 and TOL in H1. Variations in practice patterns within Australia have been documented, with significant differences occurring both between and within hospitals, states and territories, and such differences are by no means completely explained by client risk profiles (Health Department of Victoria, 1990).

3.4.3 Findings of the Pilot Study

Women’s preference (for either TOL or elective CS) identified both before and after reading the decision-aid can be compared in the movement along the scale for TOL and elective CS. Table 3.1 provides a summary of preferences for women prior to and after reading the decision-aid. Due to the small numbers this table does not show individual women, but displays proportions at the two specific time points (pre and post decision-aid). In general, those who strongly favoured a TOL seemed unchanged in their preference after reading the decision-aid. However, those who either were only mildly in favour of TOL or who were
unsure changed their preference towards elective CS after reading the decision-aid.

<table>
<thead>
<tr>
<th>Pre-decision-aid Preference</th>
<th>Post-decision-aid Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong (TOL)</td>
<td>TOL</td>
</tr>
<tr>
<td>Mild (TOL)</td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>Unsure</td>
</tr>
<tr>
<td>Mild CS</td>
<td></td>
</tr>
<tr>
<td>Elective CS</td>
<td>Elective CS</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
</tr>
</tbody>
</table>

In further describing the movement of preferences for birth within each hospital, in H1, eight (8) of 11 women preferred a TOL before the decision-aid and only six (6) after. Whilst only two (2) women preferred an elective CS before the decision-aid, four (4) preferred this after. In H2, a similar pattern exists, whereby seven (7) out of ten (10) women preferred a TOL before the decision-aid and only five (5) after. Elective CS preference increased from three (3) to four (4) after reading the decision-aid.

3.4.4 Potential Efficaciousness of the decision-aid

Women provided written feedback about the decision-aid in terms of the way it was written, whether it was easy for them to understand and the usefulness of the 'values clarification' exercise. For the 21 women surveyed, 16 (76%) provided written feedback about the decision-aid, with 15 of the 16 women giving positive
responses, and one (1) providing suggestion that details be offered about perineal trauma in the vaginal birth section. The response was rated positively if it included comments about being easy to read and/or understand, made a difference in the decision process or was considered useful to the women. The notion of the decision-aid helping women gain control in the decision process was evident in a number of the responses. For example, Case A noted that although she had discussed TOL with her midwife or doctor she was still unsure about the decision even at 39 weeks of pregnancy. After she had read the decision-aid she indicated a preference for CS.

Case A: “Less fear of complication re size of my baby, tearing of uterus and scar. Quick recovery previously, plus had no problems with breastfeeding. Feel a little more in control...I thought the booklet was well written and easy to understand. It helped me considerably in the decision I had to make. I feel informed. The activity at the end aided in clarifying the information into thought”.

Case B preferred a TOL both before and after reading the decision-aid. She indicated the decision-aid increased her control.

Case B: “When I had my caesarean 8 years ago I felt robbed of pushing my baby out myself and of welcoming her to the world. A vaginal birth is on the top of my list. If I have a caesarean I want an epidural so I can be awake and I want my husband and daughter there with me. The booklet was great it made me feel like I have more control over what is going to happen to not only me but my family as well. I feel like I will be more understood. The booklet was extremely easy to read and understand. I will be going through it again”.

60
The decision-aid may facilitate discussions between the women and their doctor/midwife about their questions and concerns. Case C expressed a mild preference for TOL prior to reading the decision-aid but changed her preference to a CS afterwards.

Case C: “My biggest fear is the scar rupturing and causing damage to the baby. As my previous c/section was only 16 months ago (or will be when the baby is due) I feel that the risk of this occurring needs to be discussed more fully with my doctor. The booklet was very easy to understand and has made me think more seriously about the options available to me. As a result of completing your survey I have put my fears and worries on paper and will make sure that my birthing options are discussed with my doctor closer to the time”.

Pressure from family and/or friends had a significant influence for some women. For Case D the decision-aid provided permission for her to prefer a TOL when her friends had clearly opted for a CS.

Case D: “I felt guilty about wanting a normal birth – after the booklet I felt much better about it – all my friends had repeat C”.

3.5 Development issues for Phase 3

Given the small number of participants, the results were only suggestive and identified issues that required exploration in the larger evaluation. The majority of women who participated in the pilot study and completed the decision aid booklet indicated the booklet was well written, easy to understand and assisted them in coming to a decision about their birth. The finding that 5 of 21 women changed their birth preferences from the before-decision-aid to after-decision-aid response, suggests the decision-aid may either confirm preferences or facilitate a
change. The degree to which this could influence overall rates of TOL versus elective CS is, however, unclear at this point.

### 3.5.1 Phase 1 and Phase 2: Summary and recommendations

The pilot study provided crucial feedback from women about the acceptability and possible usefulness of the decision-aid in helping women make choices about birth after caesarean (Shorten et al., 2004). A randomised controlled trial was designed to provide evidence about the effect of the decision-aid on women’s choice for birth after CS. Knowledge about risks and benefits of options, decisional conflict and satisfaction with the decision process and outcome were considered to be key issues for evaluation.

The RCT has methodological advantage in this research context over a ‘before and after’ cohort study design, controlled trial without randomisation and a randomised trial comparing different interventions, because it can enable higher level evidence to be gathered about the impact of ‘routine care’ provided to all women not only participating in the research but who utilise obstetric prenatal services in the research sites. This can then be compared with the single intervention of a decision-aid. A randomised controlled trial in this context is one where the control group can help determine whether the proposed intervention is more effective than present care or treatment, and the randomisation ensures that groups involved in the comparison are indeed comparable (Wallace et al., 1997). The randomisation, in terms of allocating participants to either control or intervention groups, is crucial in limiting the impact of unknown selection biases (Burrows & McLeish, 1995) which could otherwise invalidate conclusions drawn from the research. Random allocation means that each participant has equal chance of being allocated to either control or intervention groups, and that on balance the characteristics of participants within each group should be similar. Therefore the techniques selected for the process of randomisation are vital and those utilised for this research are detailed in the randomisation section 3.6.4.3.
3.6 Phase 3: Randomised controlled trial

This section will describe the design of the randomised controlled trial (RCT) of the decision-aid. Discussion will include the hypotheses addressed, key design elements including the multiple study sites used, intentions for study sample size and characteristics, recruitment plan, randomisation procedures, study instruments and RCT protocol.

3.6.1 Research Design

A randomised controlled trial design using a multiple study site approach was considered to be important for the evaluation of the decision-aid in terms of the level of evidence that can be provided by a RCT when compared with a 'before and after cohort' design (National Health and Medical Research Council, 1995; Wallace et al., 1997). This RCT was designed to comprise a control group receiving strictly 'routine care' and an intervention group, whose only departure from 'routine care' was provision of a decision-aid. This design was used to address limitations of reported RCTs involving educational strategies for women facing choices about birth after CS, can be critiqued in Chapter 2 on issues such as their clear promotion of TOL or VBAC over elective CS and designs which involved comparison of two different interventions (one minor and one major), with no true control group receiving 'routine care'(Fraser et al., 1997; Saisto et al., 2001). Multiple study sites were chosen because it was evident that due to variations in rates of CS between hospitals and practitioners within Australia (Appleton et al., 2000), using a single site may only provide information relevant to that specific site and its individual characteristics. Therefore a multi-site study was designed to provide a level of comparison both between patterns of practice and also to determine the usefulness of the decision-aid under conditions of different demographic characteristics of patient populations. Sample size calculations (see section 3.6.4.4), were conducted to ensure that each study site had an adequate sample size for individual analysis of data on key measures. Therefore comparison between sites as well as randomised groups was possible.
3.6.2 Phase 3 Hypotheses

The following are hypotheses generated for testing in the RCT.

1. \( H_0: \) Women in the decision-aid and control groups will not differ with respect to mean knowledge scores

\( H_1: \) Women in the decision-aid group will demonstrate higher mean knowledge scores than women in the control group.

Let \( X \) = Knowledge score at Survey 3

Subscripts D and C refer to Decision-aid group and Control group respectively

\( H_0: \mu_D - \mu_C \leq 0 \)

\( H_1: \mu_D - \mu_C > 0 \)

2. \( H_0: \) Women in the decision-aid and control groups will not differ with respect to mean change in decisional conflict scores.

\( H_1: \) Women in the decision-aid group will demonstrate greater mean reductions in decisional conflict score than women in the control group.

Let \( X \) = Decisional Conflict Score at Survey 3

Subscripts D and C refer to Decision-aid group and Control group respectively

Subscripts 2 and 3 refer to Survey 2 and Survey 3

\( X_A = X_3 - X_2 \)

\( H_0: \mu_{AD} - \mu_{AC} \leq 0 \)

\( H_1: \mu_{AD} - \mu_{AC} > 0 \)

3. \( H_0: \) Birthmode choice at Survey 3 is independent of study group

\( H_1: \) Birthmode choice at Survey 3 is dependent on study group
4. $H_0$: Women in the decision-aid and control groups will not differ with respect to adherence to birthmode choice at Survey 3.

$H_1$: Women in the decision-aid group will be more likely to adhere to birthmode choice at Survey 3 than women in the control group.

Let $E =$ event of adherence to birthmode choice at Survey 3 (excluding 'unsure' responses).

Let $P =$ proportion of women adhering to birthmode choice at Survey 3

Subscripts D and C refer to Decision-aid and Control groups

$H_0 : P_D - P_C \leq 0$

$H_1 : P_D - P_C > 0$

5. $H_0$: Women in the decision-aid and control groups will not differ with respect to mean satisfaction scores.

$H_1$: Women in the decision-aid group will demonstrate higher mean satisfaction scores than women in the control group.

Let $X =$ Satisfaction scores at Survey 4

Subscripts D and C refer to Decision-aid and Control groups

$H_0 : \mu_D - \mu_C \leq 0$

$H_1 : \mu_D - \mu_C > 0$
3.6.3 Research sites

Participating centres included: Royal North Shore Hospital (RNSH), Hornsby Kuring-Gai Hospital (HKH) and The Wollongong Hospital (TWH). These hospitals were from two distinct area health services within New South Wales; Northern Sydney Health (RNSH and HKH) and Illawarra Health (TWH). The majority of women within these services attended the public prenatal clinics within a hospital setting, however a number of private obstetricians from RNSH also participated. The study sites within the Northern Sydney Health area will be referred to as site 1 and the Illawarra Health hospital (TWH) will be referred to as site 2.

Anecdotal evidence from medical and midwifery staff within both study sites, and subsequent verification using medical record data, indicated that site 1 in the pre-research period had what was considered to be low rates of TOL (21%) (Royal North Shore Hospital Department of Obstetrics and Gynaecology, 1998) for women who had experienced previous caesarean section and site 2 had higher rates of TOL (80%) (Shorten et al., 1998). The expected socioeconomic status of each site was also different. Site 1 was thought to have a much higher socioeconomic status (such as education level, income) than site 2 due to geographical location and previous trends relating to socioeconomic measures within area health service data. (NSW Health Public Health Division, 2000; NSW Health Department Epidemiology and Surveillance Branch, 2002).

3.6.4 Sample

3.6.4.1 Eligibility Criteria

Pregnant women with one previous CS were eligible for inclusion into the study. Exclusion criteria were consistent with American College of Obstetricians and Gynecologists Clinical Practice Guidelines (American College of Obstetricians and Gynecologists, 1999);
• more than one previous CS
• a classical or unknown uterine scar
• a history of uterine rupture or upper segment perforation
• a multiple pregnancy
• obstetric or medical contraindications to vaginal birth and/or trial of vaginal birth (eg. placenta praevia) in the current pregnancy.

3.6.4.2 Recruitment

Women who met the inclusion criteria between May 2001 and May 2003 were identified by a research midwife or obstetric practitioner, when they attended their first visit at participating hospitals or practices (<20 weeks gestation) and were provided with an information letter (Refer Appendix D). They were invited to participate in a study regarding two different methods of giving information to women during pregnancy, which would involve completing four surveys about their feelings and experiences. Those who were willing to enrol in the study (90% of those approached) signed written consent and comprise the study group.

3.6.4.3 Randomisation and assignment

Computer-based randomised number generation was used by a separate central administration unit to prepare and issue opaque envelopes containing a random allocation for each participant code number. Once recruitment into the study was achieved and a consent form returned with the first survey, a sequential code number was assigned to the participant. The envelope for the corresponding number was then opened by the researcher and allocation recorded. This was intended to prevent departures from the schedule to accommodate the desire of a patient or her physician/midwife. A separate allocation schedule by hospital was utilised, with each schedule having the same allocation ratio, 1:1. Within each study site blocked randomisation of different sizes was used. The use of block randomisation meant that it was impossible for anyone to predict allocation schedules and in turn influence the random allocation process. The use of one researcher only to open the envelope and record the allocation also ensured the
consistent application of research protocol and no interference was encountered by clinical staff or participants themselves. Thus confidence in a true random allocation process was assured.

### 3.6.4.4 Sample size

The primary intention was to consider whether the decision-aid, as an intervention, could improve knowledge and if so whether this would impact upon choice for mode of birth in hospitals within the two area health services. It was necessary to calculate the sample size to test the hypothesis that the intervention would increase knowledge of the risks and benefits of elective CS and TOL. Analysis of the pilot study Knowledge Test data, suggested that the intervention could increase average scores from 9/15 to 11.25/15, with a variance of 6.15. Assuming a one-tailed alternative hypothesis (the average score is higher for the intervention group) at the 0.05 level of significance and 80 percent power to detect a change, calculations indicated that a total sample of only 35 respondents was required for the knowledge measure, with a 10 percent dropout rate factored in (Friedman et al., 1998:100-109).

In terms of impact on choices for mode of birth, a larger sample size was required. Site 1 (RNS and Hornsby Hospital) had a pre-experiment TOL rate of 20 percent, which was considered to be a low rate when compared with rates of 40-70 percent in other areas within Australia (Appleton et al., 2000). In determining required sample size for this site, it was decided to simulate an increase in the TOL rate to 40 percent, and to base power calculations on a one-sided alternative hypothesis (that the TOL rate would be higher in the intervention group than for the control), using the 5 percent significance level and 80 percent power to detect an increase on the TOL rate. The required sample size is 130, rounded to 145 after allowing for a 10 percent dropout rate (Friedman et al., 1998:100-109). For the comparison site at Wollongong Hospital (site 2), the pre-study TOL rate was 80 percent, substantially above the usual range of 40-70 percent. Given the promotion of TOL
over elective CS at this site, there were reasons to suspect that the intervention may lead to a fall in the TOL rate if women felt elective CS was readily available as an option. Simulating a fall of from 80 to 50 percent using the assumptions as above, gave a required sample size of 67 rounded to 70, allowing for 10 percent attrition. Therefore the minimum total targeted sample size for site 1 was 145 women and for site 2 a total of 70 or 215 women in total for the study, allowing for 10 percent attrition rate (Friedman et al., 1998: 100-109). Sample size calculations were checked and verified using a web-based sample size calculator (Brant, http://www.health.ucalgary.ca/~rollin/stats/ssize/b2.html <01/07/05>).

3.6.4.5 Blinding

Participants were blinded to their allocation, although they all expected to receive one of two unspecified forms of information about birth options during the pregnancy. This was necessary to ensure that participants had equal anticipation of information being provided during the trial. It was also hoped that this would reduce the likelihood of contamination between the groups. The first unspecified form of information was verbal information received from doctors and midwives as a part of the usual ‘routine care’ during prenatal visits. The second form of information was the decision-aid which was provided in addition to the usual ‘routine care’. There was no written information distributed to women in either group by the study sites as a part of the ‘routine care’ because none was available. Midwives and doctors were not informed of a woman’s enrolment or allocation in the study, though participants were free to use the decision-aid in discussions with their health professionals. This could have negated blinding to enrolment or allocation. The only copies of the decision-aid were held by the researcher and by the women in the intervention group. Doctors and midwives did not have access to copies of the booklet and were therefore not able to distribute it or use it in discussion with women who had not been provided with their own copy as per the allocation schedule. This approach was taken in order to minimise opportunities for obstetricians and midwives to make inadvertent departures from the allocation schedule. It was also hoped that by keeping strict controls on who was provided
with copies of the decision-aid booklet, that this would reduce the opportunity for an unintended effect or change in clinical practices within the study sites.

3.6.5 Intervention

The decision-aid booklet was provided to women allocated to the decision-aid group at 28 weeks of pregnancy. The instructions given to women both verbally by the researcher and in writing, was a standard statement...

"The booklet provides information for you about options for birth. Read the booklet at your own pace and jot down any questions you have as you read. There is a small exercise at the end of the booklet to help you as well...We hope that it will be of help to you as your pregnancy progresses and when you discuss your birth options with your midwife or doctor."

Women were directed to ask their doctor or midwife any further questions they had regarding the information in the booklet to avoid any instances of adhoc counselling between the researcher and the participants that could potentially confound the results. (The decision-aid booklet contents, design process and piloting have been discussed in sections 3.3 & 3.4 of this chapter. The decision-aid booklet can be found in Appendix C).

3.6.6 Outcome measures

The primary outcome measures for the RCT were level of knowledge (knowledge scores), decisional conflict scores (DCS) and the documented preference and choice for mode of birth for each women recorded at 36-38 weeks as well as actual birth outcomes and satisfaction with birth experience. These data relate directly to the study hypotheses and were collected at four survey points as outlined in Table 3.2. A number of other measures were included in the surveys
for the purpose of gathering baseline information and detecting possible adverse physical or psychological outcomes. The State Trait Anxiety Inventory (STAI) and the Edinburgh Postnatal Depression Score (EPDS). Details of each instrument will be provided in section 3.6.7. Birth outcome data was collected from hospital medical records and used to cross check and determine actual birth experience. A small number of other measures were included in Survey 4 and do not feature in the analysis. For example the EQ5D measure, although included in the Survey 4 postnatal health status section, was for the purpose of future research regarding potential economic cost-utility analysis, and is not within the scope of this thesis.

Table 3.2 Survey protocol and measures

<table>
<thead>
<tr>
<th>Survey 1 (12-18 weeks)</th>
<th>Survey 2 (28 weeks)</th>
<th>Survey 3 (36-38 weeks)</th>
<th>Survey 4 (6-8 weeks postnatal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Details</td>
<td>Knowledge Score</td>
<td>Knowledge Score</td>
<td>Mode of Birth</td>
</tr>
<tr>
<td>Obstetric History</td>
<td>Decisional Conflict</td>
<td>Decisional Conflict</td>
<td>Decisional Conflict Score</td>
</tr>
<tr>
<td>Birth Preference</td>
<td>Birth Preference</td>
<td>Birth Choice</td>
<td>Satisfaction with birth experience</td>
</tr>
<tr>
<td>STAI (six-item)</td>
<td>STAI</td>
<td></td>
<td>EPDS</td>
</tr>
<tr>
<td>EPDS</td>
<td><em>Decision-aid then provided to women assigned to intervention group</em></td>
<td></td>
<td>Health Problems Since Birth</td>
</tr>
</tbody>
</table>

All women participating in the study were surveyed according to the protocol outlined above. The control group women received ‘routine care’ only, according to their specified model of pregnancy care. Women in the intervention group, in addition to their ‘routine care’, received the decision-aid booklet from the researcher at 28 weeks of pregnancy.
3.6.7 Survey design and instruments

The four surveys were developed by the author in consultation with members of the panel of experts utilised for the decision-aid development process. Each survey consisted of a range of measures including some which had been previously validated in research (such as the DCS and STAI) and those developed specifically for the RCT (such as the knowledge test and the birth preference scale). Where a new instrument was developed specifically for the decision-aid study, and for which there was no research-based indicator of predictability or reliability, the draft was reviewed by members of the panel with survey development experience, and then revised prior to use in the pilot study. In particular, the knowledge test was further refined as a result of the pilot study, prior to use in the RCT. All instruments are discussed in detail below. Survey design was undertaken to measure outcomes of interest at appropriate points in time during pregnancy and after the birth. The rationales for inclusion within a particular survey are provided for each instrument.

The first three surveys were identical for both the decision-aid and control groups. Survey 4 asked specific questions of those in the intervention group about the decision-aid booklet and hence differed between groups. A copy of each survey can be found in Appendix E. When surveys were constructed, attention was paid to ease of reading and limiting the time necessary for women to complete the survey, keeping in mind that most women had at least one other child to care for and many other time commitments. The colour of the surveys was also considered in order to assist ease of reading and ensure that white, pink or blue was not used. (It was thought that white was too stark and that pink or blue might influence women’s feelings as these colours relate to the sex of the baby in many hospital environments). The surveys were printed in Optix “Groovy Green” (1 and 2), “Evol violet”(3) and “Cadi Lilac”(4).
3.6.7.1 Demographic Data and Obstetric History (Survey 1)

Demographic data and obstetric history were collected to provide a picture of participant characteristics to enable comparison of participants by site and randomised group, and to enable control for possible confounding factors in terms of key outcomes. It was proposed that knowledge may be influenced by age, parity, educational status, country of birth and socioeconomics status. Therefore Survey 1 collected baseline data on age, parity, country of birth, previous education level, employment status, marital status, partner’s employment status. It was also anticipated that if necessary, educational status, marital status, employment status of self and partner could serve as proxies for socio-economic status without asking specific questions about income.

The literature indicated that the reason for previous CS as well as previous obstetric problems and even medical history, may impact upon choice for mode of birth and likelihood of success with attempted VBAC (Gamble & Creedy, 2001). It was therefore thought important to collect this information to enable analysis of these factors within site groups and by randomised group.

3.6.7.2 State-Trait Anxiety Inventory (STAI)(Adult) (Survey 1 and 3)

It was acknowledged that information could affect, levels of anxiety in participants, although previous research indicates that use of a decision-aid does not appear to have an impact upon levels of anxiety (Murry et al., 2001). The Spielberger STAI was selected to assess levels of anxiety at Survey 1 (baseline) and then at Survey 3 (post-decision-aid). The Charles D. Spielberger tool differentiates between the temporary condition of "state anxiety" and general and long-standing "trait anxiety". It helps distinguish between a client's feelings of anxiety and those of depression. The STAI has 40 questions with a range of 4 possible responses for each question. Anxiety states are subjective and relate to feelings of worry, tension or nervousness (Speilberger, 1983). State anxiety refers to a level of intensity of feeling at a given point in time, where Trait anxiety refers
to a disposition for a particular response to given situations (Speilberger, 1983). The STAI has been used extensively in research and is considered to be both a reliable and sensitive measure of anxiety with alpha co-efficients reported to be 0.86-0.95 (Speilberger, 1983). The STAI was therefore considered to be an appropriate measure of both state and trait anxiety for use as a comparison of levels of anxiety between groups post intervention and at a time prior to the birth of the baby at 36-38 weeks. The six-item short-form has also been validated for use in detecting fluctuations in state anxiety in situations where a briefer scale may be an advantage (Marteau & Bekker, 1992). This was used in Survey 1 as a baseline measure due to the need for a shorter set of questions. The focus for Survey 1 was primarily for obtaining information about obstetric history, previous birth experience and early birth preferences.

3.6.7.3 Birth Preference Scale (Survey 1 and 2)

The Birth Preference Scale was adapted from the preference scales used in previous decision-aid evaluations. Women were asked to indicate a preference for method of birth on a 15-point scale from trial of vaginal birth to elective caesarean birth. The 15-point scale anchored by options with the midpoint as 'unsure' is documented to correlate with values and expectation and is sensitive to change in preference. The test-retest co-efficient is also stated as 0.90 (Greenfield et al., 1988; O'Connor et al., 1998a; O'Connor et al., 1998b; O'Connor et al., 1999). The 15-point scale also formed part of the values clarification exercise within the decision-aid booklet and it was thought that in order to be consistent in illustrating preference that the 15-point scale should be used in the surveys. The 15 points allows the grouping of responses within 3 specific groups of preference such as leaning towards trial of vaginal birth, unsure and leaning towards elective caesarean birth.

Caveat: In the Survey 1 preference scale, the scale inadvertently appeared as a 10-point rather than 15-point scale. This was a baseline measure only and not the key
point of comparison for preference measurement. However, is was still important to compare this Survey 1 preference with Survey 2 preference and Survey 3 choice. Therefore to allow for this difference in the number of tick points (10 rather than 15) the responses were coded in such a way as to approximate the 15 point preference scale. Prefer TOL 1-4; Unsure 5-6; Prefer CS 7-10 for the 10-point scale and Prefer TOL 1-6; Unsure 7-9; Prefer CS 10-15 for the 15-point scale. To illustrate (Figure 1) this approximate mid-point for ‘unsure’ responses is shaded for both scales.

![Figure 3.1 Birth preference scale](image)

**Survey 1 10-point scale**

<table>
<thead>
<tr>
<th>Prefer trial of vaginal birth</th>
<th>Unsure</th>
<th>Prefer elective</th>
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<tbody>
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</table>

**Survey 2 15-point scale**

<table>
<thead>
<tr>
<th>Prefer trial of vaginal birth</th>
<th>Unsure</th>
<th>Prefer elective</th>
</tr>
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### 3.6.7.4 Birth choice (Survey 3)

A statement of choice was required for Survey 3, prior to the birth. The statement of choice question was adapted from the University of Ottawa Evaluation Measures for decision-aids resource (O'Connor, 1999a). The question stated test-retest co-efficients of >0.90 when utilised for decision-aid evaluation (O'Connor et al., 1998b) and was therefore considered appropriate for this research.

The choice question was: “Making choices for birth: Now that you have thought about your choices for birth, place a tick beside the choice that you feel is best for you: Trial of vaginal birth; Caesarean birth; I’m not sure”.

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3.6.7.5 Edinburgh Postnatal Depression Scale (Survey 1 and 4)

The Edinburgh Postnatal Depression Scale (EPDS) was considered to be useful for baseline assessment of participants at Survey 1 and then for postnatal assessment of psychological state at Survey 4. Given that mode of birth has previously been associated with depression in the postnatal period, it was included in the postnatal survey (Survey 4) as a possible measure of health outcome for future research. The EPDS was developed by Cox, Holden, et al (1987) to assist primary care health professionals to detect mothers suffering from postnatal depression. The ten item scale was developed from Beck Depression Inventory with fewer somatic symptoms so as to be specific for postnatal women (Cox et al., 1987). The mother underlines which of the four possible responses is closest to how she has been feeling during the past week. The scale will not detect mothers with anxiety neuroses, phobias or personality disorder (Cox et al., 1987).

