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Progress in Labour after Colposcopy Treatment

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A thesis submitted in partial fulfilment
of the requirements of
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for the degree of Doctor of Philosophy.

School of Community Health and
Education Studies

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Abstract

Anomalies noticed in midwifery practice prompted a review of literature around progress in labour after Loop Excision of the Transformation Zone (LETZ). The previous research was equivocal. This study investigates the pattern and progress of women's labours following LETZ, and the effect of the experience on women. It also explores the basis of clinical decisions made by midwives. It takes place in North East England and involves women giving birth in 2004-2005.

The case study strategy brings together quantitative retrospective case control results, qualitative analysis of semi-structured interviews from women and midwives, and guidelines and protocols surrounding assessment and management of labour. The quantitative data is from 111 women after LETZ and 214 controls, reducing to 94 and 150 respectively after removal of cases with confounding variables. Interviews are from four women, three individual midwives caring for one of the women and a focus group of four midwives.

In the interviews, women gave no thought to how their births may be affected by LETZ, as no one had discussed the possibility with them. Women having their second baby after LETZ take less time to reach full dilatation; a result related to grade of Cervical Intraepithelial Neoplasia. Women having their first baby after LETZ are 1.8 times more likely to be admitted later in their labours, an important emergent issue that needs further research. Women having their first or second baby after LETZ are 2.3 times more likely to have a premature birth, confirming indications in previous research.

This study for the first time reveals important differences in pattern and progress of labour after LETZ. It adds to our knowledge of premature birth after LETZ. Midwives, obstetricians and colposcopists need to incorporate the study results into counselling of women before LETZ and during any pregnancy after LETZ.

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Glossary of Useful Terms

Active management: Medical management of labour from start to finish, with obstetricians involved in every birth

Antenatally: During pregnancy, before the birth of a baby.

ARM: Artificial rupture of membranes.

Biopsy: The removal of a small piece of living tissue from part of the body for microscopic examination.

Bishops Score: A score made up of several components used to judge progress in the 'passive' phase of the 1st stage of labour (see Appendix A).

Breech: The buttocks (often refers to the presentation of the foetus/baby).

Caesarean Section: Birth of the baby through incisions made in the abdomen and uterine wall.

Cartesian divide: The philosophical treatment of the mind as 'non-physical' and therefore distinct from the body 'corporeal' which is seen as trivial compared to the mind.

Cervical Intraepithelial Neoplasia (CIN): A neoplasm in which the cells are confined by the basement membrane to the epithelium of origin.

Cervical screening: Taking samples of cells from the cervix to test for premalignant changes that may lead to cancer (usually by surface scraping or more recently brushing).

Cervical smears: The slides prepared from the samples of cells taken during the cervical screening process.

Cervix: The neck of the womb

CIN: Cervical Intraepithelial Neoplasia.

Colposcopy: Examination of the vagina and cervix by means of an instrument that provides low magnification (i.e. x 5).

Cone biopsy: A cone of cervical tissue excised for histological examination and treatment of CIN.

Diamorphine: A powerful narcotic analgesic with a shorter duration of action than morphine.

Dilatation: The enlargement or expansion of a hollow organ, such as the cervix.

DOP: Direct occipito-posterior position (see position).

Effacement: The shortening or thinning of the cervix that allows it to be taken up into the main body of the uterus.

EFM: Electronic Foetal Monitoring.

Electronic Foetal Monitor: Two belts are placed around a pregnant woman's abdomen, which hold in place a Doppler ultrasound transducer and a pressure transducer. These are attached to a machine that records changes in the baby's heart rate and their temporal relationship to uterine contractions. The information is recorded on a paper strip known as a cardiotocograph (CTG).

Entonox: A gas made up of 50% air and 50% nitrous oxide, often used for pain relief in labour, sometimes referred to as 'gas and air'.

Epidural: Suppression of sensation in part of the body by the injection of a local anaesthetic (often with a small amount of analgesic) into the outer lining of the spinal cord. The extent of the area anaesthetised depends on the strength and volume of local anaesthetic injected.

Episiotomy: An incision made into the perineum to enlarge the opening and therefore facilitate delivery of a baby.

Feminism: The philosophical theory that sees the world as inherently patriarchal.

Foetus: An unborn human baby from 8 weeks after conception until birth.

Forceps: A pincer-like instrument designed to fit firmly round the baby's head, used to extract a baby from the vagina.

Gas and air: See Entonox

Histology: The examination of tissues by means of special staining techniques combined with light and electron microscopy.

Holism: The philosophical theory that the whole is greater than the sum of the parts, in medicine treating the whole person rather than just the symptoms of an illness or disease.

HPV: Human Papilloma Virus.

Human Papilloma Virus: A virus, 35 subtypes of which infect the genital tract. Thirteen of these are associated with causing cancer of the cervix.

Labour: The process of expulsion of a baby from the uterus, after 24 completed weeks of pregnancy.

Induction: Labour that is started artificially.

Augmented: Labour that is stimulated with oxytocin or artificial rupture of membranes.

Spontaneous: Labour the onset of which is natural.

Last menstrual period: The last date a women has a period before her pregnancy. Traditionally used to calculate the date the baby is due to be born.

LETZ: Loop Excision of the Transformation Zone.

LMP: Last menstrual period.

LOA: Left occipito-anterior position (see position). .

Loop Excision of the Transformation Zone (LETZ): A loop of wire through which an electric current flows, which removes an area of abnormal cells from the cervix.

Membranes: The name for the thin layers of tissue covering the amniotic fluid and baby in the womb.

Artificial rupture of (ARM): Rupture of the membranes artificially.

Premature rupture of (PROM): Spontaneous rupture of the membranes before 37 completed weeks of pregnancy.

Spontaneous rupture of (SROM): Rupture of the membranes by the natural progress of labour.

Metaplasia: The change in form of cells in the cervix from columnar to squamous epithelia at the transformation zone.

Miscarriage: Spontaneous abortion of pregnancy before 24 completed weeks.

Neoplasm: A new or abnormal tissue in some part of the body, especially as a characteristic of cancer.

NICE: National Institute for Clinical Excellence

Normal birth: Birth without interventions (i.e. without ARM, drugs etc).

Odds Ratio: The ratio of the odds of an event occurring in one group, to the odds of it occurring in another group, or to a sample-based estimate of that ratio.

Oxytocin: An octapeptide formed in the hypothalamus and stored in the posterior lobe of the pituitary. It stimulates the smooth muscle of the uterus and the mammary gland ducts.

Parity: For a particular woman the number of pregnancies that have resulted in a live birth, or miscarriage in which the baby has developed beyond 24 weeks gestation.

Parturition: Childbirth, or labour.

Pethidine: A potent analgesic drug, with a mild sedative action, used to relieve moderate or severe pain.

Position: The relationship of a designated area on the presenting part of the baby (the denominator) to the anterior, transverse, or posterior portion of the maternal pelvis (example: left occipito-anterior; LOA).

Positivism: The philosophical theory recognising only that which is measurable using the methods of the natural sciences.

Postmodernism: The philosophical theory that knowledge is both local and contingent that, even in principle, one cannot rise above human perspectives and subjectivity.

Postnatal: After the birth of a baby.

Post-traumatic stress disorder: Symptoms of neurosis following an overwhelmingly stressful event (often with flashbacks to event).

Pragmatism: The philosophical theory that evaluates theories or beliefs in terms of the success of their practical application.

PROM: Premature rupture of membranes.

PSTD: Post traumatic stress disorder.

RCOG: Royal College of Obstetricians and Gynaecologists.

Relative Risk: The ratio of the probability of an event (such as development of a disease) occurring in the exposed group versus a non-exposed group.

ROP: Right occipito-posterior position (see position).

Scientific rationalism: The philosophical theory that scientists begin by making unbiased observations, before formulating theories to explain the observations.

Spontaneous Vaginal birth: Birth of baby vaginally with the use of interventions but without resort to instruments, such as Ventouse or Forceps.

Spontaneous Vaginal Delivery: Birth of a baby vaginally without the use of instruments, but can include use of other interventions i.e. Epidural, EFM, episiotomy.

SPR: Standard prevalence rate.

SROM: Spontaneous rupture of membranes.

Standard Prevalence Rate: A measure of morbidity based on current disease or sickness in a population, which is expressed as numbers of sick people or episodes of disease of 1000 individuals at risk.

Station: The position of the presenting part of the baby (leading bony point) relative to the level of the ischial spines.

SVD: Spontaneous vaginal delivery.

Syntocinon: The artificial production of the hormone oxytocin, given to women to increase contractions of the womb in labour.

Technocracy: The description of a view of society as based on the technological supremacy over nature.

Vaginal examination (VE): Internal digital examination of the vagina and neck of the womb (cervix).

VE: Vaginal examination.

Ventouse: A cupped instrument, either rubber or metal, that fits over part of the baby's head and from which air is removed, thereby forming a vacuum that attaches firmly to baby's head. Used to extract a baby from the vagina.

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Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work.

Name: Valerie Colgan

Signature:

Date:

Chapter 1

Introduction

1.1 Introduction

The mechanisms involved in the actions of the cervix (neck of the womb) in labour, that is the process of giving birth, are not fully understood, with many competing partial explanations (Hinchliff and Montague 1988; Osmer, Rath et al. 1992; Olah, Henderson et al. 1993; Leppart 1995). Despite these acknowledgements, for many years surgical excision of the cervix was, and is, performed with the assurance from colposcopists and obstetricians that this treatment has no effect on the physiological processes of labour. The research to date remains conflicting, although a recent meta-analysis by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) suggests there may be detrimental effects. However, none of the previous research examines the actual impact on progress in labour, which is an integral part of a woman's experience of childbirth. This thesis explores the actual progress in labour after the surgical excision of cervical tissue by Loop Excision of the Transformation Zone (LETZ). It combines different methods into a case study strategy. This combines quantitative retrospective case control results from birth and colposcopy data with qualitative semi-structured interview data from women and midwives, and qualitative interview data from a focus group of midwives. The study takes place in the North East of England, using data from women giving birth in 2004-2005.

Chapter 1 introduces the researcher and the background to her interest in the problem. It describes the philosophical stance of the researcher, which Bowling (2009) asserts influences the direction and shape of the research. This study sits within a constellation of perspectives, each with its own ideology and biases, which produce conflicts and tensions both within and for the study. The theoretical bases of these conflicting paradigms are discussed, with an emphasis on the context in which the study is set and the rationale for the choice of research methods. This Chapter also identifies and discusses the important contextual material in which the research is situated. Several essential background subject areas are covered which are key to understanding the importance of the study.

Screening and treatment for abnormal smear tests of the cervix are part of this review, as is the potential impact on screening of the new vaccine for Human Papilloma Virus (HPV). There is an examination of the tendency of previous

research to look only at efficacy of colposcopy treatments, and sidestep affects on childbirth itself, despite the fact that the treatments were already in common use. An outline of the rationale for the study and the study aims and research questions follows. A description of the thesis Chapters concludes Chapter 1. An obstetric glossary is provided at the beginning of the thesis to aid readers (Page xiii.)

1.2 Introducing the researcher

As an introduction to myself, the following sections use first person instead of the academic convention of third person. I came into Midwifery after qualifying as a Nurse and working in various areas of nursing for six years. Throughout that time, I strove to use the latest evidence and let research guide my practice. I endeavoured to keep up to date by reading nursing journals and enrolling on courses that prompted me to review the latest literature and research. The activities I performed as a nurse from pre-operative fasting, through signs of deterioration of patients, to wound care, were all evidence based. Coming to midwifery after these experiences, I came to realise how little evidence there is for many of the activities midwives perform. The need for evidence to guide practice is as apparent in obstetrics and midwifery as it is in other disciplines, a view endorsed by Peterson, Meikle and Holmes (1999). There are many examples of the perceived wisdom, running counter to my own and other midwives' experiences and a great desire to have evidence from midwifery or woman centred research. During the course of the study there has been a welcome increase in the amount of research published from a midwifery/woman's perspective about aspects of labour (Lavender, Alfirevic et al. 1998; Kirkham 1999; Sookhoo and Biott 2002; Green and Baston 2003; Harrison, Kushner et al. 2003; Stewart 2005; Simkin 2007).

Strauss and Corbin (1990) identified that professional experience often suggested the topic of research, as is the case with this study. Anomalies noticed in clinical midwifery practice led to a review of previous research on the pattern and progress of labour after colposcopy treatment, this is discussed more fully in Chp. 2; Section 2.2, p. 35. The previous research was unsatisfactory both in scope of outcome variables and in the production of conflicting results. In discussions with women who gave birth after colposcopy treatment, they felt a failure when their progress did not conform to the 'normal' pattern. The study design aims to address the unsatisfactory

nature of the previous research by exploring pattern and progress of women's labours following colposcopy and the effect of the experience on women.

1.2.1 Researcher's philosophical stance

It is imperative that a researcher is aware of her biases in order to manage them. Therefore, in the selection of methods, the selection of sample and the selection of tools for analysis, a researcher must reflect on their biases and try to reduce their effects. Bowling (2009) however, asserts that the philosophical stance of a researcher influences the direction and shape of research, despite best attempts to eliminate bias. Therefore, in any study it is important to state the philosophical stance of the researcher, in order that the reader may understand the background to the choice of topic and study rationale. It also enables the readers to judge any bias for themselves.

1.2.1.1 Philosophy

Philosophy is not a term that has only one meaning. It is used to describe various types of thought or debate. Philosophers throughout the ages have had various aims when devising their philosophies. St. Augustine wished to explain the role of religion in life, Descartes wished to encompass scientific discoveries into the view of the world and Marx wished to achieve political and social reform. Therefore, philosophy has different meanings for different philosophers.

Previously held beliefs' always influence the path that is taken in "enquiry" (Lewis and Smith 1980). The Western and Oriental hemispheres have their own particular traditions of philosophy. Therefore, although adherents often describe philosophical perspectives as "world views", they are only restricted views of the world, which is perhaps why there are so many of them.

1.2.1.2 Holism

Throughout my career as a nurse and midwife, I have always sought to treat people as a whole and not define them by their pathology or child bearing process. The philosophy has always been to treat people holistically, encouraging them to take an active part in the process/treatment and thereby creating a sense of empowerment.

Holism sees the woman and foetus as one and argues that the labour progresses at a pace that is normal for them, not the mythical average woman of Friedman's curve

(Friedman 1954). That giving birth is something a woman does and is capable of, without technological interventions. Each birth is unique and never some mythical average.

1.2.1.3 Pragmatism

“for rationalism reality is ready-made and complete from all eternity, while for pragmatism it is still in the making, and awaits part of its complexion from the future”.

((Kuklick 1981, p.115))

Pragmatism is the philosophical approach that evaluates theories or beliefs in terms of the success of their practical application. Do they work, and will the outcome be different if it is true or false? It was popularised in America by William James. His attraction in the “pragmatic method” lay in the way in which he could use it to resolve both his faith in scientific advances and religion. James urges reflection, to see how disputes can be applied practically to the world in which we live. James proposes that most “new” theories are really redesigns of old theories, with the point being to save as much as we can of old beliefs to incorporate with the new (Lewis and Smith 1980).

1.2.1.4 Postmodernism

Postmodernism was born in intellectual discussions on the meaning of life at school and onwards. When I questioned the validity of a “world-view”, proposed by those whose independent means enabled them to devote themselves to developing a world-view that was only based on the experience of their own class and gender and was confined to the “Western” world, as they knew it in the 16th and 17th Centuries.

Postmodernism, shares with feminism the belief that knowledge is both local and contingent. Postmodernism questions the reliance on a single expression of authenticity in favour of multiple expressions and the celebration of diversity (Coffey Holbrook et al. 1996). For Postmodernists there is no escape from human perspectives and subjectivity cannot be transcended even in principle. Given the variety of subjective positions and the way human beings make and continuously remake the world, there are endless “points of view” on things.

1.2.1.5 Feminism

From the time I realised there was a difference between the sexes, I have always argued for equality and therein lay my feminism. A feminism that is never of the radical kind, but persistent, reasoning and implicit in every action and decision throughout my life. Being a post-modern feminist, although I see the world as inherently patriarchal, I do not see myself as limited to one particular feminist view. Post-modern feminists also reject the Cartesian body - which advocates a mind-body divide established by Western philosophers such as Descartes and Bacon (Davis-Floyd 1990).

Many women find the natural process of birth empowering leading to them seeking empowerment in other ways. This quote is from a woman who experienced a home birth in America, and after commenting on how she had done it, not the doctors, says:

*“Then I realised that if I could do that great thing, perhaps I could
do other things as well”
(Davis-Floyd 1990, p.193).*

Empowerment through the birth process is a powerful feminist experience.

As I have always had the ability to see both sides of an argument, it is not surprising that in readings of philosophy I found aspects in various philosophies appealing. However, no philosophy totally explains the basis of all knowledge satisfactorily, certainly not to the greatest philosophers throughout the ages. Therefore, my personal philosophy is best described as Holistic, Pragmatic, Post-modern Feminism. This naturally influences the direction of the study and the methods chosen. For reasons of clarity, although I favour the term ‘childbirth’ when referring to the process of the birth of a baby, the term ‘labour’ is used instead. The next section discusses the two paradigms operating in midwifery and obstetrics.

1.3 Midwifery versus Obstetric perspectives on the problem

When discussing the pursuit of this research with midwifery managers and colleagues the impression given was they thought the subject matter too medical and not midwifery orientated. The concern was that they did not believe that a woman’s progress in labour and the factors that affected that progress were suitable

for midwifery research. When discussing with obstetric staff, they were focussed on the research discovering any links with premature birth or Caesarean Section (CS). The experience of the women did not seem to have the same attraction of interest. Therefore, this study finds itself betwixt and between two worlds and their competing priorities and interests. Indeed, these competing priorities and contexts are part of the setting for the research.

Management of childbirth, which includes assessment of progress in labour, is surrounded by competing perspectives, not only in practice but also in types of knowledge and philosophies. Sociologists have already identified that two different paradigms of pregnancy and childbirth are operating. One upholding pregnancy and childbirth as natural and normal processes in which intervention is rarely necessary- a position understood as holism; the other renaming it 'parturition' and seeing this as a hazardous event (normal only in retrospect) which requires high-powered medical supervision- a position understood as technocracy, a view shared by Campbell and Macfarlane (1990). The following section outlines the historical roots of midwifery and obstetric ideologies, in order to illuminate the apparently opposing positions.

1.3.1 Holistic midwifery perspective

Midwife literally means 'with woman' (translated from the original Middle English) (Pearsall 2001). This use of the word denotes the practice of a woman who supports another woman through the experience of labour. In that sense of being 'with woman', the word has been recorded since the papyri and tomb paintings of ancient Egypt (Silverton 1993). The word and action it implies was in use for millennia before the evolution of midwifery as a profession.

Holism is the original perspective of midwifery and sees the woman and foetus as one, and every woman's pregnancy and labour in the context of herself and her family. Holism argues that labour progresses at a pace that is normal for the woman, that each labour is unique and never some mythical average of the curve of labour described by Friedman (1954). Holism sees labour as something a woman does and is capable of, without technological interventions. Edwards (1997a) confirms that a midwife's holistic approach to labour views it as a strong, woman centred occupation. Women are central to the decision making process in the management of their labour and credence is given to other signs of progress apart from cervical

dilatation. Midwives who promote birth without complications rely on an ethos of watchful expectancy and see themselves as the woman's advocate. Ina May Gaskin (2003, p. ix), an American midwife proponent of the ethos of watching and waiting, states that one of the best-kept secrets of birth is "that birth can be ecstatic and strengthening".

Midwifery knowledge has evolved throughout the ages. Midwifery now places primary emphasis on empirical knowledge which Carper (1978) claims is essential to professional practice. It is also acknowledged that midwifery is an art. Within an apprenticeship system, the art of midwifery is handed down through the generations from woman to woman, and this continues to be one of the bases of midwifery practice today. Students learn the artistry of practice from their mentors on placements and acquire practice knowledge. Providing whatever the woman requires to restore or extend her ability to cope with the demands of labour is an essential component of that artistry. Carper acknowledges that an appreciation of a woman's situation is a precursor to understanding what she requires.

The World Health Organisation ((WHO 1985a), recommends that training should pass on knowledge of the social, cultural, anthropological and ethical aspects of birth. Waldenstrom and Turnbull (1996c) maintain that these aspects of childbirth and psychology have long been significant components of midwifery knowledge. Schon (1987) asserts that expert practitioners view situations holistically. They are aware of midwifery as not only a body of facts to be recalled, but also a profession with inherent controversies and dilemmas that require critical thinking, a view endorsed by Lyons (1999). Theoretical reflection and practical action are in reality richly connected. In the case of the expert practitioner, Ashworth and Longmate (1993) argue that theory and practice may be impossible to distinguish, and that the clinical setting demands that actions and strategies are pragmatically adopted.

Broadly speaking, there are two schools of thought within the Royal College of Midwives (RCM) and the wider midwifery profession: an obstetric technological model and a holistic midwifery model. Of the two schools of thought, the holistic midwifery model attempts to redefine a social or midwifery approach to labour and has strong ties to feminism. Ashworth and Longmate (1993) and Edwards (1997a) argue that the holistic midwifery model sees labour as an essentially normal, healthy

process, where both midwives and women are autonomous, responsible people who of course take account of difficulties as they arise, and analyse and act using theories-in-action.

1.3.2 Technological obstetric perspective

Most, although not all, obstetricians have never been present throughout a non-medicalised birth, even as a student, and hold the belief that childbirth is 'only normal in retrospect'. This is perpetuated in the many obstetric/medical textbooks (Al-Azzawi 1998; Scott, Saia et al. 1999). According to Merchant (1990), this emphatic belief in the possibility of improving natural processes, stems from the underlying positivist ideology and scientific rationalism that are the basis of medicine and obstetrics, although not often acknowledged in those terms. Obstetric research rarely examines the philosophical and theoretical perspectives of their studies. However Bowling (2009) asserts that, as their research is largely experimental, it comes from a positivist philosophy with a theoretical perspective that encompasses scientific rationalism.

Positivist ideology and scientific rationalism permeates much of Western civilisation, not only obstetric practice. As Merchant (1990) discusses, during the rapid industrial expansion of Western society in the seventeenth century, the machine replaced the organism as the underlying metaphor for organisation of the universe. If society chooses to see itself, and the universe it inhabits, as purely mechanistic, then the human body officially has to reflect society's vision. Such a view is problematic as bodies are not machines. The human body therefore represents a great conceptual challenge to the technological model. Western philosophers Descartes and Bacon neatly resolved this problem in the 1600s when they established the conceptual separation of mind and body, upon which the metaphor of body-as-machine depends. Davis-Floyd (1994) argues that conceptual separation of mother and child is fundamental to medical notions of pregnancy and labour, and constitutes a logical extension of Cartesian mind-body separation.

Although as a physiological and emotional process, labour has not changed over the millennia of human existence, society's perceptions of birth have changed. Clearly, expanding capabilities in preserving and protecting life, as in the advance in Intensive Care medicine to support life artificially, and in manipulating the

reproductive process such as In vitro fertilisation for infertile couples, influences society's attitudes toward life, death and acceptable risk, a view shared by other authors (Davis-Floyd 1990; Simkin 1996; Penn and Ghaem-Maghami 2001).

Relocation of birth from home to hospital after the Peel Report in 1970 (Peel 1970), was associated with a loss of midwifery skills. Midwifery knowledge and practice became heavily influenced by obstetric and medical viewpoints, biases and ideologies, to such an extent that midwifery has adopted their positivist attitude and beliefs. This influence has been present since availability of obstetric texts to midwives in the first regulated training, but has not always so readily usurped tacit midwifery knowledge and practice learnt through the 'apprenticeship' system. Within the hospital system, pregnancy is divided into antenatal, labour and postnatal periods with physical separation of these periods by placing them in different locales i.e. antenatal clinic and ward, labour suite, postnatal ward and care, and allocating different staff to each of these areas. Webster (1991) and Wagner (1996b) both maintain that the reliance on technology, occupational divisions of the workforce and splitting of processes into single units, not only de-skills midwives but de-humanises the process of labour for women. Garcia, Kilpatrick and Richards (1990), reiterate that obstetric technology is produced within the prevailing assumptions of appropriate care- that women labour in hospital on a delivery bed. Edwards (1997b) claims that these assumptions lead to the professional agenda dominating and a discounting of women's experiences and knowledge. Women became passive players in labour. As Simkin (1996) states, they no longer birth their babies, doctors and midwives deliver them.

Within the two schools of thought in the RCM and the wider midwifery profession, the obstetric technological model aligns midwives with doctors. It perpetuates the view of woman as patient, locates the midwife within a medical hierarchy rather than 'with woman' and sees labour as a dangerous medical event. Edwards (1997a) asserts that midwives who promote labour without complications, who rely on an ethos of watchful expectancy, and who see themselves as the woman's advocate are tacitly undermined and their practice called into question.

The medicalisation of labour has resulted in the introduction of a range of technological interventions, most of which have been introduced without proper evaluation, which ignores the well-documented effects of iatrogenesis (Wagner

1996b; Edwards 1997b; Peterson, Meikle et al. 1999; Enkin, Keirse et al. 2000). An example is the Active management of labour. The Oxford dictionary defines 'manage' as- 'to have under effective control'. O'Driscoll was the first to introduce Active management in Dublin in the 1960s. The aim was "medical management of labour from start to finish, with obstetricians involved in every birth", (O'Driscoll, Meagher et al. 1995), now restated as "'active' ...refers to the nature of the involvement of the consultant obstetrician...to assume direct responsibility for the welfare of all mothers" (O'Driscoll and Meagher 2003). Britain adopted many elements of 'active management', which has resulted in the introduction of new technologies of monitoring and controlling labour. O'Herlihy (1993) claimed that active management was devised for the early recognition and correction of inefficient myometrial activity, but Wagner (1996b) found that the inventors of active management had never attempted to measure normal myometrial activity. O'Driscoll and Meagher (2003) espouse many opinions, not backed up by any references to evidence. Time limits of normal labour in active management were reduced from 36 hours in 1963, to 24 hours in 1968, to 12 hours in 1972 ((O'Driscoll and Meagher 2003). In anthropological terms, that rate of evolutionary change is astounding, as is the fact that O'Driscoll and Meagher provide no evidence to support that evolutionary development.