3.6.7.6 Knowledge of health effect score (Survey 2 and 3)

A baseline knowledge survey (knowledge test) of health outcomes for trial of vaginal birth and elective caesarean birth was constructed using the format utilised by the Ottawa Health Decision Centre. The initial tool contained 15 brief statements about the major risks and benefits of trial of labour and CS. Women circle their response as True, False or Unsure. After piloting the knowledge survey it was decided that the questions did not relate closely enough to the specific information contained in the decision booklet. Also, the average score for 21 women prior to reading the booklet was more than 13 out of 15 which indicated that the level of difficulty was too low and the questions were not specific enough. Therefore the questions were modified to relate more closely to the information contained in the booklet (major pros and cons of trial of vaginal birth versus elective caesarean). In deciding the number of statements that would be True and False, 15 basic questions were constructed (based on refined statements from the pilot results) and a coin was tossed 15 times to determine
which statements would be true and which would be false. The statements were then modified; there were 11 True and 4 False statements.

3.6.7.7 Decisional Conflict Score (DCS) (Survey 2, 3 and 4)

The DCS is an 18-item scale developed by Annette O'Connor using 5-point Likert format, including subscales on Certainty, Feeling Informed, Values Clarity, Decision Quality and Feeling Supported (O'Connor, 1995; O'Connor, 1999b). Its test-retest coefficients and alpha coefficients are >0.80. It measures the degree of uncertainty about a course of action with scores of 2 or less being associated with decision-making, therefore discriminating between decision delay and decision-making (O'Connor, 1995; O'Connor, 1999b). Uncertainty may arise from inherent decision factors such as risks and benefits and modifiable factors such as inadequate knowledge, values and expectation (Ottawa Health Decision Centre) (O'Connor, 1995) therefore the DCS was thought to be the most appropriate measure of possible impact of the decision-aid. The DCS has been used extensively in decision-aid trials and has been documented to be sensitive to changes following decision-aid interventions (O'Connor, 1995; O'Connor et al., 2002).

3.6.7.8 Postnatal satisfaction (Survey 4)

A visual analogue scale was utilised to determine women’s level of satisfaction with their Birth Experience. Postnatal satisfaction was estimated using a visual analogue scale between 0 (not satisfied at all) and 10 (extremely satisfied), where women were asked to place a cross on the scale to indicate “how they feel about their birth experience”. The scale was used to obtain a numeric rating to allow statistical comparison between groups. In addition to the scale, for the purpose of further verifying data, three questions were developed to determine women’s feelings about their birth outcomes in terms of whether they would make the same choice again and whether their outcomes met their expectations. There is also an
open-ended section for comments about their pregnancy and birth to elicit further feelings about the experience and to gather possible explanations about the circumstances that may have stimulated the feelings being reported.

It is acknowledged that there was no ‘gold standard’ yet devised to measure satisfaction (Cohen et al., 1996) with decision-aids or any other range of health care treatments and services. What was clear from the literature was that ease of response is important for participation as well as utilisation of a multi-method approach to help verify results (Cohen et al., 1996; Smith, 2001). It appears that satisfaction ‘measures’ are influenced by a number of possible dimensions, including individual physical and psychological states as well as reflecting personal expectations and needs (Brown & Lumley, 1994; Mould et al., 1996). This was taken into account when the visual analogue scale and the Likert scale questions were included in the postnatal questionnaires as well as considered in the analysis, in that possible relationships between these dimensions were considered.

In order to assess level of satisfaction with information received during their pregnancy, a set of questions was adapted from a generic survey regarding satisfaction with preparation for decision-making (Graham & O’Connor, 1999). The generic survey alpha coefficient was stated to be >0.90 and it was documented as being able to discriminate between intervention such as a pamphlet and a decision-aid with an effect size of 1.7 (p=0.001)(Graham & O’Connor, 1999).

3.6.7.9 Health problems since birth (Survey 4)

In order to identify possible health problems experienced by mothers, which may have impacted upon other measures such as satisfaction or be reflected in preferences for different modes of birth, participants were asked to indicate whether they had experienced any health problems since the birth of the baby and whether any of these were still a problem for them 6-8 weeks after the birth. The
tick box responses were adapted with permission from the “Women’s Experience of Childbirth Services” survey designed by the Centre for the Study of Mother’s and Children’s Health, Victoria, Australia (Brown & Lumley, 1998) and from published research regarding common postnatal health problems (Glazener et al., 1995).

3.6.7.10 Birth outcome data

The medical record department of the participating hospitals provided details on length of labour, specific labour interventions that were used (method for induction of labour, epidural), whether TOL had been experienced and whether birth was vaginal or by CS (elective or emergency). This could then be compared with the documented birth choice made at Survey 3 as well as birth description at Survey 4. Birth weight and Apgar scores were collected as well as admission to neonatal nursery in the event that a comparison of neonatal outcomes was needed as well as for analysis of satisfaction scores. Although intention to treat analysis was planned, information on the medically stated reason for caesarean section was also recorded in the event that it became necessary to verify inconsistency between choice and outcome.

3.6.8 Survey administration strategies

Logistic processes were planned prior to, and developed during, the research to meet the specific aims of the researcher. These aims were to;

- Maximise the number of women recruited into the RCT to meet required sample size
- Maximise response rate for surveys throughout the pregnancy episode
- Ensure adherence to the randomisation schedule
- Ensure women received comparable pregnancy care except for receiving the decision-aid
- Ensure high quality data for analysis
Both the surveys and the survey protocol were designed in such a way as to recruit women and collect data at a time important for the measurement of outcomes as well as to minimise the impact that the data collection process had on women in terms of ease of reading and time taken to complete surveys. It was acknowledged that the women participating in the study were likely to be busy with other young children or perhaps feeling the health effects of pregnancy. Therefore the survey times were planned to coincide with scheduled visits women would make as part of ‘routine’ prenatal care at each of the study sites. Where possible, this meant that the survey could be waiting for them in their notes, they could complete the survey whilst waiting for their appointment and then the midwife or doctor could collect the survey from them and place it at the central collection area at each study site. This process, described in more detail below, was devised to maximise response rate and allow participants to focus on the issues associated with the survey given the context at the time they completed it.

To maximise the likelihood of recruitment for each eligible woman, the researcher liaised with each study site to devise a method that suited their clinic routine or process. Within site 1 there were two hospitals and a number of private doctors rooms. The largest clinic within site 1 made appointments every Wednesday for all women attending the hospital and called it the “First Visit Clinic”. The researcher travelled to this clinic every week to check whether any women were eligible for the study. If women were eligible they were approached personally by the researcher and provided an information sheet about the study. If they were interested in being involved they signed a consent form and completed Survey 1. They were given the opportunity to ask questions and because the researcher was familiar with all the details of the study, the recruitment rate was high. A research assistant (midwife) was employed to recruit women at the most remote clinic within site 1, although the rate of recruitment was not as high at this site. Obstetricians who participated in the study provided the researcher with the contact details of women who met the study criteria, who were eligible to participate and who consented to being contacted by the researcher for more information about the study. The researcher then contacted the women by telephone and posted an information sheet, consent form and first survey with a
stamped return envelope. The obstetricians were not notified of whether women had decided to participate in the study in order to reduce any influence this may have had on care provided during the pregnancy. At site 2, because there was no specified day for “first visits” a system was devised so that at the booking-in interview, eligible women were identified by the midwife. The midwife either provided a recruitment package (information sheet, consent form, Survey 1) and placed completed packs in the “Study Folder” for collection or alternatively notified the researcher that an eligible participant had booked-in and a personal visit was made to the clinic on the specified date, so that the researcher would be able to personally recruit them into the study. Given that a number of outreach clinics were running within site 2 travel to community clinics for recruitment was sometimes necessary. The recruitment rate within this site was very high (refer to Chapter 4).

In order to track each individual pregnancy and ensure that women both received and returned surveys at the correct time points in their pregnancy (28 weeks and 36-38 weeks), a strategy was devised for each hospital site. Firstly a wall chart was constructed for the researcher to map each pregnancy by site. At the commencement of the study arrangements were made for the researcher to be at the clinic at the time of the appointment for each participant and to personally ensure that each survey was given out and returned at the correct gestation point. Over time, midwives became more familiar with the study and offered to assist in this process. Midwives were able to provide each woman with the relevant survey if it was placed in the notes prior to the appointment, and then place completed surveys in the “Study Folder” for collection at each participating clinic office. Therefore arrangements were made for the researcher to travel to participating hospitals each week, so that surveys could be placed in the notes of women who required a survey at their next prenatal appointment. The date of the relevant appointment for 28 weeks and 36-38 weeks was also recorded so that completed surveys could be collected from the hospital clinic as soon as possible after being completed. This was to ensure that if the appointment had been missed by the participant, and the survey not yet completed, it could be quickly established
whether another appointment had been made or whether a postal survey was required.

In the event that a postal survey was needed, the woman was phoned and notified that they would be receiving their next survey in the post with a stamped envelope for return. A copy of the standard letter sent to all women who received postal surveys is in Appendix F. If the survey was not returned within 2 weeks a follow-up phone call was made to check that the survey had been received. If it had not a second survey was sent. This strategy also meant that women who were due to receive a decision-aid after the 28 week survey, would receive their decision-aid as close to 28 weeks as possible. The process also reduced the likelihood that women gave birth prior to completing Survey 3 at 36-38 weeks. Given the small window of opportunity for administration of surveys prior to the birth and when the decision about birth was being made, the mapping strategy ensured a high survey response rate. In addition, all women in the intervention group received their decision-aid at the time specified, unless they had dropped out of the study. The decision-aid was often given personally to the woman by the researcher with a consistent introduction to what the booklet is and what it should be used for. The remainder were posted to women with a letter containing the same information about the booklet (see Appendix G) and then phoned one week later to check that it had been received.

To further encourage midwives to assist with surveys, as well as to identify women for recruitment, a regular newsletter was devised for the study (See Appendix H). The newsletter provided information about the study aims, progress of recruitment and target recruitment. In order to regularly thank midwives for their contribution to the study, morning tea, afternoon tea and chocolates were provided by the researcher at each study site on a regular basis.

Medical record data was collected regularly from the site 1 and site 2 medical record officers responsible for obstetric data management. At the commencement
of the study, data fields were identified for collection and a spreadsheet set up for the study. The medical record manager was provided with a medical record number for each participant and a relevant de-identifying code. Due to security protocol, each hospital provided a hard copy printout of data fields only. This was personally collected by the researcher from each hospital medical record department each month. The data received contained a code number for each participant alongside the birth outcome data. Data was manually entered into the computer database for each coded participant. Private obstetricians permitted the personal file of each participant to be viewed in accordance with the consent form signed by each participant. The records were hand searched for outcome data on the birth and hand recorded on a spreadsheet with coded identifiers only. Obstetric medical record data was more difficult to collect due to the handwriting on medical notes.

Once it had been established from the medical record that a live birth had been achieved, Survey 4 was administered. At between six and eight weeks after the birth, women were telephoned to check that they were feeling well and were happy to complete Survey 4. The survey was then posted with a stamped envelope. If the survey was not returned within two weeks, a phone call was made to check if the survey had been received. If it had the participant was encouraged to complete the survey and return it, or if not a second survey was sent. Survey 4 response rate was influenced by the demands of home and family for many women as well as a number of changes in address post birth. Despite this, many were keen to share their experiences and document their reflections, and response rates remained high.

3.6.9 Data entry process

Data was entered on a monthly basis as surveys were collected, to enable a more timely checking process as data was entered in smaller amounts. This also enabled missing data to be tracked and collected as required. Two people were involved in
the data entry process to ensure checking and accuracy of the data. One person entered the numerical data into the computer spreadsheet, whilst the other, the researcher, would read out the appropriate data from the surveys and medical record spreadsheets. The data was then read back for checking at the end of each survey entry process. Random checks were also conducted at the end of each data entry session to check for accuracy.

### 3.6.10 Statistical Analysis

Data were analysed using SPSSx. Knowledge was assessed using a 15-item questionnaire which required subjects to answer ‘true’, false’ or ‘unsure’ to a series of statements. It was hypothesised that mean knowledge scores and baseline preferences may vary between study sites, due to differences in socio-economic and demographic characteristics. Hence, it was thought that mean knowledge scores for intervention and control groups should be compared across sites, and tested for difference via a two-way Analysis of Variance (ANOVA). Mean changes in knowledge scores in the intervention group were to be tested for difference with changes in the control group via a paired-samples t test. This comparison would then be adjusted for factors found, via multiple regression analysis, to influence knowledge scores, namely education, mode of pre-natal care, study site and neonatal birthweight.

It was also hypothesised that DCS would decrease for the intervention group and that the Survey 3 (36-38 weeks) DCS would be significantly lower for the intervention group than the control group. DCS scores for intervention and control groups were therefore compared across sites, and tested for difference via a two-way Analysis of Variance (ANOVA). Mean changes in DCS in the intervention group were to be tested for difference with changes in the control group via a paired-samples t test.

The responses for the birth preference scale were divided into three categories of
Prefer TOL 1-4; Unsure 5-6; Prefer CS 7-10 for the 10-point scale and Prefer TOL 1-6; Unsure 7-9; Prefer CS 10-15 for the 15-point scale. Actual choice for mode of birth at 36-38 weeks was also identified for comparison. Choice about mode of birth was then compared to actual mode of birth in an attempt to ascertain the level of adherence to decisions made at 36-38 weeks by intervention (decision-aid) group and study site.

For each research hypothesis, relevant variables are firstly identified and analysed at a descriptive level. Where possible stepwise regression analysis is used to identify important explanatory variables. The level of statistical significance for statistical testing is set at p<0.05. Stepwise regression analysis parameters are applied consistently, whereby inclusion in the models is set at 0.05 and exclusion at 0.10.

All t-tests used to compare means in the analysis do not assume equal variances in the populations studied. Hence, the relevant degrees of freedom (df) vary, as they are calculated as part of the test procedure (Keller & Warrack, 2000 pp. 395-398)

3.7 Ethics Approval

Ethics approval was given by Human Research and Ethics Committees of The University of Wollongong, University of Sydney and participating hospitals. (See Appendix A for ethics approval letters). Obstetric and Gynaecological Committees of each hospital were provided with the booklet prior to full approval to ensure appropriate clinical content and consistency with individual hospital policy and practices (refer Appendix A for letters of approval). Strict selection criteria was important for the study because women who were not medically eligible to make a choice between TOL and elective CS may experience greater risks of maternal and neonatal morbidity as a result of making a choice TOL.
3.8 Summary

Chapter 3 has outlined the design and pilot study of the decision-aid, and the design of the RCT, planned to evaluate the effect of the decision-aid booklet on women's decisions about birth after previous CS. Chapter 4 will report on the results of the RCT according to the outcomes measures already described.
CHAPTER 4

RESULTS

4.1 Introduction

This chapter presents the results of the randomised controlled trial (RCT). Firstly the data are described in terms of sample achieved, response rates and characteristics of participants, both for control and decision-aid groups, and by study site. Aims and hypotheses are then addressed with results presented across the five outcome areas measured according to randomised groups and study sites. The main outcomes measured were level of knowledge, decisional conflict score, preference for mode of birth, actual mode of birth and satisfaction with the birth experience.

4.2 Sample

Women were recruited over a period of two years. The first recruitment occurred on the 23/05/01 (site 1) and 27/06/01 (site 2). The last recruitment occurred on the 5/06/03 (at site 1). The final Survey 4 was received on 15/12/03 at site 2. Of the 252 women eligible for the study and approached for recruitment, only 25 declined to participate, giving an overall recruitment of 227 women, a recruitment rate of 90 percent.
Table 4.1 Recruitment summary by study site for surveys 1-4

<table>
<thead>
<tr>
<th>Survey</th>
<th>Site 1</th>
<th>Site 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Approached</td>
<td>n = 172</td>
<td>n = 80</td>
<td>n = 252</td>
</tr>
<tr>
<td>Recruited</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survey 1</td>
<td>154 (89.5)</td>
<td>73 (91.3)</td>
<td>227 (90.1)</td>
</tr>
<tr>
<td>Survey 2</td>
<td>145 (94.2)</td>
<td>67 (91.8)</td>
<td>212 (93.4)</td>
</tr>
<tr>
<td>Survey 3</td>
<td>130 (84.4)</td>
<td>63 (86.3)</td>
<td>193 (85.0)</td>
</tr>
<tr>
<td>Survey 4</td>
<td>117 (76.0)</td>
<td>52 (71.2)</td>
<td>169 (74.4)</td>
</tr>
</tbody>
</table>

Note: Survey 1 percentage relates to those approached, while Survey 2 – Survey 4 percentage relates to those recruited.

All women who read the information sheet, signed the consent form and completed Survey 1 (12-18 weeks gestation), were considered to be recruited at that point (n=227). Once enrolled in the study, women were asked to complete two further surveys during their pregnancy, at approximately 28 weeks and 36-38 weeks gestation plus one between six (6) and eight (8) weeks postpartum. Retention rates for women successfully recruited were similar for both sites. Overall 93.4 percent of participants (n=212) completed Survey 2, 85.0 percent (n=193) completed Survey 3 (one participant completed Survey 3 but not Survey 2) and over 74 percent (n=169) completed all four surveys. Of the 34 women who did not complete Survey 3, nine became medically ineligible during the study and indicated they would not be continuing with the study for the following reasons: premature labour, twin pregnancy, miscarriage and diagnosis of malignant melanoma. Of the remaining 25 who did not complete all the surveys, three delivered before completing Survey 3, no reason was given by the other 22 subjects. It is suspected that some changed
residence (telephone was disconnected upon issuing reminders); changed hospitals
during the period (medical record was removed from clinic record system); or they
became medically ineligible and this was not able to be verified via the medical
record systems of the hospitals involved. Figure 4.1 summarises the flow of
participants through the study in terms of response to surveys by randomised group.

4.2.1 Characteristics of Participants

Information describing the relevant socio-economic and clinical characteristics of
participants was collected at Survey 1 (Appendix E) and medical history were
obtained from the medical records. It was anticipated that the process of
randomisation would lead to comparable groups in terms of characteristics. However,
it was also anticipated that the participants at the two different research sites may be
different for a range of variables. Therefore summary data are described for the
randomised groups as well as by study site.

4.2.1.1 Characteristics of intervention and control groups

Table 4.2 compares women in the intervention group (n=115) with those in the
control group (n=112) across a range of socioeconomic and clinical characteristics.
The statistical significance of all comparisons is assessed, using the Chi-Square test
for differences in proportions in the case of categorical variables, and the independent
samples t test for comparing two means in the case of numerical variables. Of the
characteristics compared, the only one to suggest a statistically significant difference
was whether the mother perceived that she experienced problems after the previous
CS, the incidence of which was higher for the intervention (decision-aid) group
(difference significant at 0.05 level). However, when taking this into account, this
variable did not appear to be a significant predictor of any outcomes analysed.
Figure 4.1 Flow of participants through trial (summary)

Eligible and approached to participate 
(n=252)

Declined to participate 
(n=25)

Women recruited (12-18 weeks) 
Survey 1 completed 
Randomised (n=227)

Lost to follow-up (n=6) 
Reason: 
Medical (4) 
Unknown (2)

Decision-aid provided

Lost to follow-up (n=10) 
Reason: 
Prem. birth (2) 
Birth prior to Survey 3 (1) 
Moved (2) 
Unknown (5)

Lost to follow-up (n=14) 
Reason: 
Unknown

Intervention 
(n=115)

Survey 2 
Completed 
(28 weeks) 
(n=109)

Lost to follow-up (n=9) 
Reason: 
Medical (3) 
Moved (1) 
Unknown (5)

Control 
(n=112)

Survey 2 
Completed 
(28 weeks) 
(n=103)

Survey 3 
Completed 
(36-38 weeks) 
(n=99)

Lost to follow-up (n=10) 
Reason: 
Birth prior to Survey 3 (2) 
Moved (1) 
Unknown (7)

Survey 3 
Completed 
(36-38 weeks) 
(n=94)

Survey 4 
Completed 
(6-8 weeks pn) 
(n=85)

Lost to follow-up (n=10) 
Reason: 
Unknown

Survey 4 
Completed 
(6-8 weeks pn) 
(n=84)

Note: Only 93 control group women completed both Survey 2 and Survey 3; pn = postnatal
## Table 4.2 Characteristics of participants by randomised group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Decision-aid Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Participants</td>
<td>Mean (or %)</td>
</tr>
<tr>
<td>Age in years</td>
<td>112</td>
<td>31.52</td>
</tr>
<tr>
<td>Parity</td>
<td>110</td>
<td>1.18</td>
</tr>
<tr>
<td>Gestation in weeks</td>
<td>112</td>
<td>18.18</td>
</tr>
<tr>
<td><strong>Previous CS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>29</td>
<td>(25.9)</td>
</tr>
<tr>
<td>Emergency</td>
<td>83</td>
<td>(74.1)</td>
</tr>
<tr>
<td><strong>Problems after previous CS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37</td>
<td>(33.0)</td>
</tr>
<tr>
<td>No</td>
<td>75</td>
<td>(67.0)</td>
</tr>
<tr>
<td><strong>Australian Born</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75</td>
<td>(68.8)</td>
</tr>
<tr>
<td>No</td>
<td>34</td>
<td>(31.2)</td>
</tr>
<tr>
<td><strong>Mode of Care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>33</td>
<td>(29.5)</td>
</tr>
<tr>
<td>Team Midwifery Program</td>
<td>12</td>
<td>(10.7)</td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>45</td>
<td>(40.2)</td>
</tr>
<tr>
<td>Doctors Clinic</td>
<td>3</td>
<td>(2.7)</td>
</tr>
<tr>
<td>High Risk Clinic</td>
<td>1</td>
<td>(0.9)</td>
</tr>
<tr>
<td>Private Obstetrician</td>
<td>18</td>
<td>(16.1)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
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<td></td>
</tr>
<tr>
<td>&lt;Year 12 (High school)</td>
<td>22</td>
<td>(19.6)</td>
</tr>
<tr>
<td>Year 12 (High school)</td>
<td>11</td>
<td>(9.8)</td>
</tr>
<tr>
<td>Post-secondary</td>
<td>37</td>
<td>(33.0)</td>
</tr>
<tr>
<td>University</td>
<td>42</td>
<td>(37.5)</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>14</td>
<td>(12.5)</td>
</tr>
<tr>
<td>Part-time</td>
<td>40</td>
<td>(35.7)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Home Duties</td>
<td>52</td>
<td>(46.4)</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>(5.4)</td>
</tr>
<tr>
<td><strong>Initial Birth Preference</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>67</td>
<td>(59.8)</td>
</tr>
<tr>
<td>ECS</td>
<td>26</td>
<td>(23.2)</td>
</tr>
<tr>
<td>Unsure</td>
<td>19</td>
<td>(17.0)</td>
</tr>
<tr>
<td><strong>Baseline EPDS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (0-8)</td>
<td>80</td>
<td>(72.1)</td>
</tr>
<tr>
<td>Medium (9-12)</td>
<td>23</td>
<td>(20.7)</td>
</tr>
<tr>
<td>High (13+)</td>
<td>8</td>
<td>(7.2)</td>
</tr>
<tr>
<td>State Anxiety 6-item score</td>
<td>103</td>
<td>9.64</td>
</tr>
</tbody>
</table>

* Difference significant at p < 0.05 level according to Pearson χ² test with 1 df

Note: Numbers of participants summing to less than 112 (control group) or 115 (intervention group) reflect missing data on some variables.

TOL = trial of labour; ECS = elective caesarean section; GP = general practitioner;
4.2.1.2 Participant characteristics by site

Table 4.3 reports on a similar set of socioeconomic and clinical comparisons, this time across the two major study sites of site 1 (n=154) and site 2 (n=73). Unlike the previous comparison, there are many statistically significant and potentially important differences between the two groups. Firstly, women recruited from site 2 were significantly younger, yet had higher parity than those recruited from site 1. Secondly, there were large and significant differences in the distribution of pre-natal mode of care. For the site 2 group, care was overwhelmingly of either the midwives clinic or GP shared care type, whereas in site 1 type of care was fairly evenly spread across not only these two types, but team midwifery and private obstetrician care as well. This could affect levels of information received and knowledge of the relevant issues involved between the two areas.

Women from site 2 were also more likely to be Australian-born, and more likely to have perceived that they experienced problems after the previous CS. There were also significant differences in initial preference (on average at approximately 18 weeks gestation for both groups) for TOL or elective CS for the current pregnancy. For the site 2 group, women were more likely to express a preference for TOL, whereas the site 1 group were more likely to prefer elective CS. This is consistent with pre-study practices regarding TOL and elective CS at the two sites.