Indeed, the regime of active management views a woman's uterus as a machine that is defective. It is made to perform, as it should, by the skill and interventions of medical men. Logical assumptions, if taking the Cartesian mind/body divide to its extreme. The advocates of active management cite a continuing low Caesarean Section (CS) rate (less than 10%) with excellent outcomes for mother and infant. However Wagner (1996b) and Dudley (1999) both provide evidence that only the associated continuous support in childbirth reduced the CS rate in active management. Lopez-Zeno, Jose and Peaceman (1992) compare active management with 'standard care' and claim a 26% reduction in the CS rate. However, Marsden Wagner (1999), a member of the hierarchy of WHO and a male neonatologist, who is an ardent supporter of midwifery practice, re-analysed their data and shows an even greater 30% drop in the control group's CS rate. Simply doing the research has resulted in changes.

Medical education and medical textbooks strive to ensure evidence-based practice in medicine, placing a low value on authority and a high value on evidence in decision-making. Peterson, Meikle and Holmes (1999) criticise practice, which is often still based on 'expert opinion', that what experts think is right will be right. Examples of this are; the rapid absorption of unproven technologies, such as Electronic Foetal Monitoring (EFM) for all women, into widespread use which had a major effect on obstetrics; conversely, corticosteroids for women at risk of premature birth were underused for years despite evidence of their effectiveness..

Waldenstrom (1996b) and Churchill (1995) argue that the obstetric technological model is insufficient for our understanding of the complexity of labour and for provision of high quality maternity care, as it fails to recognise the human factors necessary which assist women during labour. It is difficult to swim against the tide of technology, as it is the mainstream belief of society. Thankfully, some midwives and obstetricians do and are even successful in advocating for normal birth in our society (Lavender, Alfievic et al. 1998; Odent 2005; Kirkham 2007; Walsh 2008). However Sweet (1997), claims that medicine/technology has such a strong economic, political and social power over health care that substantial changes are difficult to achieve.

1.3.3 Risk and protocols

Aside from the medical management of progress in labour, inspired by 'active management', protocols and guidelines increasingly affect the management of labour. In making clinical judgements, it is argued that midwives, and others, use 'shortcuts' based on estimated probabilities to simplify the decision making task. These derive mainly from their clinical experiences, as they attempt to save cognitive effort and facilitate reasonably accurate decisions in the decision-making process. Competency in clinical decision-making is the very least a woman should expect from a midwife, legally and ethically.

Researchers examining clinical decision-making have explored the role of the midwife's experience. Experience has been conceptualised as the time spent either in midwifery or in the knowledge that comes from practice. Radwin (1998, p.590), defines the midwife's experience as "the application of that learned from previous practice situations". Three attributes of experience emerges from their research.

These include a focus on the patient, confidence in practice, and knowledge of antecedents and consequences of similar patient situations. Each aspect enhances the individualisation of care. Benner (1984) argues that each expert nurse/midwife has her own situational repertoire of paradigm cases which is unique to her, and which constitutes a body of personal knowledge, which is very different from public, academic knowledge. Benner (1984) and Rolfe (1997) conclude that expertise is concerned with working intuitively, responding to practice situations holistically from a body of personal, tacit knowledge, a repertoire of past paradigm cases, what has been called the art of midwifery.

Evidence from the literature indicates that midwives have shown an increased awareness of, and interest in, risk management. However, the focus is often on litigation avoidance, which has led to the obstetric technological model becoming increasingly more proscriptive with the introduction of guidelines, policies, protocols and care algorithms that affect individualised care of women. Thus, risk management often takes the form of **risk aversion**. The CS rate has climbed but has not reduced infant mortality rates. Penn and Ghaem-Maghami (2001) argue that obstetricians' fear of litigation has made the changing rate and indications for CS seem more acceptable.

Aslam (1999), among others, identifies that risk averse management has led to stagnation in practice and a reduction in standards, as it does not encourage innovation. Innovation is about taking **managed** risks that improve care and outcomes, and therefore raise standards and quality of care. The increased use of risk management in midwifery and obstetric practice is to be supported, however, enhancement of women's care, rather than litigation avoidance, should be the principal driving force in implementing risk management procedures.

This thesis draws on examples of documents used in assessment of progress of labour - the Labour Suite Guidelines of the study hospital, guidelines from the National Institute for Clinical Excellence (NICE) (NICE 2007) and the guidelines from the Royal College of Obstetricians and Gynaecologists (RCOG). It refers to the evidence base for their use and the reflection of the medical paradigm on which they are based. These documents are useful to supplement the information gained in the quantitative retrospective case control study and the qualitative interviews with

women and midwives. The language used in these guidelines is authoritative, without reference to the evidence base on which the authoritative statements are made. These guidelines make no mention of the woman's knowledge and are proscriptive even when advocating clinical judgement. They contain very little from a holistic midwifery model, and are heavily biased towards the obstetric technological model of birth.

The study hospital's Labour Suite Guidelines have grown from 175 pages in 2002 to 315 pages in 2006, mostly by increasing information on medical complications. No attempt is made to condense them into bullet point recommendations with easily identifiable levels of evidence, therefore midwives and obstetricians are unlikely to retain all the information contained in the guidelines, and are less likely to search for the evidence on which they are based. The recommendations in NICE do not come with levels of evidence attached; a departure from previous RCOG originated guidelines. These anomalies leave the reader with the unenviable task of reading 332 or 315 pages, (NICE or Labour Suite Guidelines) to find the references used for a particular recommendation. This is not achievable in the practical situation. Therefore, routine application of guidelines results, regardless of need. Midwives and obstetricians are unable to determine which guidelines are based on good evidence and which are based merely on the opinions of the guideline group members. Evidence based practice is more resistant to being changed by clinical judgement, while clinical judgement can more easily replace opinion.

In summary, the two perspectives that operate in childbirth and pregnancy are a holistic midwifery model and an obstetric technological model. Both schools of thought exist within the midwifery and obstetric professions. The obstetric technological model is pervasive within hospital settings and results in technological interventions that interfere with the normal labour processes. These interventions are reinforced by the avoidance of litigation measures that have resulted in a risk averse culture, dominated by guidelines and protocols, which negate the clinical judgement and experience of practitioners even when the guidelines and protocols are not evidence based. This culture influences care of women after LETZ, and the information given with respect to the effects LETZ has on their labour. It is within this context that the study is located, and the pragmatic adoption of some of the methods used reflects this environment.

1.4 Colposcopy

This section offers some key insights into cervical cytology, colposcopy treatment for abnormalities and their influence on labour. It includes a review of screening for abnormal smears, a definition of Cervical Intraepithelial Neoplasia (CIN), and the incidence of treatment. This section examines the age profile of those treated. It also examines the link between the decrease in age of those treated and the trend, with many women, to leave childbearing to later in life. It explains ripening of the cervix, the action of the cervix in labour and the importance of the cervical ripening in the 1st stage of labour. This section highlights the numerous theories on how the cervix is able to perform its functions in labour. It discusses the tendency to only research efficacy of colposcopy treatments and sidestep affects on labour itself. The identified problems for labour from all types of colposcopy treatment, other than LETZ, conclude this section.

1.4.1 Screening for cervical abnormalities

The **cervix**, or lower cylindrical section of the uterus, or neck of the womb, has a vital part to play in the progress of labour. This area is the focus of the Cervical Screening programme in the UK, looking for **pre**malignant changes that may lead to cancer. The potential field for the development of squamous carcinoma of the cervix is that part of the cervix, which protrudes into the vagina, known as the transformation zone (see Figure 1, p.16).

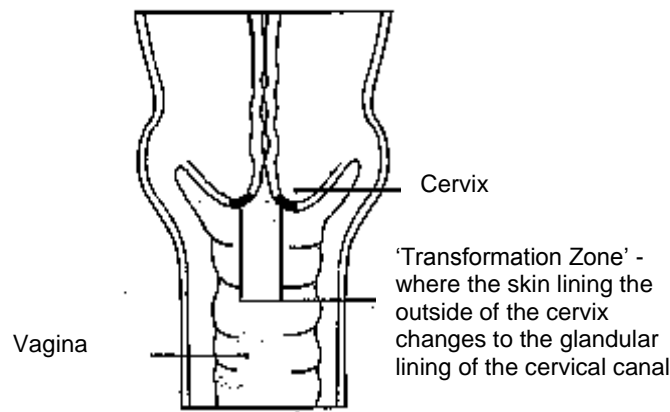


Figure1: Transformation Zone of the cervix.

The name of transformation zone derives from the fact that at various stages of a woman's life the process of metaplasia (a change in form) transforms some columnar epithelium in this region into squamous epithelium. The normal metaplasia of the cells of the cervix can, under the influence of some other stimulus, develop into neoplastic (cancerous) cells (Hinchliff and Montague 1988). Some of these stimuli are to date undefined but the most common is Human Papilloma Virus (HPV). A description of the cervical screening process is found in Szarewski (1994). The degree of cellular aberration, called Cervical Intraepithelial Neoplasia (CIN), varies and is reported in severity ranging from 1-3, with 3 the most severe. The lesion is graded CIN 1 when only the basal cells are affected, and progresses through the spectrum of change to CIN 3 when the full thickness of the epithelium contains atypical cells. The CIN terminology has almost universally replaced the older terms dysplasia and carcinoma in situ, which imply differences in biological behaviour that do not appear to exist.

The recognition and treatment of premalignant lesions affecting the uterine cervix is thought to prevent, in most instances, the subsequent development of invasive cervical cancer (Sharp and Saunders 1986). Herbert and Smith (1999) regard the benefit of screening as a treatment of risk, since it is almost certain that a high proportion of CIN 3 regresses or persists unchanged.

A fall in incidence and mortality from cervical cancer has been demonstrated in regions that have adopted comprehensive screening programmes (Miller, Chamberlain et al. 1991). In 2003, deaths from cervical cancer had declined throughout Scotland. In England and Wales there had been a fall in death rates in women aged over 45 but a rise in younger women (ONS 2003). In England, there had been an increase in the incidence of invasive cancer at all ages up to 35, with a large increase in those aged 20-29. This increase was very small in absolute terms and was reflected in results from America, Canada and Finland (Miller, Chamberlain et al. 1991; Dept. of Health 1998; Blackwell, Elam et al. 2000).

The Office of National Statistics (2003) admitted that diagnostic tests used in screening programmes were not 100% sensitive, and there was a possibility that pre-cancerous cells were not detected in a small number of women. The annual incidence of cervical cancer in the UK in 2004 was estimated to be 9.7 per 100,000 population of women of all ages, with a mortality rate of 3.9 per 100,000 population, this reduced to an incidence of 7.8 per 100,000, with a mortality rate of 2.7 per 100,000 in 2007 (Patnick 2007). The actual incidence from the Cervical Cancer Register for 2004 (last year of full figures reported) was 2,221 women of all ages, with a mortality rate of 899. Of that 2,221 women diagnosed only 722 (32.5%) were through the screening programme.

The UK target population for screening was all women between 20-65 years (ONS 2003), but this was changed to 25-64 years in 2003 (Patnick 2007). This was in part due to the continuing mounting evidence that some methods of treating the cervix for abnormal cells led to later problems in pregnancy. Although an uncommon occurrence, it was felt that the risk of not screening for older women was greater than any risk in pregnancy. However, younger women have a low chance of benefiting from cervical screening and a greater chance of problems in pregnancy or childbirth (Patnick 2007). Despite the decrease in the target population, the numbers of abnormal smears detected rose with the concomitant increase in the number of women who had colposcopy treatment.

When a woman has a smear test that is abnormal, she is referred to a colposcopy clinic for further investigation and treatment (see Sharp and Saunders, 1986 for description of colposcopy process). Treatment involves removing an area of tissue

from the cervix. Before this study, it was unknown whether the healing of this led to problems in childbirth, as the literature was equivocal. Some authors claim no effects on childbirth (Blomfield, Buxton et al. 1993; Cruikshank, Flannelly et al. 1995; Sagot, Caroit et al. 1995; Wright and Richart 1995; Raio, Ghezzi et al. 1997; Favalli, Lomini et al. 1999; Rooijen and Persson 1999; Althuisius, Schornagel et al. 2001; Mathevet, Chemali et al. 2003; Tan, Pepra et al. 2004). Others disagree and claim various effects (Leiman, Harrison et al. 1980; Hagen and Skjeldestad 1993; Forsmo, Hansen et al. 1996; Acharya, Kjeldberg et al. 2005).