Socio-economic differences were also apparent. The site 1 group had higher levels of education, with almost half having university degrees (46.8%), compared to only one in five (20%) of the site 2 group. Consistent with this higher level of education, more of the site 1 women were in paid employment (54% versus 38%), although the difference in employment distributions was not statistically significant. This was not true for their partners, however, with site 1 women being significantly more likely to have an employed partner, particularly one in full-time employment. Partners of site 1 women were also less likely to be unemployed. For both groups, almost 90 percent
had their previous CS in 1998 or later, so that they would have had children aged under five in the household when recruited to the study. Hence a large percentage did not work in paid employment, and part-time employment was more common than full-time. EPDS scores were, on average, lower (i.e. less indicative of depression) for the site 1 group, although the differences were not statistically significant. Note that for Table 4.3, *refers to difference significant at p<0.05 according to t test for independent samples (means) or Pearson χ2 test in the case of proportions. Number of participants summing to less than 154 (site 1) or 73 (site 2) reflect missing data on some variables.
Table 4.3 Characteristics of participants by site

<table>
<thead>
<tr>
<th>Variable</th>
<th>Site 1</th>
<th>Site 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of</td>
<td>Number of</td>
</tr>
<tr>
<td></td>
<td>Participants</td>
<td>Participants</td>
</tr>
<tr>
<td></td>
<td>Mean (or %)</td>
<td>Mean (or %)</td>
</tr>
<tr>
<td>Age in years</td>
<td>154 (32.73)</td>
<td>73 (29.81)</td>
</tr>
<tr>
<td>Parity</td>
<td>151 (1.11)</td>
<td>73 (1.26)</td>
</tr>
<tr>
<td>Gestation in Weeks</td>
<td>154 (18.41)</td>
<td>73 (18.38)</td>
</tr>
<tr>
<td>Previous CS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>44 (28.6)</td>
<td>18 (24.7)</td>
</tr>
<tr>
<td>Emergency</td>
<td>110 (71.4)</td>
<td>55 (75.3)</td>
</tr>
<tr>
<td>Problems after previous CS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>55 (35.7)</td>
<td>35 (47.9)</td>
</tr>
<tr>
<td>No</td>
<td>99 (64.3)</td>
<td>38 (52.1)</td>
</tr>
<tr>
<td>Australian Born</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>88 (60.7)</td>
<td>57 (78.1)</td>
</tr>
<tr>
<td>No</td>
<td>57 (39.3)</td>
<td>16 (21.9)</td>
</tr>
<tr>
<td>Mode of Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>39 (25.3)</td>
<td>32 (43.8)</td>
</tr>
<tr>
<td>Team Midwifery Program</td>
<td>28 (18.2)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>37 (24.0)</td>
<td>36 (49.3)</td>
</tr>
<tr>
<td>Doctors Clinic</td>
<td>5 (3.2)</td>
<td>1 (1.4)</td>
</tr>
<tr>
<td>High Risk Clinic</td>
<td>2 (1.3)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>Private Obstetrician</td>
<td>43 (27.9)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>Education</td>
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</tr>
<tr>
<td>&lt;Year 12 (High school)</td>
<td>18 (11.6)</td>
<td>27 (37.0)</td>
</tr>
<tr>
<td>Year 12 (High school)</td>
<td>14 (9.1)</td>
<td>5 (6.8)</td>
</tr>
<tr>
<td>Post-secondary</td>
<td>50 (32.5)</td>
<td>25 (34.2)</td>
</tr>
<tr>
<td>University</td>
<td>72 (46.8)</td>
<td>16 (21.9)</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>25 (16.2)</td>
<td>7 (9.6)</td>
</tr>
<tr>
<td>Part-time</td>
<td>59 (38.3)</td>
<td>21 (28.8)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1 (0.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Home Duties</td>
<td>60 (39.0)</td>
<td>42 (57.5)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (5.8)</td>
<td>3 (4.1)</td>
</tr>
<tr>
<td>Partner's Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>138 (90.8)</td>
<td>53 (76.8)</td>
</tr>
<tr>
<td>Part-time</td>
<td>2 (1.3)</td>
<td>8 (11.6)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>3 (2.0)</td>
<td>5 (7.2)</td>
</tr>
<tr>
<td>Home Duties</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (5.9)</td>
<td>3 (4.3)</td>
</tr>
<tr>
<td>Initial Birth Preference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>80 (51.9)</td>
<td>47 (64.4)</td>
</tr>
<tr>
<td>ECS</td>
<td>48 (31.2)</td>
<td>12 (16.4)</td>
</tr>
<tr>
<td>Unsure</td>
<td>26 (16.9)</td>
<td>14 (19.2)</td>
</tr>
<tr>
<td>Baseline EPDS</td>
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<td></td>
</tr>
<tr>
<td>Low (0-8)</td>
<td>111 (72.5)</td>
<td>46 (63.9)</td>
</tr>
<tr>
<td>Medium (9-12)</td>
<td>30 (19.6)</td>
<td>18 (25.0)</td>
</tr>
<tr>
<td>High (13+)</td>
<td>12 (7.8)</td>
<td>8 (11.1)</td>
</tr>
<tr>
<td>State Anxiety 6-item score</td>
<td>142 (9.79)</td>
<td>67 (10.28)</td>
</tr>
</tbody>
</table>
4.3 Knowledge score analysis

The first research hypothesis to be examined suggests an expectation that women who received the intervention (decision-aid) will, as a result, experience higher average levels of knowledge about the risks and benefits of birth options in the latter stages of pregnancy than women in the control group. This section also examines a range of related hypotheses regarding effects of the decision-aid on knowledge.

1. $H_0$: Women in the decision-aid and control groups will not differ with respect to mean knowledge scores

$H_1$: Women in the decision-aid group will demonstrate higher mean knowledge scores than women in the control group.

Let $X =$ Knowledge score at Survey 3

Subscripts D and C refer to Decision-aid group and Control group respectively

$H_0 : \mu_D - \mu_C \leq 0$

$H_1 : \mu_D - \mu_C > 0$

The following analysis focuses on possible changes in the level of knowledge for women participating in the study. Pre-intervention knowledge level was measured at Survey 2 for women receiving both ‘routine’ care and those receiving the addition of the decision-aid intervention. Baseline knowledge scores were compared with post-intervention scores for both decision-aid and control groups. The scores were also compared by study site due to differences in participant characteristics, including baseline levels of education and models of care as examples. The ‘before’ and ‘after’ knowledge scores were also analysed using possible confounding factors to determine strength of findings.
4.3.1 Estimation of internal consistency for knowledge test

Cronbach’s alpha was calculated for both Survey 2 and Survey 3 results of the knowledge test as an estimation of internal consistency, whereby the extent to which the items within the instrument are measuring the same construct is estimated (Burns & Grove, 1995; Bland & Altman, 1997). The Survey 2 knowledge test (administered at 28 weeks gestation) revealed a slightly lower internal consistency coefficient ($\alpha=0.65$) than Survey 3 (later in pregnancy) where $\alpha = 0.69$. Although these estimates of internal consistency were on the lower end of a ‘satisfactory’ alpha coefficient range for group evaluation, these co-efficients were considered acceptable for research purposes (Bland & Altman, 1997; Koedoot et al., 2001). As a comparison, a similarly structured tool for knowledge assessment in decision-aid evaluation for hormone replacement therapy reports an $\alpha$ of 0.70 (Kroll JC et al., 1994).

4.3.2 Baseline knowledge scores at Survey 2

Mean knowledge scores were calculated for Survey 2, to provide a baseline, or ‘before’ intervention level of knowledge, for all women who had completed both Survey 2 and Survey 3. Given that the demographic composition of the two study sites is quite different and the baseline VBAC (or TOL) and elective CS rates of the hospitals are also different, it is important to examine the issue of knowledge separately for the two research sites. Table 4.4 provides mean scores (maximum score 15) both by randomised group and study site. Note that the scores given represent the number of correct answers out of 15 questions with no “negative marking” for incorrect answers. The number of scores analysed ($n=192$) reflects the number of women for whom a knowledge score could be calculated. Statistical significance was determined using an independent samples t-test for comparison of two means, equal variances not assumed (Keller & Warrack, 2000) (Refer section 3.6.10 regarding statistical analysis).
Table 4.4 Survey 2 Mean knowledge scores by group and site

<table>
<thead>
<tr>
<th></th>
<th>Control Group (n =93)</th>
<th>Decision-aid Group (n =99)</th>
<th>Total (n=192)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1 (n = 130)</td>
<td>9.10</td>
<td>9.54</td>
<td>9.30</td>
</tr>
<tr>
<td>Site 2 (n = 62)</td>
<td>7.85</td>
<td>8.14</td>
<td>7.98</td>
</tr>
<tr>
<td>Total (n = 192)</td>
<td>8.60</td>
<td>9.13</td>
<td>8.88</td>
</tr>
</tbody>
</table>

Women at site 1 scored higher than site 2 women at Survey 2 (t=3.43, df=119, p=0.001). There was no significant difference in Survey 2 knowledge scores by group (t=1.44, df=186, p=0.152). In order to further analyse the possible impact of study site at Survey 2 and to further investigate other factors that may influence knowledge scores of participants, a list of possible explanatory factors of change in knowledge was made. This mainly consisted of ‘plausible’ factors from the participant characteristics listed in Table 4.2. A series of bivariate regressions were run with factors that were statistically significant at 0.10 or better being included in a multiple regression model reported in Table 4.5. Results shown in Table 4.5 suggest that only level of education and mode of care are statistically significant explanators. As expected, level of education is positively associated with knowledge score. The mode of care variables suggest that, at 28 weeks, women attending a private obstetrician scored higher, especially when compared with those attending either the Team Midwifery Program or the midwives clinic. Those attending the Doctors/High risk clinic also scored substantially lower but since there were very few women in this category (n=7), the effect was not statistically significant.
### Table 4.5 Survey 2 knowledge scores: multiple regression (n=192)

<table>
<thead>
<tr>
<th>Explanatory Factor</th>
<th>Coefficient</th>
<th>t statistic</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-aid Group</td>
<td>0.455</td>
<td>1.31</td>
<td>0.193</td>
<td>-0.23-1.14</td>
</tr>
<tr>
<td>Age in years</td>
<td>-0.015</td>
<td>-0.36</td>
<td>0.72</td>
<td>-0.10-0.07</td>
</tr>
<tr>
<td>Survey 1 EPDS Score</td>
<td>-0.037</td>
<td>-0.89</td>
<td>0.377</td>
<td>-0.12-0.05</td>
</tr>
<tr>
<td>Site 1</td>
<td>0.748</td>
<td>1.65</td>
<td>0.101</td>
<td>-0.15-1.64</td>
</tr>
<tr>
<td><strong>Education</strong>&lt;sup&gt;(i)&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yr 12</td>
<td>0.978</td>
<td>1.24</td>
<td>0.218</td>
<td>-0.58-2.54</td>
</tr>
<tr>
<td>Yr Cert/Diploma*</td>
<td>1.156</td>
<td>2.18</td>
<td>0.031*</td>
<td>0.11-2.21</td>
</tr>
<tr>
<td>Bachelor Degree or above*</td>
<td>1.156</td>
<td>2.86</td>
<td>0.005*</td>
<td>0.49-2.68</td>
</tr>
<tr>
<td><strong>Mode of Care</strong>&lt;sup&gt;(ii)&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>-1.046</td>
<td>-1.96</td>
<td>0.052</td>
<td>-2.10-0.01</td>
</tr>
<tr>
<td>Team Midwifery*</td>
<td>-1.636</td>
<td>-2.71</td>
<td>0.007*</td>
<td>-1.83-0.44</td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>-0.890</td>
<td>-1.58</td>
<td>0.115</td>
<td>-2.00-0.22</td>
</tr>
<tr>
<td>Doctors/High Risk Clinic</td>
<td>-1.598</td>
<td>-1.58</td>
<td>0.116</td>
<td>-3.59-0.40</td>
</tr>
</tbody>
</table>

* Statistically significant at p<0.05 or better

R² = 0.18  F<sub>11, 180</sub> = 3.52, p<0.001

(i) Omitted category is year 10 or below

(ii) Omitted category is Private Obstetrician care

Although not statistically significant at the 0.05 level (p=0.101), results continue to suggest higher overall levels of knowledge among women at site 1, after controlling for level of education and mode of care. As expected, there was no significant difference between intervention (decision-aid) and control groups at this pre-intervention point. It should be noted, however, that results suggest that the decision-aid group did score slightly higher at Survey 2.

Using an alternative stepwise regression with an expanded set of explanatory variables procedure gave similar results. Level of education and mode of care were
the most important explanators, with study site also being statistically significant, and parity was positively linked with Survey 2 knowledge score.

4.3.3 Knowledge scores at Survey 3

Mean knowledge scores were calculated for Survey 3, as an ‘after’ intervention level of knowledge for women participating in the study. Table 4.6 presents Survey 3 mean knowledge scores by randomisation and study site.

Table 4.6 Survey 3 Mean knowledge scores by group and site

<table>
<thead>
<tr>
<th>Site</th>
<th>Control (n =92)</th>
<th>Decision-aid (n =99)</th>
<th>Total (n=191)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1 (n = 129)</td>
<td>9.76</td>
<td>11.71</td>
<td>10.82</td>
</tr>
<tr>
<td>Site 2 (n = 62)</td>
<td>7.85</td>
<td>10.31</td>
<td>9.00</td>
</tr>
<tr>
<td>Total (n = 191)</td>
<td>9.08</td>
<td>11.30</td>
<td>10.23</td>
</tr>
</tbody>
</table>

Note: 1 control group participant did not complete the knowledge questions in Survey 3

Mean knowledge scores were higher for women in the decision-aid group when compared to the control group (t=6.36, df=181, p<0.001). In addition, the site effects found at Survey 2 remained at Survey 3, that is, site 1 women on average scored higher than site 2 women at Survey 3 (t=4.69, df=120, p<0.001).

Regression analysis was then conducted for Survey 3 knowledge scores to control for a range of variables that may have influenced the variation in women’s knowledge scores at Survey 3 (after the intervention). The variables analysed in Table 4.5 for Survey 2 were included in the analysis as well as additional variables significant at a p=0.10 level from bivariate regression. Table 4.7 presents the results for the multiple linear regression analysis.
Table 4.7 Survey 3 knowledge scores: multiple regression (n=162)

<table>
<thead>
<tr>
<th>Explanatory Factor</th>
<th>Coefficient</th>
<th>t statistic</th>
<th>p value</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-aid Group*</td>
<td>2.103</td>
<td>5.74</td>
<td>&lt;0.001*</td>
<td>1.38-2.83</td>
</tr>
<tr>
<td>Age in Years</td>
<td>-0.031</td>
<td>-0.69</td>
<td>0.492</td>
<td>-0.12-0.06</td>
</tr>
<tr>
<td>Survey 1 EPDS Score</td>
<td>-0.066</td>
<td>-1.31</td>
<td>0.194</td>
<td>-0.17-0.03</td>
</tr>
<tr>
<td>Site 1*</td>
<td>0.996</td>
<td>2.12</td>
<td>0.036*</td>
<td>0.07-1.93</td>
</tr>
<tr>
<td>Survey 2 DCS</td>
<td>-0.064</td>
<td>-0.19</td>
<td>0.853</td>
<td>-0.75-0.62</td>
</tr>
<tr>
<td>Education (ii)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yr 12</td>
<td>1.267</td>
<td>1.59</td>
<td>0.114</td>
<td>-0.31-2.84</td>
</tr>
<tr>
<td>Cert/Diploma</td>
<td>0.979</td>
<td>1.83</td>
<td>0.070</td>
<td>-0.08-2.04</td>
</tr>
<tr>
<td>Bachelor or above*</td>
<td>1.618</td>
<td>2.85</td>
<td>0.005*</td>
<td>0.49-2.74</td>
</tr>
<tr>
<td>Mode of Care (iii)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic*</td>
<td>-1.130</td>
<td>-2.04</td>
<td>0.044*</td>
<td>-2.23-0.03</td>
</tr>
<tr>
<td>Team Midwifery</td>
<td>-0.891</td>
<td>-1.44</td>
<td>0.153</td>
<td>-2.11-0.33</td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>-0.949</td>
<td>-1.66</td>
<td>0.100</td>
<td>-2.08-0.19</td>
</tr>
<tr>
<td>Doctors/High Risk</td>
<td>-2.099</td>
<td>-1.96</td>
<td>0.052</td>
<td>-4.22-0.02</td>
</tr>
<tr>
<td>S3 State Anxiety Score</td>
<td>-0.020</td>
<td>-0.81</td>
<td>0.421</td>
<td>-0.07-0.03</td>
</tr>
<tr>
<td>S3 Trait Anxiety Score</td>
<td>0.027</td>
<td>0.85</td>
<td>0.396</td>
<td>-0.04-0.09</td>
</tr>
<tr>
<td>Change in DCS</td>
<td>-0.186</td>
<td>-0.48</td>
<td>0.634</td>
<td>-0.96-0.59</td>
</tr>
<tr>
<td>Birthweight in gms*</td>
<td>0.001</td>
<td>2.08</td>
<td>0.039*</td>
<td>0.00-0.002</td>
</tr>
</tbody>
</table>

* Statistically significant at p<0.05 or better

R² = 0.40  F₁₆,₁₄₅ = 6.05 p<0.001

(i) Omitted category is Year 10 or below

(ii) Omitted category is Private Obstetrician care

Note: Main sources of missing data were birthweight (12) and change in DCS (14)

(Note: n=162 due to missing data on some variables including birthweight in gms)

The most important explanatory factor is whether the participant was in the decision-aid group or not (Table 4.7). After controlling for other factors, decision-aid women scored, on average, more than two correct answers higher than the control group.
Again, education level, study site and mode of care are statistically significant. Note, however, that for the latter, the gap in knowledge between those women using private obstetrician care and other groups appears to have remained approximately constant, except for the women using Team Midwifery, for whom the gap seems to narrow. This suggests that increase in knowledge was higher for the Team Midwifery group than for other modes of care. Babies birthweight is also positively related to knowledge, suggesting that women anticipating a large baby may seek more information regarding their options for birth.

4.3.4 Change in knowledge scores from Survey 2 to Survey 3

The following examines the change in responses and scores between Survey 2 and Survey 3. The analysis features changes within groups and study sites.

4.3.4.1 Use of ‘unsure response to knowledge test

The first analysis of change in response to the knowledge test relates to the pattern of response. Participants were requested to answer ‘unsure’ if they did not know whether or not a statement was correct, in order to discourage guessing. The ‘unsure’ option was often used, however varied between groups after the intervention. The mean number of ‘unsure’ responses in the control and decision-aid group at Survey 2 was not statistically different with 3.39 and 3.37 ‘unsure’ responses out of 15 respectively ($t=0.04$, df=190, $p=0.969$). At Survey 3 however, the control group had changed little, with 3.02 ‘unsure’ responses on average, compared with 1.83 for the decision-aid group. The difference is statistically significant ($t=3.80$, df=172, $p<0.001$).
Table 4.8a Knowledge test response: Change in use of ‘unsure’ between Survey 2 and Survey 3

<table>
<thead>
<tr>
<th></th>
<th>Control group</th>
<th>Decision-aid group</th>
<th>Difference</th>
<th>t</th>
<th>df</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey 2</td>
<td>3.39</td>
<td>3.37</td>
<td>0.02</td>
<td>0.04</td>
<td>190</td>
<td>0.969</td>
</tr>
<tr>
<td>Survey 3</td>
<td>3.02</td>
<td>1.83</td>
<td>1.19</td>
<td>3.80</td>
<td>172</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

* Level of statistical significance p<0.05 or better according to independent samples t-test

The degree of change in use of ‘unsure’ responses is shown in Table 4.8b. The control group use of ‘unsure’ changed by -0.37 responses (t=1.89, df=92, p=0.062), compared with a much more significant change of -1.54 for the decision-aid group (t=6.07, df=98, p<0.001).

Table 4.8b Knowledge test response: Difference in use of ‘unsure’ between Survey 2 and Survey 3

<table>
<thead>
<tr>
<th></th>
<th>Survey 2</th>
<th>Survey 3</th>
<th>Difference</th>
<th>t</th>
<th>df</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>3.39</td>
<td>3.02</td>
<td>-0.37</td>
<td>1.89</td>
<td>92</td>
<td>0.062</td>
</tr>
<tr>
<td>Decision-aid group</td>
<td>3.37</td>
<td>1.83</td>
<td>-1.54</td>
<td>6.07</td>
<td>98</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

* Level of statistical significance p<0.05 or better according to paired samples t-test

4.3.4.2 Increase in knowledge scores between Survey 2 and Survey 3

Increase in knowledge is defined as an individual woman’s knowledge score at 36-38 weeks (Survey 3) minus her knowledge quiz score at 28 weeks (Survey 2), noting that negative values are possible (i.e. decreases in score). Table 4.9 summarises changes in knowledge scores that occurred between the two survey points. Note that the scores given represent the number of correct answers out of 15 questions, with no “negative marking”.

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Women at site 1 scored higher than women at site 2 at the baseline Survey 2. However at Survey 3, women who received the decision-aid increased their knowledge score by an average of 2.17 points out of 15 at both study sites (site 1; t=7.83, df=69, p<0.001 and Site 2; t=5.19, df=28, p<0.001). Women in the control group at site 1 on average did not demonstrate any change in knowledge score at all (t=0.00, df=32, p=1.00) whilst women in the site 2 control group demonstrated a small increase (0.66) (t=2.80, df=58, p=0.007). However, comparison of confidence intervals for this site demonstrates that the amount of knowledge increase was significantly greater for the decision-aid group.

For the intervention group, where mean knowledge scores increased by 2.17 points (p<0.001, 95% CI = 1.71-2.63), the control group demonstrated a smaller increase in knowledge scores (0.42 points,) between these two surveys (p<0.05, 95% CI = 0.03-0.81). The mean difference in the increase between groups of (2.17-0.42) = 1.75 points is statistically significant (p<0.001, 95% CI = 1.15-2.35) according to a paired-samples t test, and similar results were obtained when the ANOVA procedure for repeated measures was used.
Table 4.9 Survey 2 and Survey 3 knowledge scores by group and site (mean out of 15)

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Survey 2</th>
<th>Survey 3</th>
<th>Change in Score</th>
<th>p value</th>
<th>95% CI for change in score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision-aid (n=70)</td>
<td>9.54</td>
<td>11.71</td>
<td>2.17*</td>
<td>&lt;0.001</td>
<td>1.62-2.73</td>
</tr>
<tr>
<td>Control (n=59)</td>
<td>9.10</td>
<td>9.76</td>
<td>0.66*</td>
<td>0.007</td>
<td>0.19-1.13</td>
</tr>
<tr>
<td>Site 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision-aid (n=29)</td>
<td>8.14</td>
<td>10.31</td>
<td>2.17*</td>
<td>&lt;0.001</td>
<td>1.32-3.03</td>
</tr>
<tr>
<td>Control (n=33)</td>
<td>7.85</td>
<td>7.85</td>
<td>0.00</td>
<td>1.00</td>
<td>-0.70-0.70</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision-aid (n=99)</td>
<td>9.13</td>
<td>11.30</td>
<td>2.17*</td>
<td>&lt;0.001</td>
<td>1.71-2.63</td>
</tr>
<tr>
<td>Control (n=92)</td>
<td>8.65</td>
<td>9.08</td>
<td>0.42*</td>
<td>0.034</td>
<td>0.03-0.81</td>
</tr>
<tr>
<td>Mean Difference</td>
<td></td>
<td></td>
<td>1.75*</td>
<td>&lt;0.001</td>
<td>1.15-2.35</td>
</tr>
</tbody>
</table>

* Statistically significant at p<0.05 or better
4.3.4.3 Participant characteristics and changes in knowledge score

In order to further investigate possible factors that may have influenced or confounded changes in knowledge score for participants, a list of possible explanatory factors of change in knowledge was developed. This list consisted of ‘plausible’ factors from the participant characteristics listed in Table 2. A series of bivariate regressions were run with factors that were statistically significant at 0.10 or higher being included in a multiple regression model.

Results presented in Table 4.10 confirm that access to the decision-aid is the strongest and most reliable predictor of increases in knowledge, suggesting that the decision-aid group increased their score by, on average, 1.66 questions more than the control group, after controlling for other factors.

It is also possible that other sources of information may have had an impact on the knowledge scores. Results suggest that the Team Midwifery Program may have led to greater knowledge increase when compared with other models of care. Other findings are that women carrying heavier babies, and those experiencing higher levels of decisional conflict at Survey 2 may have been more highly motivated to seek more information about the risks and benefits of TOL versus elective CS options. Note that when level of education was included in the model, it was not statistically significant, but if anything suggested that those with lower levels of formal education experienced larger increases in knowledge scores on average.
Table 4.10 Increase in knowledge scores from Survey 2 to Survey 3: multiple linear regression model (n=175)

<table>
<thead>
<tr>
<th>Explanatory Factor</th>
<th>Coefficient</th>
<th>t statistic</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-aid Intervention*</td>
<td>1.665</td>
<td>5.10*</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mode of Care(0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Midwifery</td>
<td>0.914</td>
<td>1.57</td>
<td>0.117</td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>-0.152</td>
<td>-0.33</td>
<td>0.745</td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>0.005</td>
<td>0.01</td>
<td>0.992</td>
</tr>
<tr>
<td>Doctors/High risk clinic</td>
<td>0.285</td>
<td>0.30</td>
<td>0.762</td>
</tr>
<tr>
<td>DCS (S2)</td>
<td>0.453</td>
<td>1.83</td>
<td>0.069</td>
</tr>
<tr>
<td>Birthweight (gms)*</td>
<td>0.001</td>
<td>2.09*</td>
<td>0.039</td>
</tr>
</tbody>
</table>

* Statistically Significant at p<0.05
R²=0.20 F7, 167 = 6.06 p <0.001
(i) Omitted category is ‘Private Obstetrician’
(Note: n=175 due to missing data on the birthweight variable)

4.3.4.4 Degree of change in knowledge score

In order to further examine changes in knowledge, individual changes, rather than aggregate (mean) changes in knowledge score were also analysed. The degree of change in knowledge score was found to be greater for the women who received the decision-aid (Table 4.11). Almost 80 percent (78.8%) of the decision-aid group increased their score whilst less than half (46.8%) of the control group demonstrated an increase in knowledge score. The control group increase was mostly in the category of 1-2 marks out of 15, whereas in the decision-aid group 45.5 percent of women were in the category of improvement by 3 or more marks out of 15. Therefore over half (53.3%) of women in the control group did not alter or actually decreased (34.8%) their knowledge scores during pregnancy, whereas only 21.2 percent of the decision-aid group did not increase their knowledge scores during this period.
Table 4.11 Change in Knowledge score by group and site (percent)

<table>
<thead>
<tr>
<th>Change in Knowledge Score</th>
<th>Study Group</th>
<th>Study Site</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control (n = 92)</td>
<td>Decision-aid (n = 99)</td>
<td>Site 1 (n = 129)</td>
</tr>
<tr>
<td>Decreased</td>
<td>34.8</td>
<td>11.1</td>
<td>20.2</td>
</tr>
<tr>
<td>Unchanged</td>
<td>18.5</td>
<td>10.1</td>
<td>9.3</td>
</tr>
<tr>
<td>Increased 1-2</td>
<td>34.8</td>
<td>33.3</td>
<td>39.5</td>
</tr>
<tr>
<td>Increased 3+</td>
<td>12.0</td>
<td>45.5</td>
<td>31.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$\chi^2, 3df$ 32.52 (p<0.001) 11.47 (p=0.009)

To determine whether there were interaction effects in terms of the decision-aid and the study site, a two-way ANOVA was conducted for change in knowledge score. The results of this analysis (Table 4.12) demonstrate that despite the differences in site characteristics, that the decision-aid intervention was the most important factor in the change in knowledge scores. There was no statistical indication of any interaction effects occurring between the study site and the intervention.

Table 4.12 Two-way ANOVA for change in knowledge scores

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>df</th>
<th>F ratio</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-aid</td>
<td>1, 187</td>
<td>31.85</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Site</td>
<td>1, 187</td>
<td>1.02</td>
<td>0.31</td>
</tr>
<tr>
<td>Interaction</td>
<td>1, 187</td>
<td>1.03</td>
<td>0.31</td>
</tr>
</tbody>
</table>
4.3.5 Hypothesis Testing

Research Hypothesis 1

The null-hypothesis ($H_0$) of there being no difference in mean post-intervention knowledge scores between women in the decision-aid and control groups was rejected. The alternative hypothesis ($H_1$) that: Women who receive the decision-aid will demonstrate higher mean knowledge scores than women in the control group; was supported by the findings that the mean increase in knowledge score was 2.17 for the decision-aid group versus 0.42 for the control group. The difference of 1.75 points was statistically significant ($p<0.001$, 95% CI 1.15-2.35).