Sharp and Saunders (1986) find that in the process of screening and treatment, many women feel they are painful and a small proportion of women even require a general anaesthetic for the treatment procedure. As the screening programme improved, the numbers of women screened has increased to approximately 80% of the target population over the last decade, but the figures for 2007 show a small drop in percentage terms but large drop in numbers terms of women to 79.5% (Patnick 2007). The fall in numbers has been attributed to women fearing the pain and embarrassment of the screening process, especially in the 25-29 age group. This has not led to research efforts to find a less invasive alternative. Instead, efforts have been made to persuade women to take part in the screening presently offered (Patnick 2007). This in part accounts for the continued use of a policy of performing a diagnostic colposcopy and LETZ treatment at the same outpatient appointment ('See and Treat'), as many clinicians feel women will not come back for a second procedure (Errington 2003). Unfortunately adopting this approach often results in a high false positive loop excision rate. In these circumstances, women have unnecessary treatment. Martin-Hirsch, Paraskevaidis and Kitchener (2000) confirm that best practice advocates prior colposcopy directed biopsy, which reduces the false negative loop excision rate.

1.4.1.1 Changing epidemiology

In the UK, the incidence of CIN has grown, particularly among younger women. This alone increases the demand for colposcopy, but according to Miller, Chamberlain, Day, Hakama and Prorok (1991), epidemiological evidence does not indicate increased aggressiveness of the disease. Screening at ages younger than 25, provides marginal extra benefit at the population level, because of the infrequency of invasive cancer at these young ages.

Cervical screening inevitably detects abnormalities that never progress to life threatening disease. This is due to the high prevalence of preclinical lesions in the young age groups, the majority of which do not progress within the next few years after detection, while many regress to less severe (Miller, Chamberlain et al. 1991). This has led to the financial costs of substantial over-treatment, and the accompanying emotional costs to the women involved. This is one reason the target population changed in 2003. Raffle, Alden, Quinn, Babb and Brett (2003) calculate that in the NHS cervical screening programme, around 1,000 women need to be screened for 35 years to prevent one death. For each death prevented, over 150 women have an abnormal result, over 80 are referred for investigation, and over 50 have colposcopy treatment.

Despite the reduction in target population, the number of women referred to colposcopy clinics for treatment has risen from 118,827 in 2003-2004 to 123,960 in 2007 (ONS 2004; Patnick 2007). Of those women, 22,577 in 2003-2004 had excisional treatments, the majority of which in this country is LETZ, with a decrease to 18,981 in 2006-2007 (ONS 2004; Patnick 2007). Unfortunately, the reported figures for results from those excisions are only for a 4-month sample (ONS 2004; Patnick 2007). Table 1 below shows a breakdown of some of the results given.

	2003-2004	2006-2007
Total number having excisional treatment (1)	7,526	6,327
Number where histology results known (1)	5,656	5,062
CIN 1 only	3,020	2,308
HPV infection or inflammation only	1,018	798
No abnormalities/no HPV/no inflammation	1,493	1,275
Total unnecessary excisions	5,531	4,381

(1) Estimated from yearly figures given.

Table 1 : England figures for pathology results of 4-month sample of excised tissue from the cervix.

Although the figures show a decrease in unnecessary excisions from 2003-2004 to 2006-2007, extrapolation to yearly figures, still means 13,143 women had LETZ unnecessarily in 2006-2007.

1.4.1.2 Changing demographics of positive smears

As seen in Table 2, p.20, an increasing proportion of the women who require investigation and treatment for abnormal smears of the cervix are young, and have

not yet started or not completed their families. Some are as young as 16 (Blohmer, Schmalisch et al. 1999) and local data reveals treatment on 17 year-olds (Errington 2003).

2006-2007	CIN 1	CIN 2	CIN 3
< 20 years	377 (10.7%)	67 (1.9%)	21 (0.6%)
20-24 age group	9,483 (6.9%)	2,665 (1.9%)	1,706 (1.2%)
25-29 age group	19,255 (4.4%)	6,280 (1.4%)	5,558 (1.3%)
30-34 age group	12,423 (2.8%)	4,071 (0.9%)	4,502 (1.0%)
35-39 age group	9,613 (1.9%)	3,150 (0.6%)	3,337 (0.7%)

(Bold figures are largest number or percentage)

Table 2: Degree of CIN by age group in 2006-2007.

As seen in Table 2 above, in 2006-2007, the 25-29 year age group has the most cases of CIN 3 reported on screening, compared to all other age groups. This is not only in actual number but also in percentage of the age group screened. This age group also has the most CIN 2 and CIN 1 detected by number, but the 20-24 years age group has the most by percentage of age group screened (Patnick 2007).

The study hospital has a policy of treating recurrent CIN 1 on repeated examinations with LETZ. This policy is not unusual in the UK. However, it has been known for some time that women with CIN 1 and high-risk HPV types on histology are much more likely to develop CIN 3 than those without these findings, but that large numbers of young women who have low grade CIN 1 or high risk HPV spontaneously clear one or both without intervention. This tempers enthusiasm for treatment of women with HPV or CIN 1, as does the recurrence of the detectable virus HPV six to twelve months following laser or LETZ for CIN with clinical clearance of HPV (Miller, Chamberlain et al. 1991).

1.4.1.3 Changing demographics of childbirth

Birth figures support the anecdotal evidence in society in general that suggests women are delaying childbirth to later in life, once they have established themselves in their careers or enjoyed a single life without ties for longer than their predecessors. The figures show that despite a decrease in the birth rate overall between 1993 and 2001 (from 673,467 to 594,634 births) the percentage of women giving birth at age 30 and over increases from 36% to 47% (ONS 2004). Even when the birth rate increases between 2001 and 2006, the number giving birth before 30

decreases to 51-52% (ONS 2007a). Below is the replicated table from the reports by the Office of National Statistics (Table 3).

Year	1993	%	2001	%	2003	%	2006	%
All ages	673467		594634		621469		669601	
Under 20	45121	6.7	44189	7.4	44236	7.1	45509	6.8
20-24	151975	22.6	108844	18.3	116622	18.8	127828	19.1
25-29	235961	35.0	159926	26.9	156931	25.3	172642	25.8
30-34	171061	25.4	178920	30.1	187214	30.1	189407	28.3
35-39	58824	8.7	86495	14.6	97386	15.7	110509	16.5
40-44	9986	1.5	15499	2.6	18205	2.9	22512	3.4
> 45	539	0.1	761	0.1	875	0.1	1194	0.2
< than 30		64.3		52.6		51.1		51.7
30 or >		35.7		47.4		48.9		48.3

(Figures in bold indicate largest percentage of births that year)

Table 3: Birth statistics by age of mother.

The peak age for CIN 3 abnormal smear results and therefore colposcopy treatment in 2006-2007 is 25-29. The peak age for giving birth in 2006 is 30-34. If the current trend for delayed childbearing continues, with the peak age being 30-34 and the percentage of births in those 30 and over increasing, then women still to give birth are more likely to have had colposcopy treatment than ever before. The importance of the study is its timeliness in investigating an effect that will become increasingly more prevalent in childbirth.

1.4.2 New vaccine for Human Papilloma Virus

There has been recent research into the use of a vaccine for the Human Papilloma Virus (HPV), which is now accepted as a dominant factor in CIN. HPV is a sexually transmitted virus of which there are over 100 different subtypes. More than 35 types of HPV infect the genital tract, but cancer of the cervix is thought to be predominantly the result of infection with 13 key (high risk) subtypes (Villa, Costa et al. 2005).

The majority of women infected by high-risk subtypes clear the virus spontaneously, but in a small percentage of women, it persists. The estimate is that the vaccine reduces abnormal smears by **up to** 80% (Villa, Costa et al. 2005). The target group for the HPV vaccine is prepubescent girls. As the age at birth figures shows, the majority of these girls will not give birth until age 30 years or over. That means it will take at least two decades for partial protection from HPV in the childbearing

population. Therefore, the Cervical Screening Programme will still be necessary for the present population for the next 20 years.

Even after gaining partial protection, 20% to 30% of smears will still be abnormal. To identify these smears, women will still have to undergo the invasive procedure of a cervical smear, at regular intervals in their lives. Given that, as mentioned earlier, the cervical screening programme needs to screen around 1,000 women for 35 years in order that one death is prevented (Raffle, Alden et al. 2003), future recommendations for cervical screening to date are undetermined. Developments of non-invasive markers for cervical cancer, such as the simple blood test for risk of prostrate cancer, are not at present being investigated. It looks increasingly likely that the mass cervical screening programme will continue with even less cost effectiveness. A full cervical screening programme that produces less positive results may lead to more over treatment as the number of abnormal smears decreases and fear of litigation increases. Therefore, the results in this study are of even more importance to counsel colposcopists into using caution. The new vaccine does not take away the importance of this study.

1.4.3 Ripening of the cervix

Ripening of the cervix is the phrase used to describe the changes in size and consistency during pregnancy that are thought to facilitate normal birth. Dilatation is the process of opening of the cervix, from being closed to being fully dilated i.e. when no cervix is felt around the head of the baby on digital vaginal examination. The exact process of ripening and dilation of the cervix remains unknown

Although childbirth is a continuous process that begins weeks before the birth of the baby, the birth or labour is arbitrarily divided for descriptive and medical purposes into three stages. The 1st stage is when labour starts until the cervix or neck of the womb, opens to 10cm or 'fully' dilated. The 1st stage of labour is also sub divided into 'passive' and 'progressive' stages. The 2nd stage is when the expulsive contractions push the baby through the birth canal and the woman gets an irresistible urge to help or 'push'. The 3rd stage is where the afterbirth is delivered either physiologically, by the woman pushing it out, or by 'active management' when the midwife pulls on the cord attached and removes it from the womb after an injection of syntocinon (Al-Azzawi 1998; Scott, Saia et al. 1999).

As seen from the above definition of the stages of labour, the cervix is only actively involved in the 1st stage. The cervix before labour faces posteriorly, is hard, 2-3cm long and closed. The definition of a closed cervix depends on whether the woman has given birth before. In a woman who has never given birth, it is totally closed. In a woman who has given birth before it is never totally closed, but always around 1-2cm dilatation or open (Al-Azzawi 1998; Scott, Saia et al. 1999). In labour, the cervix has to perform multiple tasks. It has to move from pointing posteriorly to pointing anteriorly. It has to soften and to thin. It has to open and be taken up into the main body of the womb, so that it no longer appears as a distinct entity. It is the only organ in the body to disappear! There are numerous theories on how the cervix works in labour.

Hinchliff and Montague (1988) argue that although it is now widely accepted that prostaglandins, particularly prostaglandin $F_{2\alpha}$, which the endometrium produces, initiates childbirth, the factors that actually determine the timing of the prostoglandins release have not been discovered. Several factors are known to be involved, but the whole mechanism underlying the initiation of labour is still unclear. Hours or days before labour contractions start, under the influence of relaxin and oestrogen the cervix became compliant, which enables it to dilate. The cervix derives its tensile strength and firmness from collagen, which is the predominant protein of the extracellular matrix of the tissue. Therefore, alterations in these biophysical parameters during labour and cervical dilatation are likely to involve changes in the organization of the collagen fibrils (Osmers, Rath et al. 1992; Leppart 1995). It may also be the result of the variation of glycosaminoglycans during pregnancy (Leppart 1995).

Insufficient connective tissue remodelling of the cervix has been shown to be a physical cause of poor progress in labour (Granstrom, Ekman et al. 1991; Olah, Henderson et al. 1993; Sennstrom, Ekman et al. 2000). The general emotional state of the mother and her fear/preparation for labour has also been shown to affect progress in labour. Watson and Royle (1987) posit that emotions and psychological reactions to stressful situations influence a woman's autonomic nervous system, which alters its control of visceral activities, and this increases or decreases the function of certain structures.

When tissue damage occurs, as in the excision of part of the cervix, the area heals by replacement of the destroyed tissue with living cells. Different tissue types heal in different ways. The muscular and elastic fibres in the cervix are of types that have very little or no regenerative capacity after structural growth is completed. The connective tissue and epithelial tissue are of types that exhibit a much greater ability to reproduce like for like cells.

Colposcopy.org (2005), claims that the excision of part of the cervical tissue in colposcopy treatments causes no problems in childbirth; there is little work on which to base this assumption. However, Bristow and Karlan (1999), assert that cervical stenosis can occur after conisation of the cervix. Gentry, Baggish, Brady, Walsh and Hungler (2000), state that a general reorganization of the cervical stroma during healing may lead to premature birth, but that typically these conditions are not detectable. In their research Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) find that reorganization and scarring of cervical tissue as it heals, changes in local defence mechanisms and subsequent infections may be responsible for any adverse outcome of pregnancies following excision of part of the cervix. If responsible for other adverse outcomes, it is logical to assume that progress in labour is also affected, which is one of the premises on which the study presented is based.

1.4.4 Colposcopy treatment

Most colposcopists suggest that there is a clear correlation between the abnormality in cells suggested by the cervical smear and the abnormal appearance of tissue seen through the colposcope. Treatment is 'See and Treat' (at the end of the colposcopy examination) or carried out at a separate, later visit when a positive biopsy result has been obtained. A small biopsy (punch biopsy) is taken from the worst looking area for analysis and confirmation of CIN by histology. Although punch biopsy is usually described as giving minimal discomfort, many women find that the procedure is embarrassing and painful. This is reinforced by the fact that in the study hospital 'See and Treat' is the method of choice, despite research findings that best practice is to wait for histology. The reason given is that many women do not return (Errington 2003).