In addition, it was found that:

- Women in the decision-aid group were statistically, significantly less likely to circle 'unsure' responses on the knowledge test at Survey 3 when compared with women in the control group.
- The decision-aid group was the most reliable predictor of change in knowledge score.
- The majority of women (78.8%) in the decision-aid group increased their knowledge score, with most scores increasing by at least 3 questions, compared with less than half (46.8%) of women in the control group. Over one third (34.8%) of the control group recorded a decrease in knowledge score at Survey 3.
4.4 Decisional Conflict Score Analysis

The second research hypothesis to be examined suggests an expectation that women who received the intervention (decision-aid) will, as a result, experience lower levels on the decisional conflict scale (DCS).

\[ H_0 : \text{Women in the decision-aid and control groups will not differ with respect to mean change in decisional conflict scores.} \]

\[ H_1 : \text{Women in the decision-aid group will demonstrate greater mean reductions in decisional conflict score than women in the control group.} \]

Let \( X = \text{Decisional Conflict Score} \)

Subscripts D and C refer to Decision-aid group and Control group respectively

Subscripts 2 and 3 refer to Survey 2 and Survey 3

\[ X_A = X_3 - X_2 \]

\[ H_0 : \mu_{AD} - \mu_{AC} \leq 0 \]

\[ H_1 : \mu_{AD} - \mu_{AC} > 0 \]

Decisional conflict is measured by an 18-item Decisional Conflict Scale (DCS), using a 5-point Likert format. The DCS developed by Annette O'Connor, includes subscales of Certainty, Feeling Informed, Values Clarity, Decision Quality and Feeling Supported (O'Connor, 1995; O'Connor, 1999). It has been widely used in decision-aid research as an indicator of the decisional state of consumers regarding attributes associated with effective decision-making (O'Connor AM, 1995; O'Connor AM et al., 2002). It measures the degree of uncertainty about a course of action, therefore discriminating between decision delay and decision-making (O'Connor,
1995; O'Connor, 1999). A score is calculated for each subscale as well as an overall total out of 5. Therefore a low level of decisional conflict (less than or equal to 2) would indicate a greater readiness for decision-making when compared to a higher score of greater than 2.

The following analysis focuses on possible changes in DCS score for women participating in the study. Pre-intervention DCS was measured for all women receiving ‘routine’ care and those receiving the decision-aid intervention. Baseline DCS scores were compared with post-intervention scores for both intervention and control groups and the scores were also compared by study site. Regression analysis was also undertaken to control for differences in participant characteristics, including baseline levels of education and models of care as examples. The ‘before’ and ‘after’ DCS scores were then analysed using possible confounding factors to determine the strength of findings.

4.4.1 Baseline DCS scores at Survey 2

Mean DCS scores were calculated at survey 2 (28 weeks) as a baseline measurement and assessed according to randomised groups and study site. Table 4.13 provides results for mean scores by group. The decision-aid group exhibited slightly higher DCS scores on four of five subscales as well as in total. This was statistically significant for the subscale certainty score only ($t = 2.04, df = 189, p = 0.043$), suggesting that the decision-aid group were less certain before the decision-aid intervention. To determine why this may have been the case, the scores were then analysed according to the study site of participants.
Table 4.13 DCS scores by group at Survey 2

<table>
<thead>
<tr>
<th>DCS Subscale</th>
<th>Control</th>
<th>Decision-aid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean Score</td>
</tr>
<tr>
<td>Certainty*</td>
<td>93</td>
<td>2.50</td>
</tr>
<tr>
<td>Informed</td>
<td>92</td>
<td>2.30</td>
</tr>
<tr>
<td>Values</td>
<td>92</td>
<td>2.34</td>
</tr>
<tr>
<td>Support</td>
<td>93</td>
<td>2.08</td>
</tr>
<tr>
<td>Quality</td>
<td>91</td>
<td>2.12</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>2.25</td>
</tr>
</tbody>
</table>

* Group difference statistically significant at p<0.05 or better

Table 4.14 provides mean scores by study site for Survey 2. It appears that site 1 participants exhibited higher DCS scores for four out of five subscales as well as total. The difference was statistically significant (p<0.001) for the subscales of certainty and quality.

Table 4.14 DCS scores by study site at Survey 2

<table>
<thead>
<tr>
<th>DCS Subscale</th>
<th>Site 1</th>
<th>Site 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean Score</td>
</tr>
<tr>
<td>Certainty*</td>
<td>130</td>
<td>2.83</td>
</tr>
<tr>
<td>Informed</td>
<td>129</td>
<td>2.22</td>
</tr>
<tr>
<td>Values</td>
<td>129</td>
<td>2.39</td>
</tr>
<tr>
<td>Support</td>
<td>130</td>
<td>2.16</td>
</tr>
<tr>
<td>Quality*</td>
<td>129</td>
<td>2.27</td>
</tr>
<tr>
<td>Total</td>
<td>127</td>
<td>2.36</td>
</tr>
</tbody>
</table>

* Group difference statistically significant at p<0.05 or better
A two-way ANOVA was conducted to further examine possible randomisation and study site interactions. This analysis found that study site was the stronger factor for the subscale of certainty ($F_{1,188} = 7.18, p = 0.008$). When site was controlled for, group was no longer statistically significant ($F_{1,188} = 3.12, p = 0.079$) and there were no interaction effects between site and group ($F_{1,188} = 0.000, p = 0.990$). Neither site nor group was related to the DCS for the subscales of informed, values and support. For the quality subscale, site was related to the score ($F_{1,186} = 7.27, p = 0.008$), and there was no interaction with group ($F_{1,185} = 0.24, p = 0.625$). For the total scores, neither variable (site and group) was significant and there were no interaction effects.

The issue of factors influencing baseline levels of decisional conflict was examined further, by proposing and estimating a regression model for total DCS. Firstly, a step-wise multiple linear regression model was estimated to identify factors influencing the level of decisional conflict among mothers facing birth after previous caesarean section (PCS). Plausible explanatory factors included in the model were demographic characteristics, obstetric history, study group, study site, knowledge score at Survey 2, State Anxiety score (6-item), EPDS score, mode of care and pre-intervention preference for mode of birth. Results of this analysis in which the dependent variable is the total average DCS score as at Survey 2 (i.e. before the intervention) are presented in Table 4.15.

Although the model (Table 4.15) does help to explain variations in total average DCS scores ($F_{6, 158} = 10.40, p<0.001$), DCS scores are difficult to predict, as there are few factors which have high explanatory power. The only statistically significant explanators are study site (decisional conflict was higher among site 1 women), state/trait score (the higher the score the greater the decisional conflict, on average), mode of care (in particular, women utilising the Team Midwifery mode had lower levels of decisional conflict), type of previous CS (those with previous elective CS had lower DCS scores) and current birthmode preference (women who were undecided had higher level of decisional conflict and those preferring elective CS had
lower DCS scores than those preferring TOL). Note that, there was almost no difference on DCS scores between control and decision-aid women, consistent with random allocation of groups, so that this variable did not enter the stepwise model.

**Table 4.15 Factors Influencing total DCS at Survey 2: Multiple step-wise regression analysis (n=165).**

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Regression Co-efficient</th>
<th>t statistic</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1</td>
<td>0.354</td>
<td>3.59</td>
<td>&lt;0.001</td>
<td>0.16 - 0.55</td>
</tr>
<tr>
<td>Previous CS (Elective)</td>
<td>-0.205</td>
<td>-2.04</td>
<td>0.043</td>
<td>'0.40 - '0.01</td>
</tr>
<tr>
<td>State Anxiety (6-item)</td>
<td>0.040</td>
<td>2.62</td>
<td>0.010</td>
<td>0.010-0.071</td>
</tr>
<tr>
<td>Preference Survey 2(i)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective CS</td>
<td>-0.266</td>
<td>-2.34</td>
<td>0.021</td>
<td>'0.49- '0.04</td>
</tr>
<tr>
<td>‘Unsure’</td>
<td>0.557</td>
<td>5.24</td>
<td>&lt;0.001</td>
<td>0.35 - 0.77</td>
</tr>
<tr>
<td><strong>Mode of care</strong>(ii)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>-0.075</td>
<td>-1.06</td>
<td>0.293</td>
<td></td>
</tr>
<tr>
<td>Team Midwifery</td>
<td>-0.286</td>
<td>-2.25</td>
<td>0.026</td>
<td>-0.54 - '0.04</td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>-0.051</td>
<td>-0.71</td>
<td>0.478</td>
<td></td>
</tr>
<tr>
<td>High Risk Doctors Clinic</td>
<td>0.035</td>
<td>0.50</td>
<td>0.618</td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = 0.28 \quad F_{6,158} = 10.40 \quad p <0.001$

i Omitted category group is ‘Prefer TOL’

ii Omitted category is ‘Private Obstetrician’

**4.4.2 Post-intervention DCS scores at Survey 3**

Mean DCS were calculated at survey 3 (36-38 weeks) as a post-intervention measurement and assessed according to group and study site. Table 4.16 provides results for mean scores by group.
Table 4.16 DCS scores by group at Survey 3

<table>
<thead>
<tr>
<th>DCS Subscale</th>
<th>Control n</th>
<th>Mean Score</th>
<th>Decision-aid n</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certainty</td>
<td>93</td>
<td>2.52</td>
<td>99</td>
<td>2.36</td>
</tr>
<tr>
<td>Informed*</td>
<td>93</td>
<td>2.14</td>
<td>99</td>
<td>1.78</td>
</tr>
<tr>
<td>Values</td>
<td>92</td>
<td>2.11</td>
<td>99</td>
<td>1.95</td>
</tr>
<tr>
<td>Support</td>
<td>93</td>
<td>2.08</td>
<td>99</td>
<td>1.88</td>
</tr>
<tr>
<td>Quality</td>
<td>93</td>
<td>2.05</td>
<td>99</td>
<td>1.88</td>
</tr>
<tr>
<td>Total*</td>
<td>92</td>
<td>2.17</td>
<td>99</td>
<td>1.94</td>
</tr>
</tbody>
</table>

* Group difference statistically significant at $p<0.05$ or better

Table 4.16 illustrates that the women in the decision-aid group at Survey 3 (post-intervention) had lower DCS scores on every subscale, and in total. The subscale of informed was the most affected ($t= 4.34$, $df = 162$, $p < 0.001$). There is some evidence that the support subscale was also lower ($t= 1.77$, $df = 165$, $p = 0.079$). Total score was significantly lower for the decision-aid group ($t= 2.52$, $df = 161$, $p = 0.013$).

Analysis by study site was also conducted and results appear in Table 4.17.

Table 4.17 DCS scores by study site at Survey 3

<table>
<thead>
<tr>
<th>DCS Subscale</th>
<th>Site 1 n</th>
<th>Mean Score</th>
<th>Site 2 n</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certainty</td>
<td>130</td>
<td>2.41</td>
<td>62</td>
<td>2.51</td>
</tr>
<tr>
<td>Informed</td>
<td>130</td>
<td>1.89</td>
<td>62</td>
<td>2.09</td>
</tr>
<tr>
<td>Values</td>
<td>130</td>
<td>2.00</td>
<td>61</td>
<td>2.08</td>
</tr>
<tr>
<td>Support</td>
<td>130</td>
<td>1.96</td>
<td>62</td>
<td>2.00</td>
</tr>
<tr>
<td>Quality</td>
<td>130</td>
<td>1.98</td>
<td>62</td>
<td>1.93</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>2.03</td>
<td>61</td>
<td>2.11</td>
</tr>
</tbody>
</table>
When compared with Survey 2 results (Table 4.14), there is a different picture by site at Survey 3. The site 1 women had lower DCS scores on most subscales, but this is only approaches statistical significance for the informed subscale \((t = 1.92, \text{df} = 87, p = 0.058)\). The differences by site observed at Survey 2 have mostly disappeared.

Two-way ANOVA was conducted to further analyse these results by group and site. For the subscale of certainty, neither group or study site were important factors. The informed subscale however was significant for both group \((F_{1,188} = 21.90, p < 0.001)\) and study site \((F_{1,188} = 4.02, p = 0.047)\). The values subscale was suggestive of decision-aid effect \((F_{1,187} = 3.60, p = 0.059)\). Analysis of the support subscale strengthen the effect of the decision-aid \((F_{1,188} = 4.91, p = 0.028)\), and the quality subscale also \((F_{1,188} = 4.94, p = 0.027)\). The total score suggests no important site effects, but very strong decision-aid effect \((F_{1,187} = 9.06, p = 0.003)\). Overall controlling for site strengthens the effect of the decision-aid on DCS score reductions.

Table 4.18 replicates the step-wise multiple regression analysis process of Table 4.15 for total average DCS scores obtained after the intervention (as at Survey 3). In contrast to the pre-intervention model, women in the decision-aid group are found to have significantly lower DCS scores \((t = -3.16, p=0.002)\). Other variables associated with higher DCS scores were mode of care (women using GP shared care had higher DCS scores), those who were still ‘unsure’ about the mode of birth they preferred at Survey 3 and those with high state anxiety scores at Survey 3. Knowledge score appears to be positively associated with higher DCS scores. Given that the level of education variable did not make it into the model with a cut-off set at below 0.05 it is possible that this was a factor.
Table 4.18 Factors influencing total DCS at Survey 3: Multiple step-wise regression analysis (n=163).

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Regression Co-efficient</th>
<th>t statistic</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-aid</td>
<td>-0.287</td>
<td>-3.16</td>
<td>0.002</td>
<td>-0.47 - -0.11</td>
</tr>
<tr>
<td>Knowledge Survey 3</td>
<td>0.035</td>
<td>1.98</td>
<td>0.049</td>
<td>0.00-0.07</td>
</tr>
<tr>
<td>State Anxiety Survey 3</td>
<td>0.014</td>
<td>3.43</td>
<td>0.001</td>
<td>0.01-0.02</td>
</tr>
<tr>
<td>Birth Preference Survey 3(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘Elective CS’</td>
<td>-0.005</td>
<td>-0.06</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>‘Unsure’</td>
<td>0.624</td>
<td>5.71</td>
<td>&lt;0.001</td>
<td>0.41-0.84</td>
</tr>
<tr>
<td>Mode of care(10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>-0.001</td>
<td>-0.01</td>
<td>0.993</td>
<td></td>
</tr>
<tr>
<td>Team Midwifery</td>
<td>-0.080</td>
<td>-1.15</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>0.193</td>
<td>2.14</td>
<td>0.034</td>
<td>0.02-0.37</td>
</tr>
<tr>
<td>High Risk Doctors Clinic</td>
<td>0.002</td>
<td>0.03</td>
<td>0.973</td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = 0.32 \quad F_{5,157} = 14.96 \quad p < 0.001$

i. Omitted category group is ‘Prefer TOL’

ii. Omitted category is ‘Private Obstetrician’

4.4.3 Change in DCS Scores by group

The mean change in DCS score was calculated using Survey 3 score minus Survey 2 score for each woman. Table 4.19 presents results by group. The decision-aid reduced decisional conflict by a greater degree on all subscales and overall.
### Table 4.19 Difference in DCS Score change by group

<table>
<thead>
<tr>
<th>DCS Subscale</th>
<th>Control Mean Change</th>
<th>Decision-aid Mean Change</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certainty*</td>
<td>89 0.00</td>
<td>94 -0.51</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Informed*</td>
<td>88 -0.19</td>
<td>94 -0.48</td>
<td>0.002</td>
</tr>
<tr>
<td>Values</td>
<td>87 -0.23</td>
<td>94 -0.44</td>
<td>0.096</td>
</tr>
<tr>
<td>Support*</td>
<td>89 -0.03</td>
<td>94 -0.29</td>
<td>0.010</td>
</tr>
<tr>
<td>Quality*</td>
<td>87 -0.10</td>
<td>94 -0.38</td>
<td>0.009</td>
</tr>
<tr>
<td>Total*</td>
<td>84 -0.10</td>
<td>94 -0.42</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

* Group difference significant at p<0.01 or better

Whilst significant reductions occurred on all dimensions for the decision-aid group (p<0.001 in all cases), there were much smaller reductions among the control group. Further, in most cases the reductions in DCS scores for the control group were not statistically significant. Only the reduction in DCS scores for the informed and values subscales were statistically different from zero (t = 3.07, df = 87, p =0.003, and t = 2.53, df = 86, p = 0.013 respectively). Comparison of the mean reduction in DCS between the two groups (e.g. comparing the Total reduction in Average DCS score of 0.10 points for the control group with that of 0.42 points for the decision-aid group), using a t test for comparison of two means, suggests that there was a statistically greater reduction in all cases for the intervention (decision-aid) group (p<0.10 for the category of values, and p<0.01 in the other five comparisons).

Further evidence is provided in Table 4.20, which uses the matched-pairs comparison of means methodology to compare the difference in average scores between the two surveys (i.e. Survey 3 average score minus Survey 2 average score). Table 4.20
demonstrates that the intervention group experienced a greater reduction in their DCS between 28 and 36-38 weeks gestation than the control group (p<0.01).

Table 4.20 Total DCS by group and study site: Pre and post-intervention (mean out of 5)

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Survey 2 (28 weeks)</th>
<th>Survey 3 (36 weeks)</th>
<th>Change in Score</th>
<th>p value</th>
<th>95% CI for change in score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-aid (n=99)</td>
<td>2.34</td>
<td>1.94</td>
<td>-0.40*</td>
<td>&lt;0.001</td>
<td>-0.51 to -0.29</td>
</tr>
<tr>
<td>Control (n=88)</td>
<td>2.25</td>
<td>2.17</td>
<td>-0.08</td>
<td>0.113</td>
<td>-0.22 to +0.06</td>
</tr>
<tr>
<td>Total (n=187)</td>
<td>2.30</td>
<td>2.05</td>
<td>-0.25*</td>
<td>&lt;0.001</td>
<td>-0.16 to -0.34</td>
</tr>
</tbody>
</table>

* Statistically significant at p<0.05 or better

4.4.4 Change in DCS Scores by study site

Mean change in DCS scores were analysed by study site to determine the extent to which site effects existed. Table 4.21 shows mean change in DCS scores by study site, suggesting that moderately greater reductions in DCS occurred at site 1. The exception is in the subscale of certainty, where women at site 1 experienced the largest reductions, but site 2 women actually slightly increased their DCS for this subscale.
Table 4.21 Mean change in DCS scores by study site

<table>
<thead>
<tr>
<th>DCS Subscale</th>
<th>Site 1</th>
<th>Site 2</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change</td>
<td></td>
</tr>
<tr>
<td>Certainty*</td>
<td>125</td>
<td>-0.44</td>
<td>58</td>
</tr>
<tr>
<td>Informed</td>
<td>124</td>
<td>-0.33</td>
<td>58</td>
</tr>
<tr>
<td>Values</td>
<td>124</td>
<td>-0.38</td>
<td>57</td>
</tr>
<tr>
<td>Support</td>
<td>125</td>
<td>-0.21</td>
<td>58</td>
</tr>
<tr>
<td>Quality</td>
<td>124</td>
<td>-0.29</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>122</td>
<td>-0.32</td>
<td>56</td>
</tr>
</tbody>
</table>

* Site difference significant at p<0.05 or better

Step-wise multiple linear regression analysis was conducted to further determine the effect of the decision-aid on women’s DCS scores. The results of this analysis are reported in Table 4.22 and confirm that the decision-aid is effective in reducing levels of decisional conflict (t = -2.70, p = 0.008). Also, women who were undecided regarding mode of birth experienced smaller reductions in DCS, as did women utilising GP shared care for pre-natal care.
Table 4.22 Factors influencing change in total DCS: Multiple step-wise regression analysis (n=153).

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Regression Co-efficient</th>
<th>t statistic</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-aid</td>
<td>-0.241</td>
<td>-2.70</td>
<td>0.008</td>
<td>-0.42- -0.07</td>
</tr>
<tr>
<td>Birth Preference Survey 3(i)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Elective CS'</td>
<td>0.045</td>
<td>0.56</td>
<td>0.575</td>
<td></td>
</tr>
<tr>
<td>'Unsure'</td>
<td>0.366</td>
<td>3.27</td>
<td>0.001</td>
<td>0.15-0.59</td>
</tr>
<tr>
<td>Mode of care(ii)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>0.063</td>
<td>0.75</td>
<td>0.455</td>
<td></td>
</tr>
<tr>
<td>Team Midwifery</td>
<td>0.048</td>
<td>0.60</td>
<td>0.553</td>
<td></td>
</tr>
<tr>
<td>GP Shared Care</td>
<td>0.201</td>
<td>2.12</td>
<td>0.036</td>
<td>0.01-0.39</td>
</tr>
<tr>
<td>High Risk Doctors Clinic</td>
<td>-0.022</td>
<td>-0.29</td>
<td>0.774</td>
<td></td>
</tr>
</tbody>
</table>

R² = 0.16  F 3,149 = 9.21  p <0.001

i  Omitted category group is ‘Prefer TOL’
ii  Omitted category is ‘Private Obstetrician’

The degree of change was also considered important when examining the effect of the decision-aid. At survey 2 the overall mean total DCS score (n=188) was 2.30 (out of 5) with a standard deviation of 0.66. Therefore to analyse the degree of change, a change in DCS from Survey 2 to Survey 3 of less than or equal to 0.66 is defined as a ‘moderate’ change and a change of 0.67 or greater is a “large” change. However, only 8 of 178 (4.5%) valid responses produced an increase in DCS of >0.66 points. Therefore there is only one category for an increase in DCS used in Table 4.23.
Table 4.23 Degree of DCS change by group

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th></th>
<th>Decision-aid</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Large Decrease</td>
<td>11</td>
<td>13.1</td>
<td>34</td>
<td>36.2</td>
<td>45</td>
<td>25.3</td>
</tr>
<tr>
<td>Mod. Decrease</td>
<td>39</td>
<td>46.4</td>
<td>35</td>
<td>37.2</td>
<td>74</td>
<td>41.6</td>
</tr>
<tr>
<td>Unchanged</td>
<td>5</td>
<td>6.0</td>
<td>4</td>
<td>4.3</td>
<td>9</td>
<td>5.1</td>
</tr>
<tr>
<td>Increase</td>
<td>29</td>
<td>34.5</td>
<td>21</td>
<td>22.3</td>
<td>50</td>
<td>28.1</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>100.0</td>
<td>94</td>
<td>100.0</td>
<td>178</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: Distributions statistically significantly different ($\chi^2_{3\,df} = 12.84, \ p=0.005$)

Table 4.23 illustrates that women who received the decision-aid were more likely to experience a larger (>1 standard deviation) decrease in DCS score when compared to women in the control group (36.2% vs 13.1%).

4.4.5 Hypothesis Testing

Research Hypothesis 2

The null-hypothesis ($H_0$) of there being no difference between decision-aid and control groups in DCS scores was rejected. The alternative hypothesis ($H_1$) that; Women who receive the decision-aid will demonstrate greater mean reductions in DCS score than women in the control group; was supported by the finding that at Survey 3, mean DCS scores for the decision-aid group were 1.94 compared to 2.17 for the control group ($p<0.01$). There was a statistically greater reduction in DCS for the decision-aid group Women who received the decision-aid experienced a reduction in DCS -0.40 compared to -0.08 for controls ($p<0.01$, 95% CI $\text{-0.51 to -0.29}$).
4.5 Preference and choice for mode of birth

Benefits or attributes yet to be determined about decision-aids, relate to their potential ability to assist consumers to make choices. The third hypothesis relates to the notion of forming a preference about mode of birth, ultimately making a choice, and the effect a decision-aid may have on this process. The third hypothesis has been generated with the notion that women in the decision-aid group, as a result of being informed, may demonstrate different patterns of preference and choice for mode of birth when compared to women in the control group.

\[ H_0 : \text{Birthmode choice at Survey 3 is independent of study group} \]

\[ H_1 : \text{Birthmode choice at Survey 3 is dependent on study group} \]

In linking this to the sample size calculation, previous research (see section 3.6.4.4) suggests that, in reality, many women may not have previously been involved in the decision process about mode of birth and that in utilising the decision-aid they may be more able to articulate their preferences and make a decision about mode of birth that is consistent with their individual needs. The large difference in CS rates between the two research sites may reflect practice patterns and therefore raised the possibility prior to commencement of the study that women may not be consistently offered an open or 'un-biased' choice for mode of birth and that the decision-aid may impact upon CS rates as a result. Therefore it was hypothesised that baseline rates for trial of labour (TOL) and elective caesarean section (CS) for each research site could change as women’s preferences were revealed as part of the research process. This important aspect of the preference and choice issues will be examined and rates for TOL versus elective CS examined as a part of this issue.

The following analysis presents the pattern of preference and changes in preference for all women who completed all three surveys, for each survey point. Table 4.24
provides a summary of preference for mode of birth (Survey 1 and Survey 2) and choice (Survey 3).

Table 4.24 Birthmode preference/choice by survey (Surveys 1, 2 and 3) (percent in parentheses)

<table>
<thead>
<tr>
<th>Preference/Choice</th>
<th>Survey 1</th>
<th>Survey 2</th>
<th>Survey 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOL</td>
<td>108 (56.3)</td>
<td>98 (51.3)</td>
<td>92 (47.9)</td>
</tr>
<tr>
<td>ECS</td>
<td>51 (26.6)</td>
<td>44 (23.0)</td>
<td>66 (34.4)</td>
</tr>
<tr>
<td>Unsure</td>
<td>33 (17.2)</td>
<td>49 (25.7)</td>
<td>34 (17.7)</td>
</tr>
<tr>
<td>Total</td>
<td>192 (100.0)</td>
<td>191 (100.0)</td>
<td>192 (100.0)</td>
</tr>
</tbody>
</table>

TOL preference/choice, overall, declined over time from 56.3 percent at Survey 1, to 51.3 percent at Survey 2 and then 47.9 percent at Survey 3. The number of women who were unsure increased from 17.2 percent to 25.7 percent between Survey 1 and Survey 2 and then fell back to the Survey 1 level of 17.7 percent (Survey 3). Preference/choice for elective CS (ECS) fell between Survey 1 and Survey 2 (26.6% to 23.0%), but then increased sharply to 34.4 percent at Survey 3.

4.5.1 Impact of decision-aid on preference/choice for mode of birth

Analysis of preference and choice for mode of birth was conducted separately by study group and study site to reflect power calculations and initial hypotheses. According to Table 4.25 there was little difference in preference/choice for women by group.
Table 4.25 Birthmode preference/choice by group, Surveys 1, 2, and 3 (percent)

<table>
<thead>
<tr>
<th>Preference/Choice</th>
<th>Survey 1 (n=93)</th>
<th>Survey 2 (n=99)</th>
<th>Survey 3 (n=98)</th>
<th>Survey 3 (n=99)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOL</td>
<td>60.2</td>
<td>52.5</td>
<td>53.8</td>
<td>49.0</td>
</tr>
<tr>
<td>ECS</td>
<td>22.6</td>
<td>30.3</td>
<td>19.4</td>
<td>26.5</td>
</tr>
<tr>
<td>Unsure</td>
<td>17.2</td>
<td>17.2</td>
<td>26.9</td>
<td>24.5</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \chi^2_{2df} = 1.58, \ p = 0.45 \quad \chi^2_{2df} = 1.39, \ p = 0.50 \quad \chi^2_{2df} = 2.20, \ p = 0.37 \]

Results suggest a drift toward uncertainty (unsure) between Survey 1 and Survey 2 for both groups. There was no significant difference between groups after the intervention at Survey 3. Preference for TOL within the decision-aid group stayed the same between Survey 2 and Survey 3 (n=48). Whilst there was a fall in uncertainty (24 to 14), women seemed to prefer elective CS (26 to 37). For the control group there was less decline in uncertainty (unsure) (25 to 20), and the number wanting TOL fell also (50 to 44), with choice of elective CS increasing (18 to 29). Overall there was no statistically significant effect on preference (Survey 1 and Survey 2) and choice (Survey 3) for mode of birth as a result of the decision-aid.

The preference for TOL, although higher than the baseline of 20 percent for site 1 and lower than the baseline of 80 percent for site 2 was similar for both intervention and control groups (Table 4.25). The control group women at both sites were more likely to be ‘unsure’ at 36-38 weeks of pregnancy (Survey 3) than the decision-aid group. This is consistent with the greater reduction in DCS found for the decision-aid group (Table 4.20).
4.5.2 Impact of study site on preference/choice for mode of birth

Preference and choice for Surveys 1, 2 and 3 was analysed by study site (Table 4.26). Preference for elective CS was higher at site 1 at all survey points. Particularly noteworthy is the increase in support for elective CS at site 1 between Survey 2 and Survey 3 (27.1% to 40.0%). Almost twice the percent of site 1 women chose elective CS when compared to site 2 at Survey 3 (40.0% versus 22.6%). Similarly support for TOL was consistently higher at site 2, although support for TOL at site 2 overall decreased over time (64.5% to 56.5%). Note also that site 1 women preferred TOL to elective CS (43.8% versus 40.0%) even at Survey 3. Site 2 women also had a higher number of women in the unsure category overall, and although this increased at Survey 2 (21.0% to 32.3%), it fell back to the Survey 1 level by Survey 3.

<table>
<thead>
<tr>
<th>Preference/choice</th>
<th>Survey 1 (n=130)</th>
<th>Site 1 (n=130)</th>
<th>Site 2 (n=62)</th>
<th>Survey 2 (n=129)</th>
<th>Site 1 (n=62)</th>
<th>Site 2 (n=62)</th>
<th>Survey 3 (n=130)</th>
<th>Site 1 (n=62)</th>
<th>Site 2 (n=62)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOL</td>
<td>52.3</td>
<td>64.5</td>
<td>50.4</td>
<td>53.2</td>
<td>43.8</td>
<td>56.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECS</td>
<td>32.3</td>
<td>14.5</td>
<td>27.1</td>
<td>14.5</td>
<td>40.0</td>
<td>22.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>15.4</td>
<td>21.0</td>
<td>22.5</td>
<td>32.3</td>
<td>16.2</td>
<td>21.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ \chi^2_{2df} = 6.88, p = 0.03 \quad \chi^2_{2df} = 4.52, p = 0.10 \quad \chi^2_{2df} = 5.65, p = 0.06 \]

Study site 1, whose baseline VBAC rate was lowest, therefore shows evidence of a movement away from TOL during the pregnancy. Almost 30 percent of women who preferred TOL at Survey 2 had either changed their mind or became undecided. Those choosing elective CS at Survey 2 generally stayed with this preference. Most undecided women made up their mind, and were more likely to choose elective CS.
This was partly offset by relatively large number of TOL women becoming undecided.

A series of nine binomial logistic regressions for birthmode preference/choice were conducted (TOL, elective CS or unsure) for Survey 1, Survey 2 and Survey 3. This procedure is equivalent to running three multinomial logistic regressions (noting that the procedures are mathematically equivalent. In the trinomial case, once two of three regressions are estimated, the coefficients of the third are deterministic). The procedure found that the decision-aid was not a significant explanator of preference/choice. To further illustrate the significant explanatory factors for preference/choice, step-wise binomial regression analysis was conducted separately for the three preference/choice categories of TOL', 'elective CS' and 'unsure', using the explanatory variables included in the binomial logistic regressions (Tables 4.27a, 4.27b and 4.27c).

**Table 4.27a TOL preference/choice (Survey 1,2 and 3): Step-wise binomial regression**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Survey 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>95%CI for OR</td>
<td>β</td>
<td>p</td>
<td>95%CI for OR</td>
<td>β</td>
</tr>
<tr>
<td>Site 1</td>
<td>-0.782</td>
<td>0.036</td>
<td>0.22-0.95</td>
<td></td>
<td></td>
<td></td>
<td>-0.864</td>
</tr>
<tr>
<td>Aust.</td>
<td>0.954</td>
<td>0.007</td>
<td>1.29-5.22</td>
<td>1.011</td>
<td>0.005</td>
<td>1.35-5.58</td>
<td></td>
</tr>
<tr>
<td>born</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCS S2</td>
<td>-0.609</td>
<td>0.025</td>
<td>0.32-0.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCS S3</td>
<td>-0.609</td>
<td>0.042</td>
<td>0.30-0.98</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAI S3</td>
<td>0.063</td>
<td>0.001</td>
<td>0.92-0.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.27b Elective CS preference/choice (Survey 1, 2 and 3): Step-wise binomial regression

<table>
<thead>
<tr>
<th>Factor</th>
<th>Survey 1</th>
<th></th>
<th></th>
<th></th>
<th>Survey 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Survey 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>95% CI</td>
<td>OR</td>
<td>β</td>
<td>p</td>
<td>95% CI</td>
<td>OR</td>
<td>β</td>
<td>p</td>
<td>95% CI</td>
<td>OR</td>
</tr>
<tr>
<td>Site 1</td>
<td>1.217</td>
<td>0.011</td>
<td>1.32-8.63</td>
<td>0.386</td>
<td>0.011</td>
<td>1.37-11.64</td>
<td>1.006</td>
<td>0.013</td>
<td>1.23-6.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPDS 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>0.020</td>
<td>0.887</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>1.441</td>
<td>0.014</td>
<td>1.34-13.36</td>
<td></td>
<td>1.301</td>
<td>0.035</td>
<td>1.10-12.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCS S2</td>
<td>-1.214</td>
<td>0.002</td>
<td>0.14-0.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAI S1</td>
<td>0.26</td>
<td>0.001</td>
<td>1.12-1.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAI S3</td>
<td>0.039</td>
<td>0.025</td>
<td>1.01-1.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(i) Omitted category is ‘EPDS Low’

Table 4.27c ‘Unsure’ preference/choice (Survey 1, 2 and 3): Step-wise binomial regression

<table>
<thead>
<tr>
<th>Factor</th>
<th>Survey 1</th>
<th></th>
<th></th>
<th></th>
<th>Survey 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Survey 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>p</td>
<td>95% CI</td>
<td>OR</td>
<td>β</td>
<td>p</td>
<td>95% CI</td>
<td>OR</td>
<td>β</td>
<td>p</td>
<td>95% CI</td>
<td>OR</td>
</tr>
<tr>
<td>DCS S2</td>
<td>1.009</td>
<td>0.006</td>
<td>1.34-5.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCS S3</td>
<td>2.224</td>
<td>&lt;0.001</td>
<td>3.49-24.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Study site was the most consistent explanatory factor for preference at all three survey points for both TOL preference and elective CS preference. At Survey 1, 2 and 3, women from site 2 were more likely to prefer TOL than ECS and women at site 1 were more likely to prefer elective CS. In addition to site, psychological factors appeared to play a role in preference. Higher state anxiety scores and high EPDS scores were associated with a preference for elective CS. Higher DCS scores, consistent with higher decisional conflict, were also associated with being less likely
to prefer TOL or elective CS and more likely to be unsure about preference for mode of birth.

4.5.3 Change in preference from Survey 2 and Survey 3

The following analysis provides a more detailed analysis of change in preference for individual women during the pregnancy. The analysis at this point is confined to the pre-decision-aid (Survey 2) and post-decision-aid (Survey 3) points in time, for all participants who completed Surveys 2 and 3. Table 4.28 provides the proportion of women who changed their preference for mode of birth both by group and study site.

Table 4.28 Change in birthmode preference by group and site (percent)

<table>
<thead>
<tr>
<th>Change in Preference</th>
<th>Control (n=93)</th>
<th>Decision-aid (n=98)</th>
<th>Site 1 (n=129)</th>
<th>Site 2 (n=62)</th>
<th>Total (n=191)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>63.4</td>
<td>73.5</td>
<td>64.3</td>
<td>77.4</td>
<td>68.6</td>
</tr>
<tr>
<td>Yes</td>
<td>36.6</td>
<td>26.5</td>
<td>35.7</td>
<td>22.6</td>
<td>31.4</td>
</tr>
</tbody>
</table>

Note: n=191 due to 1 missing preference for Survey 2 from site 1 decision-aid group

The women at site 1 were more likely to change preference than women at site 2 although the difference was not quite statistically significant ($\chi^2_{1 \ df} = 3.32$, $p = 0.068$). The difference by group was not statistically significant ($\chi^2_{1 \ df} = 2.23$, $p=0.136$), but does suggest that decision-aid group women were less likely to change their preference.

The actual pattern of change by mode of birth can also be examined first in total and then by group and by site. Table 4.29 illustrates that almost one quarter of those preferring TOL at Survey 2 changed their preference. More became undecided than changed to elective CS. Less than 15 percent of those preferring elective CS at survey
2 changed their mind. Around one third of undecided women at survey 2 were still undecided at Survey 3, of the rest, more chose elective CS than TOL.

Table 4.29 Changes in birthmode preference/choice between Survey 2 and Survey 3 (percent) (n=192)

<table>
<thead>
<tr>
<th>Survey 3 Choice</th>
<th>Trial of Labour</th>
<th>Elective CS</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial of Labour</td>
<td>77.6</td>
<td>6.8</td>
<td>26.5</td>
</tr>
<tr>
<td>Elective CS</td>
<td>9.2</td>
<td>86.4</td>
<td>38.8</td>
</tr>
<tr>
<td>Undecided</td>
<td>13.3</td>
<td>6.8</td>
<td>34.7</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.30 further illustrates the extent of change in preference/choice between Survey 2 and Survey 3 by group. Evidence indicates that women who received the decision-aid were more likely to stay with Survey 2 preference for both TOL and elective CS. Decision-aid women were less likely to remain undecided at Survey 3, if they were previously unsure at Survey 2. They were more likely to choose elective CS than TOL when making a choice at 36-38 weeks from a position of being undecided at 28 weeks.
Table 4.30 Changes in preference/choice from Survey 2 to Survey 3 by study group (percent)

<table>
<thead>
<tr>
<th>Survey 3 Choice</th>
<th>Control (n=93)</th>
<th>Decision-aid (n=98)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOL (n=50)</td>
<td>ECS (n=18)</td>
</tr>
<tr>
<td>TOL</td>
<td>70.0</td>
<td>11.1</td>
</tr>
<tr>
<td>ECS</td>
<td>14.0</td>
<td>77.8</td>
</tr>
<tr>
<td>Unsure</td>
<td>16.0</td>
<td>11.1</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure 4.31 illustrates that at Study site 2, where the VBAC rate was high, women exhibited very different preference changes to those of site 1. Most women at site 2 (approx 90%) with a definite preference at Survey 2 remained with their decision. Half of the women who were undecided at Survey 2, were still unsure at Survey 3, with the remaining women choosing elective CS and TOL equally. Overall elective CS was much less popular as a choice at site 2 when compared to women in site 1.

Table 4.31 Changes in preference/choice from Survey 2 to Survey 3 by study site (percent)

<table>
<thead>
<tr>
<th>Survey 3 Choice</th>
<th>Site 1 (n=129)</th>
<th>Site 2 (n=62)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOL (n=65)</td>
<td>ECS (n=35)</td>
</tr>
<tr>
<td>TOL</td>
<td>70.8</td>
<td>8.6</td>
</tr>
<tr>
<td>ECS</td>
<td>12.3</td>
<td>85.7</td>
</tr>
<tr>
<td>Unsure</td>
<td>16.9</td>
<td>5.7</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 4.32 provides a summary of the pattern of preference change between Survey 2 and Survey 3 both by study group and site. The distribution of preference into pre-intervention and post-intervention categories, illustrates that the decision-aid group were more likely to adhere to the preference stated at Survey 2 and if unsure at Survey 2, were more likely to have made a choice by Survey 3 than women in the control group. Women at site 1 were more likely to change from TOL to elective CS than women at site 2, however women at site 2 were more likely to remain unsure than women at site 1 whose preference moved toward elective CS.

Table 4.32 Pattern of change in preference for mode of birth between Survey 2 and Survey 3 by study group and site (n=191)

<table>
<thead>
<tr>
<th>Survey 2 Preference</th>
<th>Survey 3 Choice</th>
<th>Control</th>
<th>Decision-aid</th>
<th>Site 1</th>
<th>Site 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>TOL</td>
<td>TOL</td>
<td>35</td>
<td>70.0</td>
<td>41</td>
<td>85.4</td>
<td>46</td>
</tr>
<tr>
<td>ECS</td>
<td>TOL</td>
<td>7</td>
<td>14.0</td>
<td>2</td>
<td>4.2</td>
<td>8</td>
</tr>
<tr>
<td>Unsure</td>
<td>TOL</td>
<td>8</td>
<td>16.0</td>
<td>5</td>
<td>10.4</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>50</td>
<td>100.0</td>
<td>48</td>
<td>100.0</td>
<td>65</td>
</tr>
<tr>
<td>ECS</td>
<td>TOL</td>
<td>2</td>
<td>11.1</td>
<td>1</td>
<td>3.8</td>
<td>3</td>
</tr>
<tr>
<td>ECS</td>
<td>ECS</td>
<td>14</td>
<td>77.8</td>
<td>24</td>
<td>92.3</td>
<td>30</td>
</tr>
<tr>
<td>Unsure</td>
<td>ECS</td>
<td>2</td>
<td>11.1</td>
<td>1</td>
<td>3.8</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>18</td>
<td>100.0</td>
<td>26</td>
<td>100.0</td>
<td>35</td>
</tr>
<tr>
<td>Unsure</td>
<td>TOL</td>
<td>7</td>
<td>28.0</td>
<td>6</td>
<td>25.0</td>
<td>8</td>
</tr>
<tr>
<td>ECS</td>
<td>TOL</td>
<td>8</td>
<td>32.0</td>
<td>11</td>
<td>45.8</td>
<td>14</td>
</tr>
<tr>
<td>Unsure</td>
<td>TOL</td>
<td>10</td>
<td>40.0</td>
<td>7</td>
<td>29.2</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25</td>
<td>100.0</td>
<td>24</td>
<td>100.0</td>
<td>29</td>
</tr>
</tbody>
</table>

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4.5.4 Factors contributing to changes in preference for mode of birth

To further examine the factors associated with changes in preference for mode of birth, a step-wise logistic regression was conducted for change in preference between Survey 2 and Survey 3. Women who were unsure at Survey 2 were excluded from the analysis at this point so that the analysis could focus on the women who had formed a preference at Survey 2. Variables included in previous regression models for preference were entered into a step-wise model with entry criteria of 0.05 and exit criteria of 0.10. Table 4.33 provides the results, whereby only 4 variables were significant predictors of a change in preference.

Table 4.33 Change in preference between Survey 2 and Survey 3: Step-wise logistic regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>P value</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1</td>
<td>2.195</td>
<td>0.009</td>
<td>1.74-46.48</td>
</tr>
<tr>
<td>DCS 3</td>
<td>1.641</td>
<td>0.001</td>
<td>2.03-13.14</td>
</tr>
<tr>
<td>State Anxiety S3</td>
<td>0.112</td>
<td>0.002</td>
<td>1.04-1.20</td>
</tr>
<tr>
<td>Trait Anxiety S3</td>
<td>-0.079</td>
<td>0.044</td>
<td>0.86-0.99</td>
</tr>
</tbody>
</table>

$R^2 = 0.40$

A significant predictor of whether women changed preference between Survey 2 and Survey 3 was study site. Women at site 1 were much more likely to change their preference than those in site 2. High level of DCS at Survey 3 and state anxiety at Survey 3 were associated with change in preference. Women who had higher trait anxiety levels at Survey 3 were less likely to change their mind.

For the women who were unsure at Survey 2 and had made a choice at Survey 3, a separate step-wise logistic regression analysis was conducted. The only significant factor predictive of which choice was made at Survey 3 was the DCS at Survey 3.
The higher DCS score, the more likely women were to have chosen an elective CS (p = 0.032, 95% CI for OR = 0.38-0.96).

4.5.5 Hypothesis Testing

Research Hypothesis 3.

There were few differences in birthmode choice for women in the decision-aid and control groups in terms of choice of TOL or elective CS. Women in the decision-aid group were less likely to be ‘unsure’ at Survey 3 (p<0.10) however this was not at the level of p<0.05. Therefore the null hypothesis (H0) that birthmode choice at Survey 3 is independent of study group could not be rejected. The alternative hypotheses (H1) that birthmode choice at Survey 3 is dependent on study group was not supported.

In addition to the hypothesis stated above, there was weak evidence for the following;

- Women in the decision-aid group were more likely to have made up their mind (were less likely to be ‘unsure’ at Survey 3).
- Women in the decision-aid group were less likely to change their mind between Survey 2 and Survey 3.
4.6 Birth outcomes

The fourth research hypothesis has been generated with the notion that women in the decision-aid group would be more likely to adhere to their Survey 3 choice for mode of birth than women in the control group. It was hypothesised that as a result of the decision-aid, women will be more informed about their options and that as a result of acknowledging personal values, their choice would be more likely to be adhered to.

\[ H_0: \text{Women in the decision-aid and control groups will not differ with respect to adherence to birthmode choice at Survey 3.} \]

\[ H_1: \text{Women in the decision-aid group will be more likely to adhere to birthmode choice at Survey 3 than women in the control group.} \]

Let \( E = \) event of adherence to birthmode choice at Survey 3 (excluding 'unsure' responses).

Let \( P = \) proportion of women adhering to birthmode choice at Survey 3

Subscripts D and C refer to Decision-aid and Control groups

\[ H_0 : P_D - P_C \leq 0 \]

\[ H_1 : P_D - P_C > 0 \]

Adherence to Survey 3 choice is defined as having followed through with the intended mode of birth at Survey 3. Therefore if TOL was chosen, adherence would mean that TOL was experienced. If elective CS was chosen, then an elective CS would have been undertaken. Birth outcome data was collected from hospital medical records and used to determine actual birth experience. This was verified against
Survey 4 birth outcome information provided by the women themselves. Data was analysed separately by randomised group and for each study site.

### 4.6.1 Birth outcomes by group

Table 4.34 presents women’s birthmode choice and compares this with actual mode of birth according to the principle of intention to treat analysis for study groups.

#### Table 4.34 Choice and mode of birth by group (n=179)

<table>
<thead>
<tr>
<th>Survey 3 Choice</th>
<th>Actual Birth</th>
<th>Control</th>
<th>Decision-aid</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>TOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>34</td>
<td>82.9</td>
<td>28</td>
<td>68.3</td>
</tr>
<tr>
<td>ECS</td>
<td>7</td>
<td>17.1</td>
<td>13</td>
<td>31.7</td>
</tr>
<tr>
<td>Elective CS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>5</td>
<td>17.9</td>
<td>8</td>
<td>22.2</td>
</tr>
<tr>
<td>(ECS)</td>
<td>23</td>
<td>82.1</td>
<td>28</td>
<td>77.8</td>
</tr>
<tr>
<td>Unsure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>6</td>
<td>30.0</td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>ECS</td>
<td>14</td>
<td>70.0</td>
<td>6</td>
<td>46.2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>45</td>
<td>50.6</td>
<td>43</td>
<td>47.8</td>
</tr>
<tr>
<td>ECS</td>
<td>44</td>
<td>49.4</td>
<td>47</td>
<td>52.2</td>
</tr>
</tbody>
</table>

Women who were allocated to the control group were more likely to adhere to their Survey 3 choice for mode of birth according to the birth outcome data. For example, women who stated at Survey 3 that they wanted a TOL were more likely to have a TOL if they were in the control group (82.9% versus 68.3%, \( \chi^2 \ 1 \text{df} = 2.38, p =0.123 \)). For women who wanted an elective CS, women in the control group were slightly more likely to experience ECS (82.1% versus 77.8%, \( \chi^2 \ 1 \text{df} = 0.19, p =0.662 \)). If women were still unsure at Survey 3, if they were in the control group, they were more likely to experience an elective CS (70.0%), whilst women in the decision-aid
group were slightly more likely to have a TOL (53.8%, $\chi^2$ 1df = 1.88, p = 0.171). None of the above differences were statistically significant at the 0.05 level.

4.6.2 Birth outcomes by Study Site

There were other factors influencing whether the mode of birth chosen at Survey 3 (36-38 weeks) was adhered to or not. The analysis by study site (Table 4.35) reveals a different pattern from that when study groups were compared.

Table 4.35 Choice and Mode of Birth by Study Site (n=179)

<table>
<thead>
<tr>
<th>Survey 3 Choice</th>
<th>Actual Birth</th>
<th>Site 1</th>
<th>Site 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>TOL*</td>
<td>TOL</td>
<td>32</td>
<td>66.7</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>ECS</td>
<td>16</td>
<td>33.3</td>
<td>4</td>
</tr>
<tr>
<td>Elective CS</td>
<td>TOL</td>
<td>8</td>
<td>16.0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>ECS</td>
<td>42</td>
<td>84.0</td>
<td>9</td>
</tr>
<tr>
<td>Unsure</td>
<td>TOL</td>
<td>6</td>
<td>28.6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>ECS</td>
<td>15</td>
<td>71.4</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>TOL</td>
<td>46</td>
<td>38.7</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>ECS</td>
<td>73</td>
<td>61.3</td>
<td>18</td>
</tr>
</tbody>
</table>

* Difference statistically significant at p<0.05 or better

At site 1, where the baseline elective CS rate was high, if women chose elective CS the majority (84%) experienced this outcome. If the choice was TOL, only 67 percent of those who preferred this option experienced TOL. The majority of site 1 women still 'unsure' at 36 weeks experienced elective CS (71%). Conversely at site 2, with
high baseline TOL rate, if women chose TOL, most experienced TOL (88%). However if the choice was elective CS, only 64 percent experienced this option. Site 2 women who were unsure of their choice were more likely to experience TOL. These patterns of adherence by site were statistically significant for TOL ($\chi^2_{1df} = 5.02, p=0.025$), and approached statistical significance for elective CS ($\chi^2_{1df} = 2.63, p=0.105$) and unsure ($\chi^2_{1df} = 2.83, p=0.092$).

Step-wise logistic regression was undertaken to further investigate the influence of preference, choice, study group and site on birthmode. For the purpose of this analysis, the dependant variable was actual mode of birth undertaken, whereby TOL equals 1 and elective CS equals zero. The omitted category for choice was “elective CS”.

Table 4.36 Logistic regression for actual mode of birth* (n=179)

<table>
<thead>
<tr>
<th>Explanator</th>
<th>Coefficient</th>
<th>p value</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>2.429*</td>
<td>&lt;0.001</td>
<td>5.01-25.67</td>
</tr>
<tr>
<td>Unsure</td>
<td>0.810</td>
<td>0.102</td>
<td>0.85-5.93</td>
</tr>
<tr>
<td>Site 1</td>
<td>-1.223*</td>
<td>0.002</td>
<td>0.14-0.63</td>
</tr>
<tr>
<td>Decision-aid</td>
<td>0.032</td>
<td>0.93</td>
<td>0.51-2.10</td>
</tr>
</tbody>
</table>

Statistically significant at p<0.05 or better

$R^2 = 0.37$

a Dependent variable = 1 if TOL, 0 otherwise

Note: 13 missing birth outcome data

Table 4.36 illustrates that women who chose TOL, were substantially more likely to have a TOL than those who chose elective CS (from 5 to 25 times more likely). After controlling for choice (and group), it was found that women at site 1 were still
substantially less likely to have a TOL than women at site 2 (probably approximately half as likely). There was no effect found for group (OR and p value close to 1) suggesting that women who received the decision-aid were approximately equally likely to have a TOL as those who were in the control group.

When a stepwise logistic regression was undertaken to further analyse the importance of choice and study site on the mode of birth undertaken by women in the study, it was found that the only other significant variable was presentation of the foetus. Vertex presentation versus other presentation substantially elevated the odds of TOL (p = 0.012, 95% CI for OR = 1.86-151.89)

4.6.3 Adherence to Survey 3 choice

In order to determine whether women had adhered to their Survey 3 choice, they firstly were classified as having stated a choice at Survey 3. Therefore women who were still unsure at Survey 3 were excluded from this analysis. Women who had nominated a choice at Survey 3 and whose medical record data was available for the variable of mode of birth were included in the analysis. A stepwise multiple regression analysis was conducted, whereby the entry criteria was at the 0.05 level and removal criteria at the 0.10 level. The model resulted in four significant variables for adherence to choice (Table 4.37).
Table 4.37 Adherence to Survey 3 choice: Stepwise logistic regression (n=118)

<table>
<thead>
<tr>
<th>Explanator</th>
<th>Coefficient</th>
<th>p value</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3 Knowledge score</td>
<td>0.551*</td>
<td>&lt;0.001</td>
<td>1.30-2.31</td>
</tr>
<tr>
<td>Decision-aid group</td>
<td>-1.646*</td>
<td>0.011</td>
<td>0.05-0.69</td>
</tr>
<tr>
<td>S3 STAI Trait score</td>
<td>0.064*</td>
<td>0.051</td>
<td>1.01-1.14</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 12</td>
<td>1.277</td>
<td>0.258</td>
<td></td>
</tr>
<tr>
<td>Certificate/Diploma</td>
<td>0.697</td>
<td>0.404</td>
<td></td>
</tr>
<tr>
<td>Degree+</td>
<td>-1.366*</td>
<td>0.019</td>
<td>0.08-0.80</td>
</tr>
</tbody>
</table>

Nagelkerke R² = 0.27

* Statistically significant at p<0.05 or better

Dependant variable = 1 if women adhered to S3 decision (n=96)

= 0 otherwise (n=22).

Entry criteria p<0.05 removal criteria p>0.10.

(i) Omitted category Year 10

The analysis found knowledge seems to be the most significant predictor of adherence to the Survey 3 choice. (p<0.001). The higher the knowledge score, the more likely the adherence to the Survey 3 choice. After controlling for knowledge, the decision-aid group allocation was predictive of being less likely to adhere to the Survey 3 choice. Women who had higher levels of education (Degree level) were also much less likely to adhere to their Survey 3 choice than were women all other levels of education. It is important to note that this analysis excluded women who had not made a choice at Survey 3 and were still unsure of the mode of birth they wanted. Since women in the decision-aid group were more likely to make a choice, rather than remain unsure at Survey 3, this may indicate that although they were able to make a choice, the strength of their commitment to that choice or capacity to follow through
with that choice (given the effect of other site-related factors for example), may not have been strong enough. These aspects of adherence will be further discussed in Chapter 5. Knowledge (which was clearly facilitated by the decision-aid) still remains the most important factor for women in adhering to their preference or choice for mode of birth.