Many forms of colposcopy treatment have been developed over the last few decades (Colposcopy.org 2005). Most are still in use to a lesser or greater degree. Priority in the research for new colposcopy treatments was the efficacy of the treatment. Conduction of research into the effect the treatment had on pregnancy and labour was always long after the colposcopy method was well established.

Rooijen and Persson (1999) and Forsmo, Hansen, Jacobsen and Oian (1996) find no difference in birth weight with laser vaporisation, and Rooijen and Persson also find no difference in premature births, type of birth or total duration of labour. Rooijen and Persson have a larger study of 236 women. Forsmo, Hansen, Jacobsen and Oian also state that there is reason to suspect that the effect of loop wire biopsy or LETZ will be similar, although no research had been conducted up to that time.

Mathevet, Chemali, Roy and Dargent (2003) investigate three techniques of conisation, cold knife, laser and LETZ. They use a randomised control trial with thirty-seven women allocated to each arm. They acknowledge that the small numbers in the trial mean that it needs to be repeated in a larger study and the numbers of pregnancies studied are only 9 for cold knife, 25 for laser and 12 for LETZ in their 3-year follow up study. They find Caesarean Section (CS) for cervical dystocia in one case of laser and one case of LETZ, but both are inductions for their pregnancy progressing past the estimated date that their baby was due, with no effect on premature births.

From the above research and others by Hagen and Skjeldestad (1993); Sagot, Caroit, Winer, Lopes and Boog (1995); Raio, Ghezzi, Naro, Gomez and Luscher (1997) and Favalli, Lomini, Schreiber, Ciravolo, Junasevic, Pecorelli and Bianchi (1999), laser vaporisation of the cervix seems the treatment of choice. Subsequent further investigation shows that the use of laser vaporisation is no longer recommended. Other methods are much easier to employ than laser ablation, and the equipment cheaper to buy and maintain. There is now a trend to utilise low morbidity excisional methods, either laser conisation or LETZ, in place of destructive ablative methods. Excisional methods offers advantages over destructive methods, in that the exact nature of disease and the completeness of excision/destruction of the abnormal cells in the transformation zone is defined (Martin-Hirsch, Paraskevaidis et al. 2000).

The most common form of treatment is called Loop Excision of the Transformation Zone (LETZ) in the United Kingdom, and Loop Electro-Excision Procedure (LEEP) elsewhere. A loop of wire through which an electric current flows shaves off abnormal cells. Like a tiny cheese wire, the loop cuts out the abnormal piece of tissue from the cervix, and seals up the area as it passes through (Colposcopy.org 2005). LETZ has the advantage over ablative techniques of providing a tissue sample for histological analysis.

In summary, although mass cervical screening saves some lives, it has its own side effects. Most colposcopists, obstetricians or midwives have until now, not acknowledged these side effects. As the demographics of LETZ treatment and age at giving birth change, more women are giving birth after LETZ and it is predicted that the new vaccine for HPV will take at least two decades before it has an effect on lowering the incidence of CIN. This underlines the importance of research into the effects of LETZ on childbirth and the rationale for the study presented is considered in the next section.

1.5 Rationale for study

As discussed in the previous section, the effects of all the cervical excisional treatments on labour were researched retrospectively. The method of Laser Ablation seems to have the least side effects, but does not give the most information to clinicians and is very expensive. LETZ is now in use at the study hospital. Not only is it the treatment of choice, it is also the recommended colposcopy treatment nationally (Colposcopy.org 2005). Despite the fact that the exact process of ripening and dilatation of the cervix remains unknown, cervical excision is thought to have no impact on labour. Only Bristow and Karlan (1999), Gentry, Baggish, Brady, Walsh and Hungler (2000) and Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) claim that adverse outcomes of pregnancy and childbirth are present after excision of part of the cervix. If responsible for adverse outcomes, it is logical to assume that progress in labour is also affected.

Despite the vaccine for HPV given to prepubescent girls, protection will not arise in the childbearing population for at least the next two decades. As it only prevents

70-80% of abnormal smears the remaining 20-30% still need detection. There seems no alternative at present but continuance of the Cervical Screening programme, with even less cost effectiveness and more costs that are emotional. An increase in young women treated, together with the trend for most women to delay childbearing to later in their lives (ONS 2007a), logically leads to increased numbers of women giving birth after treatment. The importance of the study is its timeliness in investigating an effect that will become increasingly more prevalent in labour.

The study seeks to determine whether there is an effect between LETZ and pattern and progress in labour, and use the results to influence the practice of obstetric, midwifery and colposcopy staff. Therefore, the positivist ideology that underlies the obstetric technological model of birth has to be acknowledged. Although this implies a positivist theoretical stance, the underpinning theoretical perspectives for this study are Holistic, Pragmatic, Post-modern Feminism, as previously discussed in Chp. 1 Section 1.2.1, p.4. From a pragmatic viewpoint, acceptance that the research is conducted within a system in which the medical perspective dominates and accommodating that within a holistic feminist framework, is necessary to the study.

For example the quantitative element (see Chp.4 and 5) of the study adapted more of a medical model approach which is in conflict with the author's standpoint, but necessary for the completeness of the study and to influence clinical practice. The case studies adopted more of an exploratory qualitative approach, more akin to the author's viewpoint, but the analysis and presentation adopted a transparent reporting approach using the subject's accounts to illustrate the themes. Thus in these cases the author's personal biases were managed through the combination of approaches.

1.6 Introduction to research

The research is located within the broad description of management of labour or childbirth. Its focus is progress during labour after a particular surgical treatment of the cervix for abnormal smears, LETZ. Progress is measured in various ways but increasingly the dominant measure is the ripening and dilatation of the cervix, the neck of the womb, by internal digital examination – Vaginal Examination (VE) (Sookhoo and Biott 2002; Stewart 2005; RCOG, RCM et al. 2007).

The lacuna in the research on the effects of cervical treatments is addressed by the study. Previous research concentrated on pregnancy outcomes such as premature births, low birthweight babies, mode of delivery and total duration of labour (Cruikshank, Flannelly et al. 1995; Ferenczy, Choukroun et al. 1995; Crane 2003; Tan, Pepra et al. 2004; Acharya, Kjeldberg et al. 2005; Kyrgiou, Koliopoulos et al. 2006; Bruinsma, Lumley et al. 2007). No research found looked at the pattern and progress of labour in women following colposcopy. The study investigates the effects of a particular cervical treatment, LETZ, on the progress in labour of women giving birth in a North East hospital.

1.6.1 Aims and outcomes

The aim of the study is to investigate whether LETZ treatment for abnormal smears of the cervix has an effect on progress in labour. The aim was refined through the start of the research, informed particularly by the pilot study phase. A further aim is to explore women's labour experiences after LETZ and the views of midwives.

The case study strategy, selected as the methodology, incorporates a quantitative case control investigation of labour, qualitative semi-structured interviews from women after the birth of their babies to explore their views of their experiences, qualitative semi-structured interviews from midwives who gave care to one of the women and interviews from a focus group of midwives, to explore midwives views. This strategy also investigates the anomaly of the apparent clinical differences seen, in the Pilot Study, between women having their second baby, but their first baby after LETZ, and women having their first baby after LETZ.

1.6.2 Research Questions

The study aims to answer the following research questions.

1. Do women feel that LETZ makes a difference to their labours?
2. Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour?
3. Are the differences clinically relevant?

4. Are the differences statistically significant?
5. Are there differences seen in both women having their first baby after LETZ and women having their second baby, but their first after LETZ?
6. Can differences in the management of women having their first baby and women having their second baby be identified that may mask true differences?

In order to compare the study with previous research comparing women with and without LETZ, the following secondary outcomes are examined. Partial validation of the results is achieved if major constructs identified by other researchers are reviewed.

- A. Are there differences in type of birth?
- B. Are there differences in number of premature births?
- C. Are there differences in birth weight of the babies?
- D. Are there differences in onset of labour?

In summary, the overall aim is to determine whether LETZ has an affect on the progress in labour and women's experiences of labour.

1.7 Structure of thesis

Chapter 1 introduces the reader to the researcher, the researcher's interest in the problem of LETZ affecting the 1st stage of labour and the research questions the study seeks to answer. It discusses the researcher's philosophical approach and outlines some of the background to the problem such as the cervical screening programme and changes in current birth demographics.

1.7.1 Chapter 2: LETZ and progress in labour

Chapter 2 covers the main literature on affect of LETZ on labour and management of progress in labour. It discusses the retrospective research on effects in labour, with research that looks at all stages of labour, when the cervix is the main component of the 1st stage only, and the lack of distinction between parity of women. This Chapter also reviews progress in labour and the ways that is measured, together with the assessment and management of progress in labour via the conflicting paradigms. It considers the demarcation of labour into stages, and further demarcation of the 1st stage into passive, progressive and deceleration phases. Chapter 2 concludes with an examination of the effect on women, when their labours do not conform to the 'normal' pattern, and the impact of the attitudes and language of caregivers.

1.7.2 Chapter 3: Pilot study

Chapter 3 discusses the pilot study undertaken before the main study. It is used to determine if the 1st stage of labour can be isolated and retrospective delivery notes used, to examine the differences in the pattern and progress of the 1st stage of labour between women who have previous LETZ treatment for abnormal smears of the cervix and women who have no treatment. It also establishes the types of data available for analysis and provides a guide as to expected size of differences, to enable power and sample size calculations to be made for a larger study.

This Chapter illuminates the research questions that the pilot study seeks to answer. It describes the design and methodology of the pilot study and the methods of data collection. Some interesting results are discussed, some of which contradict the results of previous studies.

1.7.3 Chapter 4: Main study

Chapter 4 discusses the methodological approach of the main study, in particular the use of a case study strategy. It identifies the context within which the study is set. This Chapter also encompasses a discussion on bias, validity and reliability. Chapter 4 makes explicit the aims of the study and the research questions it seeks to answer. It sets out the design of the study and the rationale behind that design.

The sampling techniques and the statistical tests used in the quantitative arm, and the purposive sampling used and the selection of documentary evidence in the qualitative arm are explained, as are the methods of randomisation and the instruments for data collection.

From the perspective of Holistic, Pragmatic, Post-modern Feminism, a mixed method approach is most appropriate. A retrospective case control study is used, that is embedded in a case study examination of the perceived differences of effect of LETZ on women having their first baby and women having their second baby, but their first baby after LETZ. This strategy also incorporates the views of the midwives who care for these women after LETZ. The combination of quantitative and qualitative approaches in the case study strategy is used to enhance understanding. This Chapter also discusses the ethical permissions required for the study to take place and the ethical considerations made.

1.7.4 Chapter 5: Data analysis and results

Chapter 5 details the analysis and discusses the results of the quantitative data, and qualitative interview data. It first gives an overview of the individual strands. These strands are then combined into Case Studies in Chapter 6, which discuss the combined results and their implications. Chapter 5 is divided into 2 parts.

1.7.4.1 Part One:

This section describes the quantitative part of the study, the demographics, the removal of cases with confounding variables from the sample data, and the details of the analysis by parity group. The clinically relevant differences for the 'passive' phase and the 'progressive' phase of the 1st stage of labour are given. An overview of the implications of the results is given, but full discussion is kept for the Case Studies in Chapter 6. The clinically relevant secondary outcome of premature birth differences is produced to compare this study's results to the results of other studies.

1.7.4.2 Part Two:

This section describes the analysis of the qualitative interview data that is part of the input into the Case Studies. The interview data comes from four women, three individual midwives who cared for one of the women, and a focus group of four midwives. This section describes the methods used to analyse the data, gives the

results, and compares the results to previous studies. The realisation that one of the research questions could not be answered and the various themes from women and the differences in themes from midwives are highlighted.

1.7.5 Chapter 6: Case Studies Discussion

Chapter 6 examines in detail the four Case Studies that incorporate all the above analyses, together with a discussion of how previous research impacts on these results. Fictitious names are assigned to the participants, and their birth journeys used to bring together the results of the study and the relevant previous research, together with the participants' experience and feelings about their labour.

1.7.6 Chapter 7: Discussion

Chapter 7 discusses the points made in Chapter 5: Data analysis and results and Chapter 6: Case Studies Discussion more fully, incorporating the previous research in these areas and the perspectives that the various studies represent. The complex of perspectives that surround assessment and management of labour have produced conflicts and tensions within the study and in midwifery practice in general. From the initial pilot study, the research questions for the main study are formulated, based on the different results found for women having their first baby and women having their second baby. These differences persist in the main study results. Chapter 7 discusses these results in more depth, including the secondary outcomes. It concludes with an examination of the limitations of the study.

1.7.7 Chapter 8: Conclusions and recommendations

Chapter 8 reviews the main points that emerge throughout the thesis and the impact these have on the study of progress in the 1st stage of labour of women after LETZ.. This Chapter concludes with recommendations for practice and further research. These recommendations include acknowledgement that normality in labour for women after LETZ has to be redefined.