4.6.4 Hypothesis Testing

Research Hypothesis 4

The null hypothesis ($H_0$) that adherence to Survey 3 choice will not differ or will be less likely for women in the decision-aid versus the control group could not be rejected. Women in the decision-aid group were less likely to adhere to their birth choice once knowledge was controlled for ($p<0.05$). The alternative hypothesis ($H_1$) that women who receive the decision-aid will more likely to adhere to their Survey 3 choice for birth than women in the control group was not supported.
4.7 Postnatal Satisfaction

Postnatal satisfaction was estimated from Survey 4 (6-8 weeks postpartum) using a visual analogue scale from 0-10, where women were asked to place a cross on the scale to indicate "how they feel about their birth experience". In addition they were asked to respond to three questions about the degree to which their birth experience met their expectations and whether they would make the same decision again. Responses for questions were marked on a 5-point Likert scale. Each question will be addressed separately and compared to the findings of the visual analogue.

H₀: Women in the decision-aid and control groups will not differ with respect to mean satisfaction scores

H₁: Women in the decision-aid group will demonstrate higher mean satisfaction scores than women in the control group.

Let \( X = \) Satisfaction scores at Survey 4

Subscripts D and C refer to Decision-aid and Control groups

\[ H₀ : \mu_D - \mu_C \leq 0 \]

\[ H₁ : \mu_D - \mu_C > 0 \]

4.7.1 Satisfaction with Birth Experience: Visual Analogue Scale

There were 161 women (71%) who completed all four surveys and who completed the rating scale to represent their level of satisfaction with their birth experience. Overall, mean satisfaction ratings of birth experience were 7.72 (out of 10) for the intervention group, and 7.90 for the control group. The control group rated birth experience slightly higher at both sites, but no statistically significant differences were found. Table 4.38 demonstrates that satisfaction was, however, significantly related to mode of birth (\( p<0.001 \) according to two way ANOVA). The overall
average satisfaction level for TOL was 7.53 compared with 7.91 for elective CS. The highest satisfaction score was for normal vaginal birth (8.86) and the lowest for instrumental vaginal birth (5.83).

Table 4.38 Satisfaction scores (out of 10) by group and study site, choice (Survey 3) and mode of birth

<table>
<thead>
<tr>
<th>Explanator</th>
<th>n</th>
<th>Mean Satisfaction Score</th>
<th>F</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision-aid</td>
<td>84</td>
<td>7.72</td>
<td>0.20</td>
<td>0.652</td>
</tr>
<tr>
<td>Control</td>
<td>77</td>
<td>7.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Study Site</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 1</td>
<td>111</td>
<td>8.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 2</td>
<td>50</td>
<td>7.31</td>
<td>2.67</td>
<td>0.104</td>
</tr>
<tr>
<td><strong>S3 Choice</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL</td>
<td>79</td>
<td>7.42</td>
<td>1.75</td>
<td>0.177</td>
</tr>
<tr>
<td>Elective CS</td>
<td>55</td>
<td>8.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>27</td>
<td>8.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Birthmode</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Vaginal</td>
<td>33</td>
<td>8.86*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumental</td>
<td>9</td>
<td>5.83</td>
<td>5.98</td>
<td>0.001</td>
</tr>
<tr>
<td>Emergency CS</td>
<td>32</td>
<td>6.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective CS</td>
<td>78</td>
<td>7.91</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All TOL</strong></td>
<td>74</td>
<td>7.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective CS</td>
<td>78</td>
<td>7.91</td>
<td>0.78</td>
<td>0.378</td>
</tr>
</tbody>
</table>

* Statistically greater than for instrumental and emergency CS group according to one-way ANOVA (p<0.05)
To further analyse observed variations in visual analogue scale (VAS) satisfaction scores, a stepwise logistic regression analysis was conducted (variable p value for inclusion was 0.05 and 0.10 for removal from the model). Table 4.39 illustrates that the birthmode choice at Survey 3 and the actual mode of birth undertaken were the only significant predictors of satisfaction in the model.

Table 4.39 Stepwise Regression of Survey 4 satisfaction scores: VAS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>t statistic</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birthmode</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Vaginal*</td>
<td>1.672</td>
<td>2.76</td>
<td>0.007</td>
<td>0.47-2.87</td>
</tr>
<tr>
<td>Instrumental</td>
<td>-1.170</td>
<td>-1.22</td>
<td>0.226</td>
<td>-3.07-0.73</td>
</tr>
<tr>
<td>Emergency CS</td>
<td>-0.865</td>
<td>-1.56</td>
<td>0.122</td>
<td>-1.97-0.23</td>
</tr>
<tr>
<td>S3 Choice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL*</td>
<td>-1.248</td>
<td>-2.28</td>
<td>0.024</td>
<td>-2.33-0.167</td>
</tr>
<tr>
<td>Unsure</td>
<td>-0.258</td>
<td>-0.42</td>
<td>0.674</td>
<td>-1.47-0.95</td>
</tr>
</tbody>
</table>

* Statistically significant at p<0.05 or better

R² = 0.14

(i) Omitted category is elective CS for S3 choice and actual mode of birth

Women who experienced normal vaginal birth had significantly higher satisfaction scores than any other group. After controlling for actual birth outcomes, those whose choice was TOL at Survey 3 were less satisfied than those who chose elective CS.

4.7.2 Satisfaction with the birth experience: Likert scale questions

In order to further address the issue of satisfaction, beyond a 10cm visual analogue, three separate questions were asked of participants with responses marked on a 5-point Likert scale. Responses to each question will be reported using the percentage...
of women who responded to each category on the five-point scale, by randomised
group, study site and actual mode of birth.

4.7.2.1 "Thinking about my birth I would make the same choice again?"

In seeking to further explore the issue of satisfaction, participants were asked whether
they would make the same choice about mode of birth. Women were asked to circle
the response that best reflected how they felt about this statement from Strongly
Agree to Strongly Disagree. Table 4.40 summarises 168 responses to the statement
and cross tabulates this by study group, study site and actual mode of birth (whether
TOL or Elective CS).

Table 4.40 “Would make the same choice again”

<table>
<thead>
<tr>
<th>Variables</th>
<th>Strongly agree (n=94)</th>
<th>Agree (n=35)</th>
<th>Unsure (n=18)</th>
<th>Disagree (n=12)</th>
<th>Strongly Disagree (n=9)</th>
<th>Total (n=168)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision-aid</td>
<td>58.3</td>
<td>17.9</td>
<td>11.9</td>
<td>8.3</td>
<td>3.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Control</td>
<td>53.6</td>
<td>23.8</td>
<td>9.5</td>
<td>6.0</td>
<td>7.1</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>χ²&lt;sub&gt;4df&lt;/sub&gt; = 2.44 (p = 0.655)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 1</td>
<td>56.9</td>
<td>20.7</td>
<td>10.3</td>
<td>6.9</td>
<td>5.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Site 2</td>
<td>53.8</td>
<td>21.2</td>
<td>11.5</td>
<td>7.7</td>
<td>5.8</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>χ²&lt;sub&gt;4df&lt;/sub&gt; = 0.17 (p=0.997)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth Outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Vag.</td>
<td>77.8</td>
<td>11.1</td>
<td>8.3</td>
<td>0.0</td>
<td>2.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Instrumental</td>
<td>41.7</td>
<td>0.0</td>
<td>25.0</td>
<td>25.0</td>
<td>8.3</td>
<td>100.0</td>
</tr>
<tr>
<td>EmCS</td>
<td>30.3</td>
<td>27.3</td>
<td>9.1</td>
<td>24.2</td>
<td>9.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total TOL</td>
<td>53.1</td>
<td>16.0</td>
<td>11.1</td>
<td>13.6</td>
<td>6.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Elective CS</td>
<td>58.6</td>
<td>25.3</td>
<td>10.3</td>
<td>1.1</td>
<td>4.6</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>χ²&lt;sub&gt;12df&lt;/sub&gt; = 43.09 (p&lt;0.001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

144
The evidence presented in Table 4.40 would suggest that mode of birth is an important factor associated with post-decision satisfaction with the decision made. Overall 23 percent of participants disagreed or were unsure about whether they would make the same choice again, but this rose to 50 percent for instrumental birth specifically (although the sample size is small, n=12) and 42 percent for emergency CS. Normal vaginal birth and elective CS were similar in that more women agreed that they would make the same choice again. Overall elective CS receives a more positive level of satisfaction than the TOL group as a whole, largely due to the lower levels of satisfaction seen in the instrumental and emergency CS groups that outweigh higher satisfaction achieved for the normal vaginal birth group. Neither group nor site were significant factors for whether women would make the same choice again.

To further analyse variations in response to the question of whether women would make the same choice again, a stepwise logistic regression analysis was conducted (variable p value for inclusion was 0.05 and 0.10 for removal from the model).

**Table 4.41 Stepwise Regression of Survey 4 satisfaction scores:**

"Would make the same choice again"

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Vaginal</td>
<td>2.344</td>
<td>0.007</td>
<td>1.89-57.41</td>
</tr>
<tr>
<td>Instrumental</td>
<td>0.242</td>
<td>0.796</td>
<td>0.20-8.01</td>
</tr>
<tr>
<td>Elective CS</td>
<td>1.846</td>
<td>0.002</td>
<td>2.01-19.97</td>
</tr>
<tr>
<td>Australian born</td>
<td>1.242</td>
<td>0.033</td>
<td>1.11-10.85</td>
</tr>
<tr>
<td>S3 DCS</td>
<td>1.829</td>
<td>0.009</td>
<td>1.59-24.44</td>
</tr>
<tr>
<td>S4 DCS</td>
<td>-3.284</td>
<td>&lt;0.001</td>
<td>0.01-0.20</td>
</tr>
<tr>
<td>Site 1</td>
<td>0.598</td>
<td>0.440</td>
<td></td>
</tr>
<tr>
<td>Decision-aid</td>
<td>0.143</td>
<td>0.705</td>
<td></td>
</tr>
</tbody>
</table>

Nagelkerke $R^2 = 0.42$ (i) Omitted category is emergency CS
Responses were coded and then analysed according to make the same choice again (=1) if they had either responded as *Strongly Agree* or *Agree* with the statement. Women were coded as not making the same choice again (=0) if they responded that they were *Unsure, Disagree* or *Strongly Disagree*. The logistic regression analysis confirms that the mode of birth is important in terms of whether women would choose the same mode of birth again. Women who experienced normal vaginal birth and elective CS were more likely to respond that they would make the same choice for birth again than women who had experienced an instrumental birth or emergency CS. Women who were Australian born also were more likely to state they would make the same choice again. Higher DCS scores in Survey 4 however were predictive of women who were less likely to make the same choice again. Once Survey 4 DCS scores were controlled for, higher DCS scores at Survey 3 were predictive of being more likely to make the same choice again. Neither study site nor randomised group were significant predictors of women stating they would make the same choice again.

4.7.2.2 Compared to expectations “the actual birth experience was...”

Women were asked to circle the response that best reflected how they felt about the statement “Compared to what I was expecting, the actual birth was...”, from *Much Better* to *Much Worse*. Table 4.42 summarises 167 responses to the statement, by group, study site.

Only 25.8 percent of participants felt that overall the birth experience was either worse or much worse than expected. In the case of instrumental birth however, this was almost 64 percent of women (n=11) and 45.4 percent for women who experienced emergency CS. This meant that overall the expectations for women who had a TOL were not met for 32.6 percent compared with only 19.5 percent of women who had elective CS. The degree to which birth experience met expectations does not
appear to be affected by whether women received the decision-aid or not or the study site they were attending.

Table 4.42 Compared to expectations “the actual birth was...”

<table>
<thead>
<tr>
<th>Variables</th>
<th>Much Better (n=51)</th>
<th>Better (n=30)</th>
<th>Same (n=43)</th>
<th>Worse (n=30)</th>
<th>Much Worse (n=13)</th>
<th>Total (n=167)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision-aid</td>
<td>32.1</td>
<td>16.7</td>
<td>27.4</td>
<td>16.7</td>
<td>7.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Control</td>
<td>28.9</td>
<td>19.3</td>
<td>24.1</td>
<td>19.3</td>
<td>8.4</td>
<td>100.0</td>
</tr>
<tr>
<td>$\chi^2_{4df} = 1.90$ (p=0.863)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Site</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 1 (n=115)</td>
<td>29.6</td>
<td>19.1</td>
<td>26.1</td>
<td>19.1</td>
<td>6.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Site 2 (n=52)</td>
<td>32.7</td>
<td>15.4</td>
<td>25.0</td>
<td>15.4</td>
<td>11.5</td>
<td>100.0</td>
</tr>
<tr>
<td>$\chi^2_{4df} = 4.38$ (p=0.496)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Birth Outcome</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Vaginal</td>
<td>41.7</td>
<td>27.8</td>
<td>19.5</td>
<td>11.1</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Instrumental</td>
<td>0.0</td>
<td>7.3</td>
<td>9.1</td>
<td>45.5</td>
<td>18.2</td>
<td>100.0</td>
</tr>
<tr>
<td>EmergencyCS</td>
<td>12.1</td>
<td>18.2</td>
<td>24.2</td>
<td>24.2</td>
<td>21.2</td>
<td>100.0</td>
</tr>
<tr>
<td>(n=33)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total TOL (n=81)</td>
<td>23.7</td>
<td>23.7</td>
<td>20.0</td>
<td>21.3</td>
<td>11.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Elective CS (n=87)</td>
<td>36.8</td>
<td>12.6</td>
<td>31.0</td>
<td>14.9</td>
<td>4.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Total (n=168)</td>
<td>30.5</td>
<td>18.0</td>
<td>25.7</td>
<td>18.0</td>
<td>7.8</td>
<td>100.0</td>
</tr>
<tr>
<td>$\chi^2_{12df} = 40.28$ (p&lt;0.001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To further analyse observed variations in response to the question of their actual birth compared to what they were expecting, a stepwise logistic regression analysis was performed (variable p value for inclusion was 0.05 and 0.10 for removal from the model). The responses were coded as better than expected (=1) if women responded *Much better or Better* and all other responses (=0) if they responded *The Same, Worse* or *Much Worse* than expected. Table 4.43 summarises the results.

### Table 4.43 Stepwise Regression of Survey 4 satisfaction scores: “Compared to expectations the actual birth was...”

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>p value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birthmode(i)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Vaginal</td>
<td>1.82</td>
<td>0.003</td>
<td>1.86-20.44</td>
</tr>
<tr>
<td>Instrumental</td>
<td>-0.07</td>
<td>0.933</td>
<td>0.18-4.77</td>
</tr>
<tr>
<td>Elective CS</td>
<td>0.507</td>
<td>0.0295</td>
<td>0.64-4.28</td>
</tr>
<tr>
<td>Mode of Care (ii)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives Clinic</td>
<td>-0.868</td>
<td>0.038</td>
<td>0.18-0.96</td>
</tr>
<tr>
<td>Team Midwifery</td>
<td>0.077</td>
<td>0.781</td>
<td></td>
</tr>
<tr>
<td>GP Shared</td>
<td>1.628</td>
<td>0.202</td>
<td></td>
</tr>
<tr>
<td>Doctor/High Risk</td>
<td>0.000</td>
<td>0.986</td>
<td></td>
</tr>
<tr>
<td>Site I</td>
<td>0.004</td>
<td>0.947</td>
<td></td>
</tr>
<tr>
<td>Decision-aid</td>
<td>0.341</td>
<td>0.559</td>
<td></td>
</tr>
</tbody>
</table>

Nagelkerke $R^2 = 0.15$

(i) Omitted category is emergency CS
(ii) Omitted category is private obstetrician

The most significant predictor of response that the birth experience was better than expected was mode of birth. Those who experienced normal vaginal birth were most likely to respond that the birth was better than expected. The women who attended the midwives clinic were the least likely to respond that the birth was better than
expected. Neither group nor study site had any significant effect on the response to this question.

4.7.2.3 Compared to expectations “my health after the birth was…”

It was thought that a possible factor affecting satisfaction may relate to perceived health after the birth. Literature has already identified that women who experience emergency CS may be less satisfied than women who experience elective CS (Joseph GF et al., 1991; Abitbol MM et al., 1993) The third question was therefore to elicit expectations of health after the birth when compared to actual health, ranging from Much Better to Much Worse. Table 4.44 summarises the 167 responses according to mode of birth and according to TOL versus elective CS.

Overall women’s health was reported to be consistent if not better than their expectations, except for 19 women (11.4%). However, when mode of birth is taken into account, it appears that women who experienced instrumental birth felt better than they expected with 63.6 percent stating that they either felt better or much better than expected. Although the numbers are small for this group (n=11) it seems that satisfaction may not be closely related to perceived health-state after the birth. Women who responded with the category “the same” may be indicating that it was either as good as they expected or as bad as they expected, so the analysis is limited in this regard.
Table 4.44 Compared to expectation “health after the birth”

“Compared to what I was expecting, my health after the birth was...”

<table>
<thead>
<tr>
<th>Variables</th>
<th>Much Better (n=94)</th>
<th>Better (n=35)</th>
<th>Same (n=18)</th>
<th>Worse (n=12)</th>
<th>Much Worse (n=9)</th>
<th>Total (n=168)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision-aid (n=84)</td>
<td>34.5</td>
<td>26.2</td>
<td>27.4</td>
<td>9.5</td>
<td>2.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Control (n=83)</td>
<td>30.1</td>
<td>28.9</td>
<td>30.1</td>
<td>8.4</td>
<td>2.4</td>
<td>100.0</td>
</tr>
<tr>
<td>(\chi^2) 4df = 0.53 (p=0.971)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Site</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 1 (n=115)</td>
<td>30.4</td>
<td>27.8</td>
<td>30.4</td>
<td>10.4</td>
<td>0.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Site 2 (n=52)</td>
<td>36.5</td>
<td>26.9</td>
<td>25.0</td>
<td>5.8</td>
<td>5.8</td>
<td>100.0</td>
</tr>
<tr>
<td>(\chi^2) 4df = 5.25 (p=0.263)</td>
<td></td>
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<tr>
<td><strong>Birth Outcome</strong></td>
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<tr>
<td>NVB (n=36)</td>
<td>36.1</td>
<td>25.0</td>
<td>22.2</td>
<td>16.7</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Instrumental (n=11)</td>
<td>9.1</td>
<td>54.5</td>
<td>27.3</td>
<td>9.1</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>EmergencyCS (n=33)</td>
<td>21.2</td>
<td>27.3</td>
<td>33.3</td>
<td>12.1</td>
<td>6.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total TOL (n=80)</td>
<td>26.3</td>
<td>30.0</td>
<td>27.5</td>
<td>13.8</td>
<td>2.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Elective CS (n=87)</td>
<td>37.9</td>
<td>25.3</td>
<td>29.9</td>
<td>4.6</td>
<td>2.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total (n=167)</td>
<td>32.3</td>
<td>27.5</td>
<td>28.7</td>
<td>9.0</td>
<td>2.4</td>
<td>100.0</td>
</tr>
<tr>
<td>(\chi^2) 12df = 15.65 (p=0.208)</td>
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</table>
To further analyse observed variations in response to the question of their health compared what they expected, a stepwise logistic regression analysis was performed (variable p value for inclusion was 0.05 and 0.10 for removal from the model). The responses were coded as better than expected (=1) if women responded *Much better* or *Better* and all other responses (=0) if they responded *The Same, Worse* or *Much Worse* than expected. There were no significant variables in this model, including those of study group and site.

### 4.7.3 Hypothesis Testing

**Research Hypothesis 5**

The null hypothesis (H₀) of no difference in level of satisfaction between decision-aid and control groups could not be rejected. The alternative hypothesis (H₁), that women in the decision-aid will demonstrate higher mean satisfaction scores than women in the control group, was not supported. The level of satisfaction was not statistically different for decision-aid and control groups. Actual mode of birth was found to be a powerful predictor of satisfaction with the birth experience.

### 4.8 Summary of Results

The decision-aid was successful in both study sites in improving knowledge of the risks and benefits of trial of labour versus elective caesarean birth. Women in the control group showed little evidence of increasing knowledge between 28 and 36-38 weeks, despite the fact that they would have attended approximately 4-5 visits to their clinic or doctor during this time. Decisional conflict scores were significantly reduced, when compared with the control group, where an increase in decisional conflict was found for site 2 participants. Women who had received the decision-aid were less likely to be unsure about their birth choice. Women's preferences for mode of birth do not appear to be related to whether they received the intervention or not, but were influenced significantly by the study site. Rates for mode of birth reflected...
common practice at the study sites in terms of whether they had initial (pre-study) high TOL rate or high elective CS rate. Overall satisfaction was highest for women who experienced elective CS compared to TOL, but was highest specifically for women who experienced normal vaginal birth.

Chapter 5 will discuss these findings in relation to the research questions and how the answers from this study relate to current literature. Chapter 6 will follow with conclusions and recommendations for future research and clinical practice.
CHAPTER 5

DISCUSSION

5.1 Introduction

An important focus of this thesis is the relationship between women's knowledge of the risks and benefits of mode of birth after caesarean section and the actual choices that women make about mode of birth. In order to explore this relationship, a RCT was designed to analyse the effect of an intervention designed to increase women's knowledge and facilitate a process whereby informed choice could potentially occur, and then to observe the choices that were made, birth outcomes achieved and subsequent satisfaction. Data from this trial were presented in Chapter 4 under the headings of knowledge, decisional conflict, preference and choice, birth outcome and satisfaction. This chapter will focus on the effect of the decision-aid according to these dimensions. The limitations of the research will be discussed and the significance of the findings for future clinical research and practice will be further explored in Chapter 6.

One of the key objectives of this research was to determine the effect of knowledge on women's choice of mode of birth after CS. In order for this to be determined, a strategy for improving knowledge and for facilitating a process of informed choice was developed. The decision support framework was adopted for this purpose because of its potential value in promoting healthcare decision-making, although it had not been utilised for healthcare decisions regarding childbirth, and not verified for use in any Australian healthcare context. In developing a decision-aid specifically for women facing the choice about mode of birth after CS, it was hoped that the potential value of a decision-aid for decision-making about birth could be established, and further insight into the determinants of mode of birth after CS could be gained.
The discussion will highlight the findings of the RCT in terms of the effect of the decision-aid on knowledge of risks and benefits of options for birth after CS, changes in decisional conflict, pattern of preference for mode of birth, birthmode choice, outcomes for birth and satisfaction with birth experience. The degree to which changes were observed for these specific outcome measures will be discussed within the context of current literature, in terms of the effect of the decision-aid, as well as other important variables measured within the RCT. The RCT findings will finally be addressed within the context of consumer participation in healthcare decision-making.

5.2 Effect of the decision-aid on women’s knowledge

Decision-aids have been shown to be effective in improving knowledge of healthcare options. Previous systematic reviews of decision aids have emphasised that decision-aids are better than ‘usual’ care in improving knowledge about healthcare options (O’Connor et al., 1999; O’Connor et al., 2002). The decision-aid developed and evaluated for this research by RCT, was the most important determinant of improvement in knowledge about options for birth after CS (Table 4.7). Improvement in knowledge for women in the decision-aid group was greater than for women in the control group at both study sites, and regardless of baseline knowledge scores and differences observed in terms of site characteristics (Table 4.9).

Mean knowledge scores increased by 2.17 points for women in the decision-aid group, however the control group demonstrated a smaller increase in knowledge scores (0.42 points) between Survey 2 (28 weeks) and Survey 3 (36-38 weeks) (Table 4.9). An equivalent increase in mean knowledge score (2.17) was achieved by women in the decision-aid group within both study sites. When considering the degree of change in score, 45.5 percent women in the decision-aid group increased their knowledge score by 3 or more points compared with only 12.0 percent of
women in the control group (Table 4.11). In fact 53.3 percent of knowledge scores in the control group were either unchanged or had decreased between Survey 2 and Survey 3, compared with 21.2 percent of decision-aid women in that situation.

The degree to which women were sure about their responses to the knowledge questions also varied between the decision-aid and control groups. At Survey 2, the 'unsure' option was used 22.5 percent of the time (or 3.37 times in 15 responses on average) by the former group and 22.6 percent of the time (average 3.39 responses) by the latter (no statistically significant difference). However, at Survey 3, the incidence of use of the 'unsure' response had barely changed for the control group (down from 22.6% to 20.3% (3.39 to 3.02 responses), no statistically significant change at the 5 percent level), whereas a far more pronounced drop had occurred for the decision-aid group (from 22.5% to 12.2% (or 3.37 to 1.83 responses), significant at p<0.001) (Table 4.8b). Therefore it may be concluded that the degree of uncertainty over the issues involved in the choice between the two birth options was reduced among the intervention (decision-aid) group but not among the control group. Therefore the decision-aid would also appear to promote greater certainty regarding the issues.

Regression analysis confirms the relationship between using the decision-aid and improved knowledge scores between Survey 2 and Survey 3 (Table 4.7 & 4.10). The use of the decision-aid was the most powerful predictor of increase in knowledge even when factors such as study site, level of education and mode of care were taken to account. The result that women from all levels of education at both sites in the study were able to benefit from the decision-aid, in terms of improvement in knowledge, is an important finding.

Debate surrounding the efficacy of different modes of care, including continuity of care and continuity of carer models (Team midwifery and Private obstetricians for example), has suggested that that these models of care provide greater levels of
satisfaction (Laslett et al., 1997; Waldentrom et al., 2000; Biro et al., 2003) perhaps through opportunities for building relationships and as a result perhaps better opportunities for exchange of information. Although the women using Team Midwifery care appeared to benefit more than women using some other mode of care, the decision-aid alone had a greater impact in improving women’s knowledge about their choice for birth after caesarean than mode of care (Table 4.10).

It is important to note again that women in the control group demonstrated little increase in knowledge between Survey 2 and Survey 3 (between 28 and 36-38 weeks), despite the fact that they would have attended approximately 4-5 visits to their prenatal clinic or doctor during this time. Women in the control group in site 2 specifically, showed a mean improvement in score of 0.00 (Table 4.9). Although the knowledge questionnaire was based on material presented in the decision-aid booklet, women in the control group could have been expected to be able to answer these questions in order to assist them to arrive at an informed birth mode choice. The findings (Table 4.9) suggest that the control group women did not have equivalent access to evidence-based information as decision-aid women, or perhaps equivalent opportunities to consider such evidence-based information prior to making their decision about mode of birth. The extent to which women are informed of the risks and benefits of options for birth after CS therefore appears to vary, with some women receiving limited information to assist them with choice about birth. The control levels of knowledge reveal apparent limitations to the ‘routine’ approaches used in prenatal care for the sites studied. For example, variations in individual practitioner knowledge of the evidence-based information regarding risks and benefits may have left women vulnerable to either inconsistent or personally biased information, ultimately leading to confusion. Anecdotal evidence suggests that this was the case for some women participating in the study.

An example of this issue can be found in a comment noted verbatim (with permission) during a conversation on the telephone when a participant was contacted
to confirm her address so that a postnatal Survey 4 could be posted. When asked how she was feeling she said that she was satisfied with the overall outcome of the caesarean section but on reflection...

"...was very confused by the end of pregnancy and by then not in a state to make a rational decision. Often the views of healthcare providers come across when asked questions. Tried to do my own research but the information was often biased". (#2015 Control)

Further discussion will highlight some of these important issues raised by women participating in the study.

5.2.1 Towards understanding the extent to which women are informed about options for birth after CS

Some of the women participating in the control group for this study revealed concerns about not feeling well informed and wrote additional statements on their surveys to express their unease about not receiving adequate information about their options.

"I am finding it difficult to know what is best to do. I haven’t really got an understanding of how safe a trial of vaginal birth is. Also I feel I don’t really have enough information about either option. I have never been given the impression there is a choice to make. Each medical person I see gives me the impression there’s no reason not to go on like normal, as if my previous caesarean hadn’t happened. However, I feel inconfident since last time...” (#1037 Control)
This comment below raises a similar concern, also from a woman in the control group.

"I realise how uninformed I was about the 2 options. Additionally the doctors didn’t really approach the subject until 36 weeks and at this stage it was much too late to start a rational discussion and research process for myself. Certainly it is an important decision and the whole issue appears quite political varying from doctor to doctor and even country to country" (#2015 Control)

A perception of ‘bias’ came from a range of healthcare practitioners within different models of care. This appeared to have had an impact on how women felt within their mode of care for pregnancy and may have hampered their decision-process. The following quote was provided (with permission) during a conversation with one of the participants who was telephoned regarding a survey reminder...

"...changed to a private doctor. Really want a caesarean section [I] had no choice last time and feel angry that midwives make me feel that I am a failure and shouldn’t want a caesarean” (#2014 Decision-aid)

The role that knowledge plays in the decision process is therefore potentially affected or even hampered by some practitioners and their own personal values and biases about birth. This was an issue for both medical practitioners and midwives who clearly communicated personal feelings about women’s choices if they did not align with their own beliefs about what women should choose.

In contrast, some of the comments shared by women who received the decision-aid booklet and who were supported by their practitioners in making a choice, were very positive. In particular, if women had come to a decision that they were confident about, they expressed positive feeling that came with that confidence.
The word *peaceful* was expressed on a number of occasions when explaining what choice they had made...

"I really felt the book was helpful. I now understand the terms and feel more informed about my choice. I took the booklet with me to my midwife and we looked at it together...I feel peaceful about this decision as it cuts out the mystery and the chance of an emergency Caesar which I want to avoid at all costs. It meets the needs of everyone in my family, me, the baby and my children and husband."

(1010 Decision-aid)

The decision-aid booklet was designed to enable women to consider their choice in terms of weighing up risks and benefits. In fact some women wrote their explanation about their choice using the terms risks and benefit as seen in the two examples below;

"For me, the benefits of c-section definitely outweighed those of trial of vaginal birth" (2059 Decision-aid)

"My decision to have an elective caesarean was taken on the basis of the baby's size and my medical condition at the time. These two factors meant that the risks of a trial of scar became greater than the benefits..." (2005 Decision-aid)

This overt weighing up of the 'risks and benefits' and applying this in the context of their individual situation is important and a potentially valuable aspect of the decision-aid. Knowledge in itself may not be useful unless it can be applied to an individual's own set of circumstances, needs and values. The decision-aid may have
encouraged women to think in these terms and the evidence suggests that this may be an effective aspect of the strategy.

5.2.2 Information as support to decision-making

McClain's work in the 1980's raised the question about the extent to which risk-benefit assessment played a role in the context of making choices about childbirth services and providers of care (McClain CS, 1983). The concept of bolstering (Janis IL & Mann LJ, 1977) applied to the context of childbirth, explains the tendency for women to play up the advantages of one alternative course of action to reduce conflict and avoid post-decision regret (McClain CS, 1983). This bolstering also involves downplaying the benefits of the alternatives and emphasising their risks (McClain CS, 1983). The risk-benefits assessment of options using the bolstering hypothesis mean that women would articulate choices in terms of the least 'risky' and most attractive.

The results of the RCT, although it was not attempting to investigate the phenomenon of bolstering, lend some support to these decision behaviours. In the example below, the risk of ruptured uterus, although numerically small is stated as a significant risk in the justification for preferring caesarean section. The reflection on past negative experience adds weight to the likely event of further negative experiences so the caesarean section is the 'least risky' alternative in this case.

"I feel that having a caesarean birth would avoid the risk of having a rupture uterus and the bad experience I had with my first one. I just don't want to take the risk." (#1028 Decision-aid)
Women may use this process as a coping strategy. In fact some women referred to their decision as a way of coping. In stating why she had chosen caesarean section this participant said;

"Convenience, save strength of when the baby comes – Better coping strategy"(#2087 Decision-aid)

and another who selected caesarean to reduce stress;

"Feel that is the best for me and my husband. Less stress involved”

(#2045 Control)

The role of the decision-aid in reducing decisional conflict (see also section 5.1.2) may have assisted women in ‘bolstering’ as a strategy to reduce conflict. Women may have been able to use the information on risks and benefits to assist them to bolster their preferences, however the extent to which this phenomenon occurred in the study is speculative

5.3 Effect of the decision-aid on Decisional Conflict

Decisional conflict has previously been established as a potentially important measure of capacity for decision-making. The decisional conflict score (DCS) has been used extensively in decision-aid trials and has been documented to be sensitive to changes following decision-aid interventions (O’Connor AM, 1995; O’Connor AM et al., 2002). Women in the decision-aid group in this study demonstrated lower DCS scores and experienced a greater reduction in DCS scores than women in the control group (Table 4.20). Women in the control group at site 2, actually experienced a small increase in decisional conflict (0.20), although this was not statistically significant. The extent of reduction in DCS was also found to be greater for women in the decision-aid group (Table 4.23), whereby 36.2 percent of women who received
the decision-aid experienced a greater than one standard deviation decrease in DCS score compared with only 13.1 percent of women in the control group. Stepwise logistic regression analysis (Table 4.22) confirmed the importance of the decision-aid in reducing the level of decisional conflict.

Women who had received the decision-aid were less likely to be unsure about their birth choice and were therefore more likely to be in a position of having made a choice consistent with personal values and expectations, verified by the factors measured by the DCS. The factors of Certainty, Feeling Informed, Values Clarity, Decision Quality and Feeling Supported, contained within the decision-aid were all improved for the decision-aid group compared with the control group. In particular the informed subscale was the most affected. This is consistent with the data on knowledge scores, because the questions within the DCS on being 'informed' reflect the perception of the individual about whether they felt informed about the risks and benefits. The women who received the decision-aid not only demonstrated an increase in knowledge, according to the knowledge test, they recognised that they felt informed about their choice and were also more certain about it. This becomes important again when the issue of adherence to decision is considered below.

These findings are also consistent with other decision-aid studies in that when DCS have been utilised previously, most consistent results were found in the DCS subscale for feeling informed (O'Connor AM et al., 2002). The reduction in feeling undecided has also been favourable in previous decision-aid studies, whereby decision-aid groups were less likely to be undecided than control groups (O'Connor AM et al., 2002).

In further investigating whether the level of decisional conflict was associated in any way with adherence to Survey 3 choice (verified by the medical record of birth
outcome), DCS scores for Survey 3 and Survey 4 were analysed for 134 women who had made a choice at Survey 3 (excluding those who were still 'unsure'). Overall the DCS scores for both the 111 women who adhered to their choice (that is their Survey 3 choice was consistent with the stated mode of birth) and the 23 who did not adhere, were the same at Survey 3. Therefore the DCS at Survey 3 were no different for women who stayed with their choice than women who did not. At survey 4 the mean score was 1.78 for the group that did not adhere and 1.90 for the group that did adhere, although this was not likely to be clinically significant and was not statistically different (p =0.38). This indicates that although the DCS is an effective measure of decision state prior to a decision being acted upon, the DCS may not predict a tendency to adhere to a decision. This issue of adherence to choice is important in terms of outcomes of decision support and will be raised again in section (5.5) in the discussion about consistency between preference, choice and outcome.

5.4 Effect of the decision-aid on women's preference and choice

The decision-aid evaluated in this study promotes the idea that women are free to consider both options for birth in a balanced and non-biased form. This is an important distinction when determining the impact of the decision-aid and most specifically, knowledge on preference and ultimately choice for mode of birth. When 'free' to choose between mode of birth, or at least encouraged to via a survey, women were not significantly more likely to choose one mode of birth over the other on the basis of increased knowledge of the risks and benefits of each option for birth.

Women in the decision-aid group were less likely to change their preference/choice between Survey 2 and Survey 3 and more likely to have made a choice by Survey 3 if unsure at Survey 2 (Table 4.25, Figure 4.4, Table 4.29), although this difference in pattern of preference was not statistically significant. Women's pattern of preferences for mode of birth do not appear to be strongly related to whether they received the decision-aid or not, but were influenced significantly by the study site.

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Preference for elective CS was higher at site 1 than site 2 at all survey points. Particularly noteworthy is the increase in support for elective CS at site 1 between Survey 2 and Survey 3 (27.1% to 40.0%). Almost twice the percentage of site 1 women preferred elective CS when compared to site 2 at Survey 3 (40.0% versus 22.6%) (Table 4.26). It should also be noted that more site 1 women preferred TOL than elective CS (43.8% versus 40.0%) even at Survey 3. Similarly, support for TOL was consistently higher at site 2, although support for TOL at site 2 overall decreased (64.5% to 56.5%). Site 2 women also had a higher number of women in the unsure category overall, and although this increased at Survey 2 (21.0% to 32.3%), it fell back to the Survey 1 level by Survey 3.

Study site 1, whose baseline VBAC rate was lowest, therefore shows movement away from TOL during the pregnancy. Almost 30 percent of the women who preferred TOL at Survey 2 had either changed their mind or became undecided. This change seems to be unrelated to use of the decision-aid (Table 4.27a). Those choosing elective CS at Survey 2 generally stayed with this preference. Most undecided women made up their mind, and were more likely to choose elective CS than TOL, a change which was partly offset by relatively large number of TOL women becoming undecided.

Stepwise regression analysis (Table 4.30) revealed that the study site was the strongest predictor of change in preference. Women at site 1 were more likely to change from their Survey 2 preference than women at site 2. These site effects will be raised again during discussion on actual birth outcomes, because there are clearly factors associated with the actual site practices that were impacting upon women’s process of decision-making.

It is important to note that women’s preferences for TOL at 36-38 weeks (43.8% at site 1 and 56.5% at site 2) (Table 4.26) were quite different to the pre-study actual
baseline rates for mode of birth provided by the hospitals (20% and 80% respectively). However, the eventual outcomes in terms of actual mode of birth (Table 4.32) were more consistent with these pre-study rates (38.7% and 70% respectively). Also, at site 1 in particular, it is likely that the TOL rate is actually inflated by women who spontaneously went into labour before the date booked for their elective CS, and were recorded as having experienced labour prior to CS. Therefore, the rates for mode of birth reflected common practice at the study sites in terms of whether they had initial (pre-study) high TOL rate or high elective CS rate. This illustrates the potential impact of organisational culture and clinical practice patterns on consumer decision-making and the inhibiting effect this could have on true consumer choice.

Issues such as these and their potential association with organisational culture are discussed in work on “informed choice leaflets” for pregnancy, published in the UK in 2002. A choice about various options of care, including ultrasound and electronic foetal monitoring in labour, often reflected the ‘norm’ of the health service or ‘local obstetric culture’ (Stapleton H et al., 2002). This same behaviour described as ‘framing language’ to ensure the ‘right choice’ may apply to the process of decision-making in Australian obstetric services as the findings of this UK study appear to be consistent with the strong effect of research site on the choices women made about birth after caesarean in the current trial.

It could be argued that site factors observed in the study merely represent consumer demand within the two different area health services. Survey 1 preferences for TOL were lower at site 1 than site 2, declining further at site 1 up to Survey 3. These preferences may reflect demographic or sociocultural characteristics of women attending these hospitals, and expectations already formed about birth after CS. Information exchange that occurs between women within the same age cohort (for example those attending local schools, playgroups, and through social networks) may
of course influence opinions about mode of birth as the pregnancy progresses. In addition, advice received immediately after the primary CS and the resultant preference for future birth shaped at that time, could establish expectations for subsequent pregnancies. The ideal time for receiving information about birth options after CS has not yet been established and future research in this area may be warranted.

5.5 Consistency between preference, choice and outcome: site effects

Decision-aids have been shown to be effective in improving knowledge of healthcare options and reducing decisional conflict associated with choice, however adherence to decisions and improvements in health outcomes associated with decision-making have been identified as gaps in research (O'Connor et al., 2002). Consistency between women's preferred choice for mode of birth and actual mode of birth experienced was significantly predicted by study site. If women preferred an elective CS, they were more likely to experience elective CS if they were at site 1 where the CS rate was highest. If they preferred TOL they were more likely to experience TOL at site 2 where the highest rates of TOL were experienced (Table 4.23). Therefore of women who stated their 'choice' as TOL (Survey 3) at site 1, only 66.7 percent actually experienced TOL. This is compared with 88.2 percent of women at site 2 who chose TOL and experienced TOL. However if women chose elective CS, only 64.3 percent experienced elective CS at site 2 compared with 84.0 percent of women at site 1 who had chosen elective CS at Survey 3.

Adherence to birthmode choice at Survey 3 in terms of actual birthmode experienced was found to be significantly related to knowledge. Women who had higher knowledge scores at Survey 3 were much more likely to adhere to their Survey 3 choice (Table 4.34). What is interesting about this regression analysis however, was the findings that after controlling for knowledge, the decision-aid group were less
likely to adhere to their Survey 3 choice. The interaction between knowledge and the
decision-aid was evident but there is insufficient evidence to state that the decision-
aid increased adherence to choice.

The issue of whether women were making ‘informed choices’ or merely stating
‘informed preference’ defined as *a verbal or written statement referring to the type of
birth that an individual considers to be most desirable or favourable to them*, is
relevant to this discussion. Although the intention of the Survey 3 birth choice
questions was to elicit the choice women had made, evidence of incongruence
between ‘choice’ and mode of birth could be interpreted that women were given the
opportunity to state preference, rather than to make a choice about the birth they felt
was best for them.

Incongruence between choice and outcome evident within the two study sites,
challenges the notion of true consumer involvement in healthcare decisions and
questions the existence of genuine support for informed choices for women in
pregnancy. It is interesting to recall the ACOG recommendation in this context, that
women who have experienced one previous caesarean and are eligible according to
their criteria, should be provided with an opportunity to weigh the risks and benefits
of VBAC versus elective caesarean, and to make an informed decision in consultation
with their doctor (American College of Obstetricians and Gynecologists, 1999).
Australian reports into childbirth practices have also promoted the notion of
consumer involvement and informed choice for decisions in pregnancy (Senate
Community Affairs References Committee, 1999). The reality in practice would seem
to be very different to rhetoric found in current policy documents.

It appears that women in the control group receiving ‘routine’ pregnancy care were
not as well informed about their options as the intervention group, given limited
improvement in control group knowledge during their pregnancy (at Site 2 there was

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no improvement) (Table 4.9). Despite this, preferences about mode of birth, when formed, were more likely to be adhered to if they were aligned with the practice patterns of the specific hospital site (Table 4.32). This suggests that practice patterns and perhaps organisational culture are important determinants of outcomes and may undermine women's preferences if the preference is not aligned with the common practice(s) of the study site. The extent to which this is the case is currently speculative, as it is possible that some women could simply have changed their preference, or clinical factors could have arisen, between 36 weeks gestation and the birth that did not appear in the medical record.

There are several possible theoretical reasons why the decision-aid was effective in increasing knowledge of the risks and benefits of trial of labour and elective caesarean section, yet this did not translate into systematic changes in the pattern of birth mode preference or adherence to choice. Firstly, although statistically significant, the size of the effect on knowledge may have been insufficient to lead to changes in preference. Secondly, the fact that the decision-aid was deliberately presented in a balanced, non-biased form may have tended to emphasise that the choice between TOL and elective CS is finely balanced, with pros and cons for both options. Hence, although individual women frequently did change their preference, the aggregate effect did not appear to favour either birth option. Thirdly, timing of the decision-aid may have been a factor, whereby the intervention may have been more influential if initiated earlier in the pregnancy. Finally, written comments made by women on their surveys during the study suggested that data regarding birth choice may have been influenced by their practitioners in some cases, in the sense that women felt compelled by study site factors to express preferences which did not reflect their true inclinations.
The statement that they did not feel they had a choice at all was made by a number of women in the study; 

"I've been told the choice is not mine. I have been told the decision is not mine as I don't have Private Health Insurance. The decision will be made at 36 weeks by an obstetrician. I strongly would like another caesarean due to the stress my last baby went through. I wish the decision was mine"(#1038 Control)

On a subsequent survey (at 36 weeks) this same participant stated...

"I'm afraid of my scar from previous surgery ripping. I've been told to have a trial of labour-not asked. It hasn't been my decision. I would like a repeat caesarean but have been told by Dr's I must have a trial of labour first. I've been told there's a 50% chance (of successful vaginal birth) which I don't feel is enough. I feel a caesarean birth is best for me...I'm afraid I will go through a painful labour and then end up have a caesarean anyway" (#1038 Control)

It is interesting to note that in this individual case, medical records revealed that her fears were realised and she underwent an emergency CS for failure to progress and foetal distress. Her postnatal satisfaction score was 1/10 and she expressed unhappiness about her birth experience.

The suggestion that medical practitioners in each of the study sites were inclined towards either VBAC or ERCS, and thus influenced decisions according to their preferences, rather then the preferences of women, has some support in the literature. Barriers to patient participation in healthcare decision-making have been suggested to include the complex language of doctors which is difficult for patients to understand or use for decision-making, a tendency for doctors to dominate discussions with a
limited capacity for listening to patients and patients being discouraged from asking questions (Molenaar et al., 2000). Informal discussions with participants in this research support these ideas, whereby some women felt they had been discouraged from asking questions and felt that they did not have a choice at all. Barriers clearly exist and in order for effective strategies to be developed to assist in the process of patient participation, barriers need to be more clearly identified.

The potential impact of organisational culture and clinical practice patterns on consumer decision-making and the inhibiting effect this could have on true consumer choice is important. The notion of the impact of societal culture on choice for mode of birth has been suggested in an Australian context (Walker et al., 2004). Community perceptions or cultural norms portray caesarean section as an accepted “easy and convenient” way of giving birth (Walker et al., 2004). However the result of this RCT emphasises the greater influence that not only individual doctors or midwives may have in the decision process, but the impact that actual hospital site, area health service or organisational culture has in this decision.

Women’s views and preferences regarding TOL versus ECS have been found previously to impact upon mode of birth chosen (Kline & Arias, 1993; Mould et al., 1996; Fraser et al., 1997). A range of personal factors such as previous birth experience, opportunity for resumption of ‘normal’ social roles and outcomes extended to relationships, child-care, employment and social activities has been identified (McClain, 1985), however, little has been documented prior to this research about the role that objective information and knowledge play in the formation of preferences for birth. This study is consistent with previous research that emphasises a range of factors are at work, but further suggests that knowledge and information do appear to impact significantly on women’s final birth preference, as well as emphasising the important role played by healthcare services and providers in arriving at this decision. It seems that women are capable of forming informed
opinions and informed preferences based on evidence-based information about their options. However it may be that practitioners are not equipped to facilitate informed choices when the choices do not align with their own personal preferences for care or the perceived organisational preferences for particular modes of birth.

The idea that knowledge is not necessarily a 'proxy' for informed decision-making has been raised in the context of a study which aimed to develop a reliable measure of informed choice, associated with prenatal testing for Downs Syndrome (Michie et al., 2002). Decision outcome regarding prenatal testing was best predicted by attitude components, rather than those of knowledge. The importance of incorporating consumer attitudes toward decisions into measures of informed choice are thought to be important (Michie et al., 2002). In the context of this thesis, the attitude of the women themselves is not necessarily a good indicator of informed choice. Perhaps the key to informed choice in terms of consistency between choice and outcome for birth after caesarean as is the focus of this RCT, is the attitude of hospitals and practitioners within them as they appear to be crucial factors in determining a women's choice for birth.

In acknowledging the relevance of women's decision-making about their healthcare for the nursing and midwifery professions, Ruth Witmann-Price (2004), suggests that decision theories, such as those underpinning decision-aids do not account for the societal norms that can affect individual value systems in a very oppressive way. The notion of oppression and the struggles of emancipation are raised as barriers to shared decision-making in the context of women's healthcare. The idea that historically healthcare decision-making reflects social norms of medical paternalism is raised again here as an important factor in the movement to a paradigm of shared decision-making between 'patient' and provider of care (Witmann-Price R, 2004). Midwifery 'paternalism' is as much an issue as medical paternalism in this context and the negative comments directed towards women who choose caesarean section rather
than trial of labour have been raised by women in the study. Receiving such comments appeared to have a negative impact on women’s perception of the pregnancy and birth experience, and in some cases led to feelings of ‘failure’, such as in the comment “…midwives make me feel that I am a failure and shouldn’t want a caesarean” (#2014 Decision-aid). The already difficult decision about mode of birth was made even more challenging if women felt they were not supported by their midwife, doctor or even their family.

One of the key components to an ‘emancipated’ decision-making process is a ‘Flexible Environment’ (Wittmann-Price, 2004). In the true sense of this idea it would involve ‘free’ choice and a ‘non-judgemental’ support of choice for healthcare options (Wittmann-Price, 2004). Without this flexibility, the improvement in personal knowledge would be lost to other powerful factors such societal norms and lack of empowerment. The subjugation of knowledge-based choices to the influence of hospital culture and practitioner attitudes is suggested by the findings of this RCT. This is consistent with the similar issues raised by Kirkham and Stapleton (2004) in their discussion on the culture of maternity services in Wales and England as a barrier to informed choice (Kirkham & Stapleton, 2004). Although the language of informed choice was adopted within the maternity services, the ‘local’ practices were found to be rigid so that an informed choice was synonymous with the ‘right’ choice according to local established practices (Kirkham & Stapleton, 2004 p. 131).

This concept of power imbalance in healthcare decision-making is not new and was raised as an important factor in limiting success of tailored ‘informed choice leaflets’ in a recent UK study (Stapleton et al., 2002). The availability of information was not sufficient in itself, and the information was withheld in cases where for example, obstetricians defined whether or not a choice should be available. A conclusion that power imbalances need to be addressed to further enhance such strategies (Stapleton et al., 2002) is consistent with the findings of this study. Increasing practitioner
understanding of how to facilitate a process of ‘shared’ decision-making, given time constraints and associated work pressures, is important if healthcare services wish to move from a state of ‘informed compliance’ to genuine informed choice (Stapleton et al., 2002).

This raises the question about criteria for judging the effectiveness of decision-aids in the context of childbirth. The decision-aid in this RCT was effective in improving knowledge, reducing decisional conflict and facilitating a process of decision-making, however it may be inappropriate to extend measures of effectiveness to the level of outcome. Important and influential determinants related to practitioners as well as organisations within which they practice are possibly beyond the scope of a decision-aid.

An alternative view might be that adherence to choice as an indicator of informed choice is not appropriate for the clinical context of birth after CS. There is a level of uncertainty in pregnancy, where circumstances can change including immediately prior to the birth. In some instances this may suddenly restrict birth options for women, for example in the case of a medical contraindication to TOL such as placenta praevia. Although the issue of medical complication was not evident in the available medical record data for the women in the study whose outcomes differed from their Survey 3 choice, it still raises the notion that perhaps an informed choice must also be a flexible one in the context of childbirth. The value in being well informed of the knowledge of the risks and benefits of birth options, and being in a position to adapt to changes in circumstance or new information, could enable women to move from one mode of birth to the other without affecting other decision factors such as increasing levels of decisional conflict or reducing satisfaction with the birth experience. This is an issue worthy of future research in terms of the effect of decision-aids on enabling consumers to adapt to changes in decision context.
5.6 Effect of the decision-aid on satisfaction with the birth experience

Satisfaction with the birth experience was assessed as a means of identifying a possible association between being more informed as a result of using the decision-aid and feelings about the overall experience of birth. Although some studies of decision-aids have used this as a measure of assessing the extent to which the decision is consistent with personal values, this was not the purpose of using satisfaction measures in this RCT. It has been suggested in recent literature, that satisfaction is a measure to be used cautiously in evaluating effectiveness of decision-aids because the notion of satisfaction is multi-faceted and it can be measuring a whole range of factors that impact upon a perception of being satisfied, rather than aspects associated with making decisions (Kennedy A, 2003). This was thought likely to be the case for birth, as many factors not only impact upon the decision, but influence the perception of the experience and outcome. Exploration of other factors that may have been associated with the satisfaction score revealed that there was no relationship between satisfaction scores and the use of the decision-aid. However mode of birth was very important.

Findings regarding satisfaction with the birth experience are therefore consistent with other VBAC studies. Emergency CS rated lowest in terms of satisfaction with the birth experience (Abitbol et al., 1993). This was particularly the case in Site 2 where TOL was highest and where there was evidence (Table 4.35) that some women may have undergone TOL whilst having a preference for elective CS. Elective CS rated well overall, although highest levels of satisfaction were reported by women who achieved normal vaginal birth (Table 4.35). Despite this, significantly lower levels of satisfaction among women who experienced either instrumental birth or emergency CS meant that overall average satisfaction levels were higher for elective CS (Table 4.35). This indicates that if a hospital is unable to achieve high normal vaginal birth rates for TOL, then it may well be the case that, on average, elective CS will lead to the highest levels of consumer satisfaction.
As an adjunct to the analysis the TOL success rate (VBAC) was calculated separately for each site using medical record data, and varied substantially by site. The VBAC success rate at site 1 was much lower (47.8%) than at site 2 (74.3%). Given that the elective CS rate for site 1 was 59.6 percent, only a small number of women actually achieved a vaginal birth at this study site (19.3%) compared with 51.0 percent at site 2. Current evidence suggests that vaginal birth rates should be in the range of 60 to 80 percent for women who choose VBAC (Appleton et al., 2000), yet site 1 was only able to achieve a rate of less than 48 percent, compared to over 74 percent at Site 2. Rather than accepting this, it is suggested that the focus, should move to the notion of women-centred care, and in supporting women who choose TOL. By improving rates of vaginal birth, and especially ‘non-instrumental’ birth, for informed women who choose VBAC, overall levels of satisfaction can improve. More detailed hospital data about organisational practice patterns and labour outcomes may be required for women to make fully informed decisions about birth after CS. Given that this appears to change from year to year, it presents a challenge to those monitoring birth data and emphasises the importance of regular revision of decision-aids if used in clinical practice situations.