Chapter 2

LETZ and progress in labour

2.1 Introduction

Chapter 1 outlines the research problem of the effect of LETZ on labour, and the aims and outcomes of the research. It describes the researcher's personal philosophy and the conflicting paradigms of holistic midwifery and technological obstetric models within which the study is situated. Of specific interest are the adverse effects of excision of the cervical tissue on pregnancy and labour outcomes identified by some researchers, which logically leads to an assumption that progress in labour is affected by LETZ. Chapter 1 links the decrease in age of those treated, to the trend among many women to leave childbearing to later in life, which results in an increase in numbers of women potentially affected by LETZ in labour. This underlines the importance and timeliness of the study.

Chapter 2 covers the main literature on the effect of LETZ in labour and management of progress in labour. The databases searched for this literature were MEDLINE, Embase, Dare, CINAHL, Cochrane Library, ProQuest Nursing Journals, Assia, Science Direct, Web of Knowledge, Wiley Interscience, AMED, Biomed Central, Cancerlit, Conference Proceedings and Citation Index, Health Services and Sciences Research, Ingenta Connect, INTUTE, from 1990. The terms used for the main literature review were Colposcopy or wire loop biopsy, LETZ, LEEP, LEETZ. Loop biopsy, LLETZ; Labour/labor, childbirth, birth, dilatation, dilation, progress of labour/labor, measurement of labour/labor; Pregnancy; Cervix or neck of womb, cervical, cervical treatment, abnormal smears, cancer of cervix, uterine cervix. References in the relevant literature identified other literature.

Chapter 2 discusses the retrospective research on effects in labour, and the narrowing of outcomes to the problems known in the old treatments, with the concurrent lack of open questioning of effects in labour. It describes research which looks at all stages of labour, when the cervix is the main component of the 1st stage only, and the lack of distinction between parity of women. This Chapter also discusses the plethora of statistical tests used.

Chapter 2 reviews progress in labour and the ways this is measured, together with the assessment and management of progress in labour via the conflicting paradigms. It examines the predominance of medical management and its

detrimental effect on midwifery skills. This Chapter considers the demarcation of labour into stages, and further demarcation of the 1st stage of labour into passive, progressive and deceleration phases. It justifies the use in the study of a specific point of transition, 4cm dilated, from passive to progressive phases. Chapter 2 concludes with an examination of the effect on women, when their labours do not conform to the 'normal' pattern, and the impact of the attitudes and language of midwives and obstetricians.

2.2 Research of affect of LETZ

Since its introduction in 1989, LETZ has become a popular treatment for women with CIN before long-term effectiveness and safety were fully evaluated. In a survey of United Kingdom Colposcopy practices, Kitchener (1991) reported that LETZ was the preferred treatment in a third of clinics asked. Bigrigg, Haffenden, Sheehan, Codling and Read (1994) reported that in 1992 more than 30,000 LETZ procedures were performed in the USA. Thus, LETZ had become the treatment of choice for many gynaecologists before long-term data was collected.

Previously research findings tended to endorse laser ablation as the way forward in colposcopy treatments, to minimise complications in labour (Sagot, Caroit et al. 1995; Raio, Ghezzi et al. 1997; Favalli, Lomini et al. 1999; Rooijen and Persson 1999). However, laser ablation is no longer recommended due to it providing no tissue for histopathological examination, difficulty in acquiring technique (Baggish, Dorsey et al. 1989) and increased costs of very expensive laser equipment (Ellman 1991; Martin-Hirsch, Paraskevaidis et al. 2000). Cruikshank, Flannelly, Campbell and Kitchener (1995) and Wright and Richart (1995) both find in their clinical trials that LETZ is faster and easier than laser ablation and to have similar complications and success rates.

The research literature to date is unable to use the medical establishments 'Gold Standard' of randomised control trials, as it is unethical to allocate women to not receive treatment if they have CIN. Therefore, all the research is necessarily retrospective regarding colposcopy treatment, and very few are longitudinal as the follow up time for all of the women is too great. Women in a 1990 case control study of the procedure were followed-up by cytology for longer than 2 years, and the

results claim LETZ to be a safe and effective procedure with no effect on menstruation or fertility (Bigrigg, Haffenden et al. 1994).

Other research has examined the various outcomes of intention to conceive, pregnancy complications, late miscarriage, premature birth, low birthweight, onset of labour, type of birth and admission of the baby to a Special Care Baby Unit (SCBU) (Bigrigg, Codling et al. 1991; Blomfield, Buxton et al. 1993; Haffenden, Bigrigg et al. 1993; Braet, Peel et al. 1994; Cruikshank, Flannelly et al. 1995; Ferenczy, Choukroun et al. 1995; Crane 2003; Sadler 2004; Tan, Pepra et al. 2004; Samson, Bentley et al. 2005; Kyrgiou, Koliopoulos et al. 2006; Bruinsma, Lumley et al. 2007). Often sub-analyses are performed for grade of CIN, dysplasia, size of loop used, age, parity and previous obstetric history. The majority of the research are retrospective case control studies with the colposcopy subjects matched to one or two controls, each by a variety of factors (Cruikshank, Flannelly et al. 1995; Paraskevaidis, Koliopoulos et al. 2002; Tan, Pepra et al. 2004; Acharya, Kjeldberg et al. 2005; Bruinsma, Lumley et al. 2007). The matching factors include one or more of parity; date of delivery; age; previous obstetric history; referral to colposcopy clinic; height; partner's social class; and smoking habits. The numbers of participants in these research studies vary from 28 to 571 colposcopy subjects with either one or two controls. The study presented matches each subject to two controls by age, parity, and year of delivery. It uses 111 colposcopy subjects and 214 controls.

Premature birth is a common outcome to most previous research but is defined differently in some studies. Althuisius, Schornagel, Dekker, Geijn and Hummel (2001) compare the subjects to the 'norm' of 40 weeks gestation and find a statistical difference in means of minus 5 days that is not clinically relevant, a normal term birth occurring anytime between 37-42 weeks (Scott, Saia et al. 1999). Most research defines premature birth as before 37 weeks gestation (Bigrigg, Codling et al. 1991; Blomfield, Buxton et al. 1993; Haffenden, Bigrigg et al. 1993; Braet, Peel et al. 1994; Cruikshank, Flannelly et al. 1995; Ferenczy, Choukroun et al. 1995; Crane 2003; Sadler 2004; Tan, Pepra et al. 2004; Samson, Bentley et al. 2005; Kyrgiou, Koliopoulos et al. 2006; Bruinsma, Lumley et al. 2007). The research by White, Lyndsay, Raynor, Graves and Birdsong (2001) and Mathevet, Chemali, Roy and

Dargent (2003), do not specify the gestation used. The study presented uses the definition of less than 37 weeks for premature birth.

The results of research to date are conflicting. Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) find that the colposcopy subjects have a higher prevalence of pregnancy complications than their matched controls, with a consistent picture of a relatively high level of problems when the size of the diathermy loop is 25mm. They conclude that their research confirms previous reports by Leiman, Harrison and Rubin (1980) and Raio, Ghezzi, Naro, Gomez and Luscher (1997) that the outcome of pregnancy is related to cone size, as regeneration may be impaired beyond a certain critical point of tissue excision. However, the authors admit that their research does not have the statistical power to draw definitive conclusions, as their research has only 79 colposcopy subjects of various parities and 158 controls. Tan, Pepra and Haloob (2004) claim less Caesarean Sections (CS) and more Spontaneous Vaginal Deliveries (SVD) in their colposcopy subjects. They have 119 colposcopy subjects of various parities, matched to one control by age and parity. However, in their results, there are more colposcopy women having their first baby and in the results of analysis, percentages only are used, with no explanation given for the statistical tests used to calculate the P values.

The only previous research to emerge from the literature review that investigates the duration of the first stage of labour, reports no differences (Blomfield, Buxton et al. 1993; Cruikshank, Flannelly et al. 1995; Tan, Pepra et al. 2004). Cruikshank, Flannelly, Campbell and Kitchener (1995) are the only researchers that do any sub-analysis by parity and length of 1st stages and 2nd stages of labour. They conclude that there are no significant differences. No other research found in the literature review includes sub-analysis by parity, although all mention including women having their first baby, and women having other births. Several of the research studies look at overall length of labour, despite the fact that the cervix is only involved in the 1st stage. The study is designed at the outset to analyse by parity, and uses only the length of the 1st stage of labour to define differences.

Several research studies have been undertaken to date, each looking at slightly different outcomes, each matching for different confounding variables, each using

slightly different statistical tests. Despite the lack of consistency, many of these are classed together in meta-analysis studies. Crane (2003) for example, applied meta-analysis to five case control studies that all have control groups and concludes that LETZ is associated with more premature births and low birthweight infants. The numbers in each case control study vary from 28 to 152 colposcopy subjects and controls; or are matched to 2 controls, giving 40 or 149 colposcopy subjects and controls of 80 to 298. Crane's meta-analysis looks at the outcomes of premature birth, low birthweight, CS, labour less than 2 hours, induction of labour and admission of baby to Special Care Baby Unit (SCBU). The results show that LETZ is associated with more premature births ($p = 0.006$) and lower birthweight ($p=0.04$). Crane includes in their meta-analysis Blomfield, Buxton, Dunn and Luesley (1993), Haffenden, Bigrigg, Codling and Read (1993), Braet, Peel and Fenton (1994), Cruikshank, Flannelly, Campbell and Kitchener (1995) and Paraskevaïdis, Koliopoulos, Lolis, Papanikou, Malamou-Mitsi and Agnantis (2002). The inclusion of Paraskevaïdis, Koliopoulos, Lolis, Papanikou, Malamou-Mitsi and Agnantis (2002), which looks at women treated for microinvasive cancer, as opposed to abnormal cells, may be seen as a flaw of this analysis as microinvasion necessitates deeper excision. In order that the study presented can be compared to previous research, it uses the secondary outcomes, which are reported in the majority of previous research studies, of premature births, birthweight of babies, type of birth and onset of labour.

Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaïdis (2006) meta-analysis compares all types of treatment - Cold Knife, LETZ, Laser ablation and Laser conisation (see Table 4, p.39). They include reported research found in a search of MEDLINE and EMBASE, between 1960 and 2004. Reported researches without a control group are excluded, as are those that do not report individual treatments separately. Outcome measures are conception rates, number of pregnancies, time to conception, premature birth (<37 weeks), CS, precipitous labour (<2 hours), Premature Rupture of Membranes (PROM), low birthweight, perinatal mortality, and SCBU admission.

Kyrgiou et al (2006)

Treatments	Searches	Exclusions	Outcomes
Cold knife	Medline	No control group	Conception rates
LETZ	Embase	Not reported by individual treatment	Number of pregnancies
Laser ablation	1960 to 2004		Time to conception
Laser conisation			Premature birth (<37 weeks)
			Caesarean Section
			Labour < 2hrs
			*PPROM
			Low birthweight
			Perinatal mortality
			*SCBU admission

*PPROM = Preterm Premature Rupture of Membranes

*SCBU = Special Care Baby Unit

Table 4: Criteria for inclusion in and outcomes for Kyrgiou et al (2006).

Data are analysed using random-effects model and Relative Risks (RR) and 95% Confidence Interval (CI) are calculated with Revman 4.2 software. Heterogeneity among research studies for every outcome is assessed by use of the Q test (defined in Cochrane's Handbook to Revman 4.2). Confounding variables are excluded by subgroup analyses for studies with matching factors (age, parity, smoking), research studies that apply self-matching, research studies without matching or with less than the above 3 factors, and research studies after exclusion of those that use self-matching. Further sub-analyses are the dimensions of excised tissue and risk of premature birth according to depth of tissue (see Table 5, below).

Kyrgiou et al (2006)

Analysis	Sub group analysis	Results
Revman 4.2	Matched by age, parity, smoking	Increase in premature birth
Random-effects model	Self-matching	Increase in low birthweight
Relative Risk	No matching or less than the 3 above	Increase in PPROM
95% CI	All studies except self-matching	Increase in premature birth if depth of tissue > 10 mm.
	Dimensions of excised tissue	No change in CS
	Risk of premature birth by depth of tissue	No change in labour < 2hrs
		No change in perinatal mortality
		No change in SCBU admissions

Table 5: Types of analysis and results from Kyrgiou et al (2006).

Risk of premature birth increases if depth is greater than 10mm, conflicting results are found for less than 10mm depth. A sub-analysis of grade of disease is not feasible due to this not being reported in most of the research. The study presented uses depth of tissue excised in its sub-analyses and grade of CIN.

Most of the research in the meta-analysis investigates only LETZ (Blomfield, Buxton et al. 1993; Haffenden, Bigrigg et al. 1993; Braet, Peel et al. 1994; Cruikshank, Flannelly et al. 1995; Paraskevaïdis, Koliopoulos et al. 2002; Tan, Pepra et al. 2004; Samson, Bentley et al. 2005). However, Sadler (2004) looks not only at LETZ but also at laser treatments. Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaïdis (2006) meta-analysis is an update of Crane (2003) using modern software and including the research by Tan, Pepra and Haloob (2004), Sadler (2004) and Samson, Bentley, Fahey, McKay and Gill (2005).

From the results of that meta-analysis, LETZ shows significant increase in premature birth (RR=1.70), low birthweight and PROM, with no increase in CS, precipitous labour, perinatal mortality or admission to SCBU. Statistical methods used to explore publication bias, identify the theoretical possibility of 3 studies that can be assumed as existing but not published. That shifts the estimated effect of premature birth to non-significant. Three is a very small number to change the results and this statistically weakens the robustness of LETZ adverse effects, as does the inclusion of the research on micro-invasive cancer rather than CIN. That inclusion may be biased in that one of its authors, Paraskevaïdis is also co-author of the meta-analysis, a point also made by Bruinsma, Lumley, Tan and Quinn (2007). However, when this author reviewed the meta-analysis, after removal of Paraskevaïdis, Koliopoulos, Lolis, Papanikou, Malamou-Mitsi and Agnantis (2002), it did not alter the overall findings for outcome of premature birth after LETZ. The meta-analysis groups together the results of research studies that all have their own outcomes and different methods of statistical analysis.

Bruinsma, Lumley, Tan and Quinn (2007), is the latest and largest research study to date, of all types of colposcopy treatments. Their research looks at all women who are referred to the colposcopy clinic at an Australian centre, and have a subsequent birth recorded in the regional birth database. The numbers used are 1,682 women who have colposcopy treatment and 2,294 controls. The main outcome measure is

number of premature births, defined as less than 37 weeks. They used Standard Prevalence Ratios (SPR) for age-specific rates for premature birth, and Odds Ratio (OR).

The authors of that research claim that, before confounding factors are accounted for, LETZ increases the incidence of premature birth. However, the OR is 1.91, whereas the power calculations before the study show it is only capable of assessing a 3.5 difference in the LETZ group. This is due to only 69 (3.6%) of the total treated women in the study, (n=1682) having LETZ as their treatment. After adjusting for confounding factors, the only treatment that still increases the risk of premature birth is ablative cryotherapy. Although Bruinsma, Lumley, Tan and Quinn is the largest research study to date, it only looks at a small number of subject women who have LETZ (69), due to the report authors' acknowledgement that Laser Ablation is their preferred method. The study presented in this thesis is larger with a sample of 111 subject women who have LETZ.

The Australian study by Bruinsma, Lumley, Tan and Quinn follows the pattern of medical studies previously, in that it concentrates on the outcome of premature birth. It suggests that Laser ablation does not result in premature births, but does not mention the pre-pregnancy problems of reduced fertility, and inability to have any tissue for histology to ensure all affected areas are removed. Its recommendation that 'See and Treat' be avoided is confirmed by best practice guidelines in the UK (Colposcopy.org 2005), as research has proven it leads both to over treatment of low grade CIN that normally resolves spontaneously, and to deeper incisions than are necessary.

Most research studies specifically state that the pregnancy being investigated is the first pregnancy after treatment (Bigrigg, Codling et al. 1991; Cruikshank, Flannelly et al. 1995; Althuisius, Schornagel et al. 2001; Crane 2003; Tan, Pepra et al. 2004; Samson, Bentley et al. 2005; Bruinsma, Lumley et al. 2007). Blomfield, Buxton, Dunn and Luesley (1993) and Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) do not specify first pregnancy after treatment but it is implied. There is no indication in White, Lyndsay, Raynor, Graves and Birdsong (2001), that the pregnancies examined are the first after treatment. Ferenczy, Choukroun, Falcone and Franco (1995) and Mathevet, Chemali, Roy and Dargent (2003), specifically

state that they include more than the first pregnancy, albeit only on one woman. The study uses only the first birth after LETZ in its analyses (see Chp. 4; Section 4.4.2.1, p. 95).

In most of the research studies found in the review, the concentration is on comparing the outcomes to the known detrimental outcomes of Cold Knife Conisation. There is little attempt to move outside of that mindset. Gentry, Baggish, Brady, Walsh and Hungler (2000) is the only research to look at cervical treatments differently. They selected 20 women and measured their cervix before treatment with LETZ and three months after treatment. They conclude there are no differences in the lengths of the cervix that can explain adverse results, but postulate that a general reorganization of the cervical stroma during healing could lead to premature birth. Six of the 20 women measured appear to have grown their cervix in length after LETZ, compromising the validity of the results. Blomfield, Buxton, Dunn and Luesley (1993) and Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) claim the rate of pregnancy complications in general, and infections in particular, are significantly higher among colposcopy subjects in comparison to controls. They agree with the proposition of LETZ affecting the cervix and state that reorganization and scarring of cervical tissue as it heals, and changes in local defence mechanisms and subsequent infections, may be responsible for any adverse outcome of pregnancies following LETZ.

A plethora of statistical tests has been deemed suitable for the analyses of the results in these previous research studies. Blomfield, Buxton, Dunn and Luesley (1993) and Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) uses t-test for paired comparison for continuous variables and compares the subject score to the mean of the controls score. Conditional logistic regression is used for proportions, and correlations are tested using Pearson's product-moment correlation. Crane (2003) uses Mantel-Haenszel χ^2 and calculates the Odds Ratio (OR) of each outcome in their meta-analysis. In Tan, Pepra and Haloob (2004) percentages only are used, and no explanation is given for the statistical tests used to calculate the P values. Althuisius, Schornagel, Dekker, Geijn and Hummel (2001) use Wilcoxon signed rank test. Cruikshank, Flannelly, Campbell and Kitchener (1995) use t-test for continuous variables, Mann Whitney U-test for gestation and Chi Squared for categorical variables.

The more recent studies use SPR and OR (Bruinsma, Lumley et al. 2007) or RR (Kyrgiou, Koliopoulos et al. 2006), which reflect a growing tendency in medical literature to analyse and report results in this way. From the vast variety of statistical tests in use, it is apparent that there is no consensus on the type of data being analysed. Indeed some of the tests in use, such as the t-test, are inappropriate for use with the non-normal distribution of data. The study presented uses Relative Risk (RR) for the analyses, which reflects the change in reporting of medical studies. It also uses Mann Whitney U test (MWU), which is the more powerful of the non-parametric tests, suitable for use on non-normal distributions.

In summary, from its introduction in 1989, various researchers have looked at a variety of pregnancy outcomes after LETZ. From a research quality perspective, the various choices of statistical tests are worrying. Tests usually used in randomised control studies are used, without regard to the type of data collected. The studies vary in methodology and therefore it is difficult to aggregate these studies. Their results vary, and therefore their evidence is equivocal. Importantly, none of the research already completed into the effects of cervical treatments takes cognisance of the woman's experiences during labour.

Most studies investigate both mothers having their first baby and mothers having other births. Although all emphasise the need to include both groups, and cite the differences in the pattern and progress in labour in these groups as justification, only Cruikshank, Flannelly, Campbell and Kitchener (1995) do any sub analysis by parity. They find no difference in pregnancy outcomes, or in the length of the 1st stage of labour, i.e. that part which involves the cervix. A study that plans at the outset to analyse by parity is long overdue, as is the examination of women's experiences.

LETZ is in use at the study hospital. Not only is it their treatment of choice, but the recommendation for colposcopy treatment nationally is to use this treatment. The inclusion of only women who have LETZ enables the removal of type of colposcopy treatment as a confounding variable. Further limiting the inclusion of women to those treated after 1997, enables the use of the colposcopy database, set up in 1997.

2.3 Progress in labour

This section reviews the research literature on progress in labour and the different ways this is measured, together with the assessment and management of progress in labour via the conflicting paradigms. It examines the hegemony of technological obstetric management and its detrimental effect on holistic midwifery skills. This section considers the demarcation of labour into stages, and further demarcation into passive, progressive and deceleration phases. It explains the use in the study of a specific point of transition from passive to progressive of cervical dilatation of 4cm.

2.3.1 *Invasive methods*

The competing perspectives and ideologies of the technological obstetric model and holistic midwifery model surround management of labour (see Chp. 1; Section 1.3, p.6 for discussion). This includes assessment of progress during labour.

Measurement of the dilatation of the cervix is a relatively modern phenomenon. Emmanuel Friedman (1954) initiated this trend with his careful study of thousands of normal and abnormal labours with serial cervical examinations in the 1st stage, and defined the expected rate of progress and patterns that might indicate a labour abnormality. A graphic labour curve, referred to as the Friedman curve, is used to detect these patterns (Farrington and Ward 1999). He achieved his aim of identifying maternity cases that needed transfer to remote hospital facilities in Africa. It was adopted in the Western world where the same conditions do not apply. Measuring progress in labour became measuring dilatation of the cervix as an imperative with the introduction of active management of labour. Prior to this, progress was measured by the behaviour of the mother, the frequency and strength of the contractions and the amount of the baby's head palpable abdominally. (Sookhoo and Biott 2002), argue that one of the ways of avoiding uncertainty is to rely upon conventions and put trust in procedures. Therefore, the use of 3cm dilatation of the cervix is often adopted as an indicator of the commencement of labour. This measure presupposes that every woman's cervix reacts in the same way. Where LETZ has been performed, this supposition may not hold.

2.3.1.1 Mechanism of labour

Labour is a normal physiological process that commences with effacement and dilatation of the cervix, uterine contractions of increasing frequency, length and intensity, and proceeds to the birth of a child (Farrington and Ward 1999). A more medical view states –

“Labour, in its simplest terms, is the force of uterine contractions overcoming resistance of the female reproductive tract including the lower uterine segment, cervix, vagina, and perineum.”
(Dudley 1999, p.438)

At term, biochemical changes occur in the cervix, which make it softer in consistency, sometimes shorter, and in some women open slightly (Read and Wellby 1985). This is known as ripening of the cervix. The precise mechanisms of these changes remains unknown (Osmers, Rath et al. 1992; Leppart 1995; Steer and Flint 1999). Since the 1990's it has been accepted that labour not only depends upon adequate uterine contractions of the uterine smooth muscle, but also on changes in the connective tissue of the uterus and, more particularly, the cervix. If these connective tissue changes do not occur, labour does not succeed, no matter how strong the contractions (Read and Wellby 1985). As postulated in the previous section about research studies on the affects of LETZ on labour, LETZ may affect the changes in the connective tissue of the cervix (Leiman, Harrison et al. 1980; Raio, Ghezzi et al. 1997; Gentry, Baggish et al. 2000; Acharya, Kjeldberg et al. 2005).

2.3.1.2 Three stages

It is considered fundamental that medical students understand the mechanics that culminates in birth, in order to understand progress in labour (Vande-Vusse 1999a). The conventional divisions of the components of labour are first identified in the medical literature for students. Labour is arbitrarily divided into three stages for descriptive purposes (Read and Wellby 1985). The medical establishment define these stages to help follow progress in labour and identify women who have an abnormal labour, which may be helped by intervention. These stages or divisions are unequal in length. The one concerned with the cervix is the 1st stage, and therefore it is this stage that is affected by LETZ.

Farrington and Ward (1999) state that the usual definition of 1st stage is from the onset of regular uterine contractions until the cervix is fully dilated. It is further

arbitrarily subdivided into three phases; the passive phase, the progressive phase, and the deceleration phase (Read and Wellby 1985; Farrington and Ward 1999). Part of the fundamental change underlying the process of 1st stage is progressive dilatation of the cervix. This gives rise to the familiar symptoms and signs of labour. The cervix is richly supplied with nerve endings, and when it starts to dilate, this produces the characteristic pain of labour. The dilatation of the cervix reduces the support for the amniotic membranes around the baby, which bulge through the cervix, and often the rupture of these membranes is the initiating phenomenon of active labour (Steer and Flint 1999).

The passive phase of the 1st stage is characterised by a gradual increase in contractions. Contractions become stronger in intensity, longer in duration, more frequent and better coordinated. It is also characterised by effacement of the cervix, which is progressive shortening of the cervix, this continues in the progressive phase until it no longer protrudes into the vagina and cannot be distinguished from it. There is also minimal dilatation of the cervix (Read and Wellby 1985; Al-Azzawi 1998). The mother's discomfort can be minimal to severe. Steer and Flint (1999) claim this phase during which the cervix dilates only very slowly is often very demoralising for the mother. Farrington and Ward (1999) restate that the passive phase can be intermittent over several days, or it can last only a few hours. Progress in the passive phase is assessed with the Bishops Score (see Appendix A, p.262), a score based on not only dilatation of the cervix but thinning and softening of the cervix, position of the cervix and position of the presenting part of the baby .

When the cervix is approximately 3cm dilated, or when the Bishops Score is equal to 11, is the indication in use in the medical model for the onset of the progressive, or active, phase of labour (Steer and Flint 1999). The contractions become much stronger and very regular. The rate of cervical dilatation increases markedly, and the presenting part descends well into the pelvis. By the end of the 1st stage, with most women, the contractions occur every two to three minutes and last 40 seconds or more. As the contractions become stronger, they also become more intense. Dudley (2008) agrees with Vahratian, Hoffman, Troendle and Zhang (2006) that the 1st stage is of variable duration and is longer in women having their first baby. This phase of labour is predictably associated with increased discomfort for the mother (Read and Wellby 1985).