5.7 Consumer participation in healthcare decision-making

These research findings regarding the effectiveness of the decision-aid in the process of healthcare decision making are consistent with the decision-aid literature in terms of improvement in knowledge and reduction in decisional conflict (O'Connor AM et al., 2002). The notion that this is clinically significant cannot however be confirmed in the context of making choices about birth after caesarean. It is not enough to merely inform and increase comfort with choice without increasing the capacity to follow through with actual choices made. This research has not established that a decision-aid improves long-term persistence with choices because the decision-aid in itself does not tackle the complex decision environment of obstetric care. Women are themselves aware that their practitioners attempt to influence their choices and often
allow their biases to show. This leads to frustration and uncertainty for those women who wish to challenge and negotiate with caregivers.

The following quotation from Survey 3 illustrates the impact that such frustration can have on individual women who do not feel support in their choice for birth...

"I was sure I was going to trial VBAC. During my last appointment the Dr stated that I would be having a planned caesarean...I cried for about 24hrs after this appointment and now can hardly talk about the uncertainty..." (#1047 Control)

This woman actually achieved a normal vaginal birth and at Survey 4, upon reflection...

"...I demanded he re-read his notes from my last labour... it helped work out what went wrong last time (my son was transverse)...This labour felt good. There was pain but it was purposeful...I can't believe what a difference a good start makes to recovery and coping with a new baby ...I was well informed and felt confident about me and my body's ability to do this...which was why I felt able to challenge the doctor..." (#1047 Control)

It must be recognised that 'pressure' is not only directed from caregivers but family and friends. The degree of support for decision-making from those who are 'significant others' clearly has an impact on decision-making as well...

"I feel extremely satisfied and proud of myself. I feel very glad and pleased that I stuck to my birth choice as I did get a lot of pressure and negativity from family and friends about my decision to have a vaginal birth" (# 2030 Decision-aid)
The extent to which family and friends contribute to decisions made about birth is not quantified in the study, although it is an important issue to consider. The decision-aid in some cases assisted participants to deal with non-supportive friends and relatives. The concept of feeling supported in making a decision features in the DCS, however this was the dimension where least impact was made by the decision-aid compared with other dimensions such as 'informed'.

5.8 Limitations of the research

Sample size for the study was calculated for the main outcome measures associated with knowledge and preference for mode of birth. In the process of analysis a number of other issues were identified as important, but small numbers may have limited the strength of analysis. Although attempts were made to model the change in preferences over time according to research site and change in knowledge, the small numbers in each group meant that there was no statistical strength in those aspects of analysis.

It is important to note that the baseline rates used in the sample size estimates were provided by the research sites and were determined by retrospective information on mode of birth, using medical record data. It is therefore possible that changes in policies and practices at each research site could have led to changes in underlying rates of TOL and CS over the study time period. This may have had an impact upon the power of the sample size to detect the changes proposed in women’s preference for birth.

It was valuable that all women in the intervention group received their decision-aid and were informed about how to use it, given previous difficulties experienced by other researchers where practitioners were inconsistent in supplying educational material to participants (O’Caithain et al., 2002). It was not possible to detect the
extent to which women utilised the decision-aid booklet or whether they shared this information with other women they knew in the clinical trial. Information from surveys collected during the study did not suggest that contamination had occurred, but this was still possible and a limitation of using randomisation within research sites rather than of research sites.

When the methodology for the RCT was established, there were a number of common and validated outcome measures used for the evaluation of decision-aid effectiveness. One of those was the use of anxiety measures (such as the STAI) to assess iatrogenic effects of decision-aids when compared with usual care. Since that time a systematic review of the literature on measurement of the effectiveness of decision-aids has been conducted. The systematic review concluded that in nine of the ten RCT's reviewed that included measures of anxiety, none demonstrated an increase in levels of anxiety from exposure of decision-aids when compared with controls (Bekker et al., 2003). Therefore they assert that anxiety scores are not a suitable measure of iatrogenic impact of decision-aids and in the event of an increase in anxiety, this may indicate a desirable effect in that it may be due to greater arousal associated with individual engagement in the decision-making process (Bekker et al., 2003). The inclusion of anxiety scores are thus still thought to be potentially useful for further understanding the process of decision-making and the relationship between anxiety and decision-making strategies. This would be need to be reflected in the analysis adopted for future studies with an important proviso that measures for effectiveness of decision-aids need to reflect the purpose of the specific decision-aid intervention.

Levels of anxiety in the participants for this study are consistent with the conclusion of Bekker et al that women who received the decision-aid did not have increased levels of anxiety when compared with the control group (Bekker et al., 2003). The use of anxiety within this RCT was in line with detecting iatrogenic effects of the
decision-aid to satisfy concerns from ethics committees that information may increase levels of anxiety and impact on women participating in the study in a negative manner. The decision-aid neither increased or decreased anxiety for women and therefore satisfied such requirements.

There was no validated tool for assessment of knowledge for the specific decision-aid developed within this study, and the issue of birth after caesarean. For this reason, the knowledge survey was developed simultaneously with the decision-aid and based specifically on content included in the decision-aid. At the time the study was designed, this was the recommendation of the Ottawa Health Decision Centre developers in terms of facilitating content validity. The knowledge survey was based on the format of generic knowledge surveys utilised by Annette O'Connor and associates at the Ottawa Health Decision Centre, and those used in assessment of Hormone Replacement Therapy research (O'Connor AM et al., 1998). The questions were posed as statements about birth after caesarean and women were asked to circle whether or not they thought these to be true or false or that they were unsure.

The knowledge survey was piloted at the time the decision-aid was piloted and the survey refined to more closely represent the content of the booklet. Cronbach’s alpha was calculated for both Survey 2 and Survey 3 results of the knowledge test as an estimation of internal consistency (refer section 4.2.1). Although is was thought to be satisfactory for the purposes of this research, it would not be immediately transferable to other research on decision-aids. Therefore the knowledge survey developed for this research would be of limited general value for assessment of other decision-aids in the future. There is still no generic knowledge test for decision-aids because each decision-aid will have its own content and it will still be a focus of developers to consult with a range of expertise and ultimately decide which pieces of information are important to check for understanding using such a test.
The measurement of knowledge was a crucial element of the research, in terms of decision-aid effectiveness, and therefore caution regarding the clinical significance must be raised. The clinical impact of creating a capacity to answer questions correctly may be insignificant when compared to the impact of other powerful factors in decision-making and will have little relevance in the future if environmental and cultural factors remain the same.

It is important to note that the terms preference and choice have both been used by women in the study to indicate which mode of birth they thought was best for them. It is important to acknowledge that for some women, a response to Survey 3 may have been interpreted as an exercise of stating a preference for mode of birth, or the most favoured option for birth, with a number of caveats reflecting that this preference/choice could change prior to the birth of the baby.

"Still hoping for a vaginal birth but understand if not progressing well then I should have a caesarean delivery and I'm happy with either. Depending on final position of the baby the hospital may book me in for elective caesarean which would be a bit disappointing but absolutely fine if it means lower risk". (#3011 Decision-aid)

For others it meant documenting the choice they had made about which mode of birth they felt was best for them.

"My decision to have an elective caesarean was taken on the basis of the baby's size and my medical condition at the time. These two factors meant that the risks of a trial of scar became greater than the benefits..."  
(#2005 Decision-aid)
Therefore, although the term choice rather than preference was used for Survey 3, due to possible individual interpretation of the terms preference and choice, different levels of commitment to follow through with that choice may have been missed. Ultimately this could have been reflected in whether women adhered to their Survey 3 choice or not. However, the structure of the question used, meant that it was not possible to assess the extent to which variation in strength of commitment to choice occurred for Survey 3 responses and whether the choice reflected practitioner recommendations or a genuine consumer preferred choice.

5.9 Summary

The development of consumer-centred strategies such as decision-aids is important because they are potentially effective in assisting consumers to make informed preferences and ultimately choices about their options for care. Decision-aids demonstrate a capacity to put the 'informed' into informed consumer decision making and in making women more comfortable with their decision, as suggested by reductions in decisional conflict. However, the effect of this is blunted in the absence of effective strategies to assist organisations, and the practitioners within them, to develop a capacity to accept these decisions made by well informed consumers, even if they do not align with the establishment. It is also possible that the medicolegal environment in which modern obstetrics is practiced influences the ability of practitioners to accept patient decisions that do not conform with their own view of best practice. Further work needs to be done to examine ways in which the power of the consumer in decision-making within the doctor-patient relationship can be enhanced. These and related issues arising form the thesis will be discussed in Chapter 6.
6.1 Women's choice: reality or rhetoric?

This final chapter will focus on the experiences of women making choices for birth after caesarean section (CS) in the wider context of contemporary Australian healthcare. Significant changes have occurred in terms of childbirth experiences for Australian women with the continuing trends of increased use of a range of interventions in birth. Caesarean section rates in particular have continued to rise and the most recent published figure for NSW of 26.5 percent CS rate in 2003, represents a 6.8 percentage point increase from 19.7 percent in 1999 (NSW Department of Health, 2004) at the time when this research was first conceived. The social context of pregnancy and birth is an important factor here as well as health policy changes, increasing the use of private health insurance for example, which can effect women's birthing expectations and experiences (Shorten & Shorten, 2004). Media coverage of birthing issues, as well as ongoing research in the area of birth after CS, and research relating to informing consumer choice, will be addressed as the wider context within which the results of this study can be placed.

6.1.1 Caesarean section in the media

Over the time this research was conducted, the issue of CS has received ongoing media attention and been the subject of continuing debate. The issue of risk and the safety of ‘natural’ versus ‘surgical birth’ has been discussed alongside personal accounts from women and doctors about why CS was best for them or alternatively why they chose vaginal birth. In February 2004, for example, The Sydney Morning herald ran a story entitled “When push comes to shove”, raising the issue of birth after CS. The article emphasised the notion that individual women will prefer different modes of birth for very different reasons. Some of the
fear women feel comes from not being supported in their choice as is noted in a quotation from mother Jennie Freedman about her birth choice...

"Once I had researched and processed the risk of uterine rupture, had to move on and let it go...I was more scared an obstetrician would drop in and pull me in for an emergency caesarean at the drop of a hat" (Keen, 2004 <05/02/04>)

In answering research questions associated with the process of decision making for women about birth after CS, the first underlying assumption was that women were in fact making a choice. The notion of consumer demand for CS for instance raises the picture of women empowered to state their choice and doctors or midwives ready to comply. Although the literature provides a mixed account of women's involvement in decision-making about mode of birth, recommendations from midwifery and obstetric professions, as well as various government organisations, to facilitate informed choice (National Health and Medical Research Council, 1996; American College of Obstetricians and Gynecologists, 1999; Senate Community Affairs References Committee, 1999), reinforce the notion that most women are actively involved in decision processes about childbirth. The extent to which recommendations mirror clinical reality is raised, due to the evidence of incongruence between choice and outcome for many women participating in this RCT.

Early development of this area of study initially arose out of a personal concern over high rates of caesarean section in Australia and more importantly, wide variations in clinical practices surrounding CS and childbirth in general. Given the significant clinical, social and economic implications of unnecessary surgical interventions in childbirth, this study sought to address the need to further examine the decision-making process surrounding method of birth from a consumer perspective. This was assuming that consumers were actively involved in making the decisions about what is best for them. The study sought to address the second underlying assumption, that women if medically eligible to choose,
would select more ‘natural’ methods of birth over surgical birth if their awareness
of the relative risks and benefits increased. Hence, this study aimed to determine
whether improving women’s knowledge about the risks and benefits of options
for birth after CS could impact upon the decision made about mode of birth.

In the first instance it was proposed that an educational decision-aid could reduce
the rate of CS by increasing the selection of attempted vaginal birth or TOL in
study site 1. In designing this study, it was also acknowledged that informed
decision-making may in fact reduce the rate of TOL and increase uptake of
elective CS in study site 2. This study sought to determine the impact of
knowledge on the process of decision-making during pregnancy and to investigate
the potential value of decision-aids in the context of pre-natal care. In examining
the impact of a decision-aid on women’s preferences for method of birth and
comparing this to actual birth outcomes in order to identify the extent to which
birth outcomes align with women’s choices and expectations, some important
issues arose.

Decision-aids as ‘stand-alone’ aids can contribute to decision-making through
increasing knowledge, reducing uncertainty and assisting women to put the pro’s
and con’s into perspective according to important personal factors such as past
experience, values and needs. This however is of limited value if the practitioner
is not prepared for an inclusive consumer relationship. If expectations of the
consumer differ to those of the practitioner, then this imbalance creates a situation
of challenge for both parties. Therefore strategies are required that can assist
practitioners to develop skills in decision-making alongside their consumers.
Clinical Practice Guidelines such as those developed in the UK on CS will help
inform practitioners as well as consumers regarding risks and benefits of birthing
options. (National Institute of Clinical Excellence (NICE), 2004). However
without an effective strategy in place, the informed part of decision-making is of
little value. Interactive computer-based decision-aids that can involve both
consumers and their practitioners at the same time, rather than separately, may
deserve future research attention. A series of paper-based practitioner worksheets and associated resources are already being developed by the Ottawa Health Decision Centre (O'Connor & Jacobsen, 2004) in response to a need for practitioner support. The problem that remains is in whether practitioners will want to utilise such resources and how they deal with situations where their beliefs conflict with those of the women and they anticipate a medico-legal conflict of interest.

6.1.2 The changing evidence base for birth after caesarean?

The fact that caesarean section has received media attention throughout the period of this research, may have in some way influenced the decision-making by the cohort of women participating in the study. As already acknowledged, print media, including magazines and newspapers, as well as current affairs television, have showcased women’s stories of decision-making in the context of primary caesarean as well as birth after previous caesarean section. Over the period of this research, caesarean section rates in Australia have risen from 20 percent in 1999 (Senate Community Affairs References Committee, 1999; Nassar & Sullivan, 2001), to an all time high of 27 percent in 2002 (Laws & Sullivan, 2004). Rates of repeat caesarean have risen to 79.4 percent with only 20.3 percent of women achieving a vaginal delivery after previous caesarean (only 16.6% of women achieved spontaneous vaginal birth after previous caesarean) (Laws & Sullivan, 2004).

Adding to the support of CS over TOL, a recent report in the Sydney Morning Herald, entitled “Caesareans, The Unkindest Cut”, reports on a US study published in the New England Journal of Medicine (Landon et al., 2004), that concluded the risk of trial of labour was greater than risk of elective CS. The newspaper article stated that...
"Responsible doctors will now advise women who have had caesareans of the study. Rightly apprehensive mothers to be, cautious doctors and risk averse health institutions now have a compelling reason to make sure that once a caesarean always a caesarean." (The Sydney Morning Herald, 2004:10).

This is the latest of a series of papers published in the New England Journal of Medicine regarding birth after caesarean, that has encouraged a reconsideration of the idea of choice for birth after CS. The issue of ‘risk’ of TOL is consistently raised within these papers (McMahon et al., 1996; Lydon-Rochelle et al., 2001; Landon et al., 2004). What does this ‘new evidence’ add to the decision about birth after caesarean section? Has trial of labour became a greater risk than elective repeat CS and therefore should women no longer be offered a choice for birth after CS?

In considering this question, in light of the RCT, it was interesting to firstly note that the rate of rupture of the uterus reported in the new study, was still less than 1.0 percent (0.7%). The rate of still birth after 39 or more weeks was only increased marginally for trial of labour women and the intrapartum and neonatal death rates were apparently similar for trial of labour and caesarean section groups (Landon et al., 2004). The majority of the cases of hypoxic-ischemic encephalopathy of infants were associated with rupture of the uterus (7 cases in 17,898 TOL) with no cases reported for the elective caesarean group. An important omission in the findings is that there is no reported data on the type of outcome for vaginal birth and whether or not instrumental birth contributed to any other adverse outcomes reported for trial of labour. This weakens their work considerably. The suggestion that “risk of an adverse perinatal outcome at term among women with a previous caesarean delivery of approximately 1 in 2000 trials of labour (0.46 per 1000), a risk that is quantitatively small but greater than that associated with elective repeated caesarean delivery” overstates the degree of
perinatal risk and may create unwarranted anxiety for women and practitioners. It is also important to note that there were three maternal deaths among women who underwent trial of labour (as a result of liver failure associated with preeclampsia, cardiac arrest associated with sickle cell disease and postpartum haemorrhage). This is compared with seven maternal deaths among CS women (two attributed to the surgery) and five apparently ‘unrelated’ (four from suspected amniotic fluid embolism and one aortic dissection). Can it be extrapolated that maternal death is twice as likely to occur in elective CS as trial of labour? The absolute risk is small but the consequence is major.

One would certainly question whether this ‘new’ information is actually a “compelling reason to make sure that once a caesarean, always a caesarean” (The Sydney Morning Herald, 2004 p.10). Is there no longer a choice for women to make, or is there still a case for informed choice to be made here? Given a situation where “absolute risk is low” is there justification in warning women away from the option of TOL, where the absolute benefits may outweigh the absolute risk? Big conclusions have come from small absolute risks and when reported in the general print media in this way, women are at risk of being further confused about what is best for them and their baby.

6.2 Implications for clinical practice

Partnership approaches to care, although articulated in policy documents and professional codes of practice are difficult to achieve without effective education and training. Even a commitment to the principles of informed choice will not equate to providing informed choices. Obstetricians and midwives in the study verbalised support for the notion of informed choice for women, yet women themselves revealed that they felt that they did not have a choice or that they were being influenced by the individual biases of their practitioners.

Patient participation in healthcare decision-making has become an issue for debate amongst a broad range of nursing and medical literature. It is interesting that the
focus has been on the role of the ‘patient’, whether or not they wish to be engaged in the decision-making about their healthcare and if they are in fact equipped to do so in any meaningful way. There is an acknowledgement, in upholding the principles of ‘self-determination’, that patient participation is justified in the context of healthcare, and in this, individual preferences about their expected involvement needs to be elicited by the practitioner (Guadagnoli & Ward, 1998). It is important to acknowledge that there are different types of patients in terms of the degree to which they want to be involved in making medical decisions. However I would extend upon this notion and argue that there are also different types of practitioners. The argument to devise strategies to determine the readiness of patients to participate in decisions should also include strategies to determine the readiness of practitioners to engage in this process. In assessing what constitutes ‘patient participation’ for an individual doctor-patient or nurse/midwife-patient dyad, the assessment and process to follow should consider the attributes and expectations of both parties in the decision ‘partnership’. Incompatible expectations may even lead to a decision that a different practitioner should be sought by the ‘patient’.

6.2.1 The notion of risk and choice
In attempting to communicate the idea of risks and benefits or pros and cons, the notion that information about risks and benefits relates only to probable outcomes rather than certain outcomes is very important. This is consistent with the underpinning philosophy of this thesis, which reflects ‘probable outcomes’ of choice rather than certain outcomes. Information used to make risk estimates is based upon past experience, through research and clinical experience, interacting with patient past experiences and associated risk factors. An example of this is the estimated likelihood of successful VBAC for women who have experienced previous CS. Women who have experienced a vaginal birth and then a CS are 28 times more likely to succeed with VBAC in a subsequent pregnancy than women who have never experienced vaginal birth (Neff, 2004). The degree to which such additional knowledge assists in decision-making was not examined in this study.
The tailoring of ‘risk’ is an area to be further developed in decision-aid research and its inclusion may benefit future research in this area of birth choice.

The probability of an event occurring is a calculation involving aggregate data over a period of time, and therefore in terms of risk analysis, it does not serve to predict an event for any individual person at a given point in time (Reith, 2004). There is no certainty associated with risk estimation and patients should not be encouraged to think in terms of risks without weighing the benefits as well. This is a very important message for healthcare providers and consumers, because if behaviours are driven to control or minimise risk, such as in the case of recommending that women avoid VBAC (Landon et al., 2004), this can lead to large benefits being forfeited to reduce a numerically small risk. Value judgements made on behalf of someone else and then communicated in the language of risk are contrary to true consumer involvement in healthcare decisions. Does medicine have a tendency to use risk estimates to convince patients that the adverse events will happen if they do not take evasive action? An interesting example which suggests this may be the case was reported in the media on February 2005 (The Australian, 2005; Wenham, 2005)

"Queensland Health confirmed the Royal Brisbane and Women's Hospital lodged a child abuse notification after Ms Dagan failed to turn up for antenatal checks and cancelled a caesarean booking for last Thursday...Ms Dagan previously had two children by caesarean section and a specialist had advised that the risks of a vaginal birth increased after those caesareans." (Wenham, 2005 <03/02/05>)

The risk being referred to may be that associated with rupture of the uterus, which is increased after more than one caesarean section. The issue is however one of higher risk rather than the certainty that an adverse event will occur. In referring to the outcome, an obstetric spokesperson, Dr Molloy, stated that;
"This woman in this particular circumstance has got away with it," Dr Molloy told ABC Radio today. "We are trying to move women and their babies away from 'what can we get away with in nature' to 'what's the best evidence for myself, the mother, and the baby'." (The Australian, 2005 <03/02/05>)

The extent to which the mother in this case had considered the risks and benefits and made the decision to trial VBAC, and in this case birth vaginally, is unclear. There is not enough detail about the circumstances to judge flow of information or process of choice. This situation, although extreme in terms of using risk assessment and child protection policy together, carries an interesting sentiment about ‘natural’ childbirth. Nature is about chance and surgery is about safety and certainty. Such ideas contribute to the culture of birthing choices and the idea that women are even being criminally negligent if they do not choose medical management for their ‘risky’ pregnancies. Is the philosophy of informed choice therefore inappropriate for the current healthcare system and the medicolegal environment? Is there a limit to the specific clinical scenarios patients should be ‘allowed’ to make choices within? Is the fact that in pregnancy, the baby is a patient too, complicating the situation for those legally responsible for the outcomes of care? The issues of how much power patients should have in making a choice, under what circumstances and the documentation of this decision process deserves closer examination in the future. Already practitioners, in an attempt to document discussions about choice for birth, have begun writing comments such as “discussed VBAC risk of rupture less than 1%” in medical notes at one of the study sites during this study.

6.2.2 Is it possible to change the decision environment?

The consumer decision-aid concept, as a strategy to facilitate informed choice, is not enough on its own. Attitude of practitioners toward women’s ability to participate in birth choice appears to vary and this has an effect on the level of involvement women can expect during their birthing decisions. Attitudes however can change and perhaps practitioners, rather than being expected to comply with
policy, need to take a more active part in the process. During the RCT, overt antagonism toward the study by obstetricians who were sceptical about VBAC or of women making a choice often changed as they became more familiar with the purpose of the decision-aid.

In commenting on the proposal of the decision-aid for this study, one of the obstetric specialists (name withheld) approached with an early draft, to discuss the concept of a decision-aid, stated about the decision-aid;

"This is propaganda...affecting my livelihood...woman can't decide what's best for them" (15/11/2000).

It was pleasing to see a change in opinion over time from this individual and his overall evaluation of the booklet prior to the RCT was as follows;

"I felt it was a very well written booklet, with well-stated options and observations. I am happy to support the study..." (25/9/2001)

This individual comment about choice and livelihood was a very revealing one, in that the obstetric practitioner was being honest about balancing his individual needs in terms of income and the information needs of women. Any active role that women may have wished to take in the decision process was being compromised due to the beliefs of that practitioner in terms of what they saw as the benefits of involving women in such decisions. The extent to which other practitioners subscribe to this philosophy was not measured during the study but is an issue for future research. Financial incentives to ensure efficient work practices and the prospect of women making informed choices that do not comply with personal beliefs or practice patterns of medical staff, may not be compatible. The evidence that some women did not have the birth choice they had specified at 36-38 weeks, suggests that there is something systematic happening to change their minds, or that they may not have had an opportunity to articulate and assert that choice during medical consultations. Statements such as “I did not have a choice”
suggest that it may be a combination of both. That fact that little documentation about the rationale behind the birth choice appears in medical records, means at present the extent to which this ‘problem’ exists is unclear.

With this in mind how, can the benefits of a decision-aid such as this be maximised in the current healthcare environment? Given the results of the UK study using ‘informed choice’ leaflets (O'Caithain et al., 2002; Stapleton et al., 2002), where women who needed information resources were not uniformly offered them, it is important that we neither rely on the practitioner nor the consumer alone to ensure such strategies are utilised. The nature of busy prenatal clinics and private obstetric services means that resources such as decision-aids may be used intermittently and infrequently unless there is a process that integrates such tools into the consultation format or clinical practice guidelines. The best way to facilitate this is yet to be determined, but is the next step in the research for decision-aids.

6.3 Final Comments

This thesis undertook to contribute to the discourse regarding the role of women in making decisions about mode of birth after CS, and the relative effectiveness of a decision support strategy designed to facilitate a process of informed choice for childbirth. The RCT examined the effect of a decision-aid booklet designed for women who face the choice regarding mode of birth after primary CS. Evidence about the extent to which mode of birth was driven by women’s choice and the degree to which this was informed, is an important outcome of this work. The degree to which the notion of informed choice is a reality for women participating in the study raised important questions for future development of decision support strategies for pregnancy and birth.

Results of the RCT demonstrated that decision-aids are a potentially useful tool to assist women and their families in becoming informed about their options and making a choice about what mode of birth is best for them. Improvements in
knowledge, reduction in decisional conflict, forming a preference and making a choice, were facilitated by the decision-aid. Despite this, organisation factors, illustrated by significant study site effects, emphasise the importance of such factors as determinants of choice for birth after CS. Organisational culture and patterns of practice appeared to have a most significant effect on women’s choice and ultimately mode of birth.

Therefore the development of strategies such as decision-aids, in supporting informed choice for consumers, should be broadened to assist practitioners to better support informed choices in the current healthcare system. The possible legal imperatives that may drive practice patterns within individual hospitals, and therefore sway women’s choices to comply with organisational norms, must be acknowledged. However, if decision-aids are to work effectively, strategies are needed to assist practitioners, both midwifery and medical, to more effectively engage in discussion about risks and benefits of birthing options, document interactions, and support informed consumer choices about childbirth. Important organisational factors that have an apparently powerful effect on women’s choices for birth must also be addressed, so that women and their families are ensured the opportunity to make informed and supported choices that are ultimately the best for them.
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Note about appendices.

The author has requested that the appendices of this thesis not be available on open access. To see the full thesis please visit the University of Sydney Rare Book Library.

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