Various definitions are given for the average rate of normal labour. Steer and Flint (1999) claim that the Bishop Score changes by 1 point per hour for the first birth and 1.6 points per hour for future births. Read and Wellby (1985) state that the average rate of cervical dilatation in women in their first birth is 1cm per hour, and for future births 1.6cm per hour, while Dudley (2008) and Farrington and Ward (1999) claim all women normally have cervical dilatation in excess of 1cm per hour. Steer and Flint claim a reasonable time from 3cm to 10cm dilated (or full dilatation) varies from 8-12 hours for first births and 3-8 hours for other births, while Farrington and Ward claim up to 5 hours for first births and 2 hours for other births. These are the timescales against which 'slow' or protracted labours are judged. A prolonged progressive phase is attributed to be the result of inadequate uterine contractility. This is often despite the timing, and strength of uterine contractions appearing to be normal, and the cervix continuing to change slowly, with or without oxytocin infusion. Dudley (2008) confirms that oxytocin therapy is often not successful in accelerating labour. These changes in the cervix may well be influenced by LETZ and it may be that this needs to be taken into account when defining 'normal' progress.

The deceleration phase goes unnoticed in many labours. It occurs at the end of the progressive phase and simply represents the observed relative slowing of dilatation when the cervix is close to being fully dilated (Farrington and Ward 1999). Some authorities do not recognize the deceleration phase and claim that prolonged time in achieving complete dilation from 8cm is an ominous sign (Dudley 2008).

The 2nd stage of labour occupies the time from full dilatation of the cervix until the baby is born. The 3rd stage of labour involves the separation and expulsion of the placenta and membranes. The management of these stages is another thesis in itself. As the section of birth that involves the cervix is the 1st stage, these other stages are not discussed in the study.

2.3.1.3 Vaginal examination

The purpose of obstetric Vaginal Examination (VE) is primarily to determine dilatation of the cervix. Lai and Levy (2002) assert that the VE is an invasive examination, which often causes women distress and discomfort or pain. As in this quote from one woman -

"I had vaginal examination twice. It is very uncomfortable for a woman to be in that situation, it bothers you psychologically more than physically. The doctor is used to performing these kinds of medical examinations but you can never expect a woman to get used to that"

(Kabakian-Khasholian, Campbell et al. 2000,p.106-107)

VE is usually performed to assess progress in dilatation of the cervix, but also provides other information, such as presentation of the baby and level of presenting part. Good practice suggests that VE includes assessment of the following; the softness or firmness of the cervix, degree of effacement (thinning), dilation of the cervix, location of the cervix with respect to the axis of the birth canal (vagina) noted as anterior or posterior, and the level of the presenting part (Farrington and Ward 1999). The origins of VE as a method of labour assessment are uncertain. Historical documents suggest it was routine practice in the 19th century, when it was recommended that the examination be carried out at least three times: at the onset of labour, when the membranes ruptured and when contractions gained strength (Stewart 2005). Repeated measurements of dilatation of the cervix are a relatively new phenomenon, the trend started after Friedman's work, mentioned previously, for identification of women needing transfer to remote hospital facilities in Africa..

The number and frequency of VE varies from hospital to hospital and from labour to labour. In an audit of hospital policy in the UK, Tindall (1995) suggests that maternity units have a policy of three to four hourly VE. However, Stewart (2005) in her study claims the actual number performed exceeds this figure in 71% of cases. Although the guidelines in the study hospital state 4 hourly VE, in the study women have 2-9 VE, with on average only 2 hours 40 minutes between examinations. This finding replicates those in the study by Stewart. Frequent VE increases a woman's expectations for progress in labour that may not be realistic; in addition, such examinations are uncomfortable and increase the risk of infections (Farrington and Ward 1999).

Findings on a VE differ depending on the parity of a woman (how many births she has previously). In a woman having her first baby, labour usually starts with effacement of the cervix, with or without contractions, followed by dilatation of the cervix. Conversely, in other births, labour often starts with cervical dilatation followed by effacement. The amniotic membranes may be intact or not (Read and Wellby

1985; Al-Azzawi 1998). Women having their first baby and women having other births behave fundamentally differently in labour. Indeed, the Friedman curve reflects two different curves or labour patterns for women having their first baby or others (Farrington and Ward 1999). Buchmann and Libhaber (2007) conclude in their study that findings on a VE also vary between practitioners who perform the VE, be that midwives, obstetric staff or consultant obstetricians, often by 1-2cm but that is enough to change the definition of a labour from 'normal' to 'dystocia'. The study postulates that LETZ affects the dilatation of the cervix. The study shows this medical reliance on dilatation results from VE is not appropriate for these women.

2.3.1.4 Pharmacological pain relief

The increased availability of pharmacological methods of pain relief, further affects the labours of women. Opiates based pain relief, such as Diamorphine and Pethidine, affect the cooperation of the woman in the birth process, restrict her movements and dull her senses. Epidural pain relief means she has to labour on a bed, and is continuously attached to an Electronic Foetal Monitor (EFM) that continuously records the foetal (baby) heart rate and the contractions. Epidural interferes with the release of the natural Beta-endorphins and interferes with the woman's full participation in the birth process. Epidurals increase malpositions of the baby's head by slowing rotation (Illuzzi, Magriples et al. 2003), which increases Instrumental births (Cunningham, Levenko et al. 2001; Illuzzi, Magriples et al. 2003) and increases the use of oxytocin (Cunningham, Levenko et al. 2001). Epidurals are also implicated in maternal temperature rises, with concomitant rise in baby's heart rate that increases CS (Fusi, Steer et al. 1989; Goetzl 2008; Steer 2009). Use of EFM means that the woman is exposed to the very heavy false positive indications of that particular monitoring, resulting in more interventions and an increase in CS (Walsh 2008).

2.3.1.5 Prolonged labour (Dystocia)

Progress in labour is difficult to predict. The likely strength and frequency of uterine contractions are unknown, the ease with which the cervix softens and dilates and the extent of moulding of the baby's head are also unpredictable elements. Equally, the complex rotation of the baby necessary for an efficient labour to take place properly, can only be anticipated not calculated (Steer and Flint 1999). Various definitions are used for normal labour throughout the UK and the world. Dudley (1999) claims normal labour progresses in a predictable fashion after the diagnosis

of labour is made. Alternatively, Oakley and Houd (1990) state that normal labour progresses at a rate that is normal for each individual woman.

Dystocia, literally translated, means 'difficult childbirth' and includes all labour abnormalities that occur in women during childbirth (Pearsall 2001). As the above discussion of time frames in the section on the 1st stage of labour illustrates, there is no real consensus on the time frame for normal labour. The precise incidence of dystocia is difficult to determine and varies with different maternity units, based on local practice patterns. In 1990, 30% of the CS in USA were for dystocia and 36% for previous CS (Dudley 1999).

One medical opinion of the increase in dystocia is –

“...results from environmental changes that are developing more rapidly than Darwinian natural selection. Humans are poorly adapted to the affluence of our modern diet, and the result is dystocia.”

(Cunningham, Levenko et al. 2001, p.496)

No evidence is given for this supposition. Other medical opinion believes that tighter control of the definition of progressive 1st stage of labour will be the answer to the continued rise in CS rates. Stewart (2005) and Dudley (2008) feel that incorrect diagnosis of progressive labour puts more women in the definition of 'dystocia' than is necessary. NICE (2007) obviously agrees, as the definition of the start of the progressive phase of the 1st stage of labour was recently changed from 3cm to 4cm cervical dilatation. It has apparently not occurred to the policy makers at NICE that perhaps they need to look at the definition of time scales for normal. Lavender, Alfirevic and Walkinshaw (1998) question the time scales and their research concludes that the CS rate is decreased markedly, if women's labours are allowed to deviate from the 'normal' time parameters by up to 4 hours before any interventions. Publication of that data has not changed medical practice. Given the likelihood that, following LETZ, women's labours may not be conventional, the study is further justified.

2.3.2 Normal physiological methods

*“Birth is illogical not dangerous. It is a social phenomena not a medical one.”
(Fisher, Hauck et al. 2006, p.74)*

The above quote describes the philosophy of a holistic midwifery approach to care. In an ideal situation, midwives use holistic assessment and treat every woman's pregnancy and childbirth in the context of herself and her family. An ethos of watchful expectancy is the norm in midwifery, with midwives adept at taking cues from the mother's behaviour, both verbal and non-verbal. This ethos involves confidence in women to give birth, without the necessity to intervene. It views childbirth as something that women do, rather than as something that is done to them. It encourages women to adapt to the physiological and psychological stresses of childbirth, with their own coping mechanisms. These coping mechanisms are assisted by endogenous forms of pain relief, Beta-endorphins, which are released into the circulation at times of stress. The levels increase throughout pregnancy and labour and contribute to the woman's ability to cope with the birth (Cluett, E. 2000).

2.3.2.1 Observation and women's behaviour

In the early stages of a birth, women are mobile without difficulty, engage in conversation with midwives and family and are able to enjoy light snacks. As labour progresses their mobility takes more effort, they have difficulty in conversation and are not keen to eat. The timing, frequency and length of contractions are observed by the woman's behaviour. Transition, the point at which dilatation is complete and women are about to feel the urge to push, often manifests itself, in many women, as irrational behaviour, short temper or feelings of being out of control. This is recognised more by midwives than obstetricians and is usually given one line in obstetric textbooks, if it is mentioned at all.

A line of red/purple discolouration, which arises from the margin of the rectum and extends upwards between the buttocks, known as the 'red line', is a clinical sign in use by midwives. It indicates progress in labour without vaginal examination, full dilatation indicated when it reaches the nape of the buttocks (Byrne and Edmunds 1990; Hobbs 1998). Dilation of the anus or rectum is an indication that full dilatation is achieved, as is the uncontrollable desire to push. Timing, length and intensity of

contractions are also determined by the mother's sounds during labour. A change in the noise the mother makes during contractions, to a more guttural sound, is an indication that the second stage is about to begin, and that the woman's cervix is fully dilated. Listening in to the baby's heart intermittently, with a pinnard stethoscope at the end of a contraction, monitors the baby's well being during birth.

2.3.2.2 Abdominal palpation during labour

Abdominal palpation is a less intrusive way of monitoring progress in labour if the midwife is unsure of observations only. Palpation reveals many other pieces of knowledge that the midwife uses, together with her observations of the mother's behaviour and sounds, to form her view of progress in labour. Contractions are confirmed abdominally, by placing a hand on the mother's abdomen. The length of the contraction can be timed and strength of contraction ascertained, a more reliable way of determining an increase in strength than electronic monitors (Olah, Henderson et al. 1993). The length of contractions deduced by sound, are shorter than on palpation, as the mother does not react to the contractions until they reach a certain level.

The presentation, position and descent of the baby can be ascertained by abdominal palpation during the 1st stage of labour. The two main criteria, for progress in labour, are the patterns of uterine contractions, and the descent and flexion of the baby's head determined by abdominal palpation. If labour is progressing normally, contractions become stronger, longer and more frequent (Stuart 2000). Almost all women in labour experience this pattern of progressive contractions and descent. Observation and abdominal palpation (as described above) do not rely on dilatation of the cervix measurements. As the study indicates that LETZ affects the dilatation of the cervix, it will be better to monitor progress in these women by non-invasive methods.

2.3.2.3 Elements of birth (the Ps)

In medical terminology the '3Ps' that are important in birth are Powers, Passage and Passenger, first identified in the medical literature for students. For a normal birth, each of these three factors has to fulfil its own role, and has to interact efficiently with the other two factors (Al-Azzawi 1998). The Powers are defined as uterine contractions and maternal voluntary pushing efforts during 2nd stage. The Passageway is defined as the maternal bony pelvis and related soft tissues,

including the lower uterine segment, cervix, pelvic floor muscles, vaginal canal and introitus. The Passenger is defined as the baby. The baby's head in the optimal circumstances is the leading part in labour.

In a more holistic study by Vande-Vusse (1999a), mothers identify 13 Ps. They include the above three and nine others. Place of birth and Position choice of the mother, are two of these and are self-explanatory. Physiology, the other sensations felt as part of sympathetic nervous system responses to the intensity of labour e.g. vomiting and large muscle shaking, is another. Psychology of the mother is a powerful influence and is demonstrated when women decide to take control with their minds, or wills, and deliver their baby. People are also identified, other people present, friends, other labouring women etc as support for the woman. Women also identify the Politics of the social norms, as expressed in childbirth videos (no noise etc), and Pressure, denoted by feelings of not being involved in decision-making. Procedures performed by midwives are identified by women, as contributing to the control of women's labours. Also identified are Professional providers as agents of control and as essential factors affecting labour. Preparation by the mother is also identified, with women identifying themselves as active agents of control. Without knowledge of how LETZ affects labour, how is it possible for women to be properly prepared for labour?

2.3.3 Medical predominance

Although there are other ways of determining progress in labour, explained in the previous section on Non –Invasive methods, the medical preference for concentrating on the dilatation of the cervix remains pervasive worldwide. This is despite there being no accurate way of determining the exact dilatation when examining a woman during VE, and research shows intra-operator differences, the most recent by Buchmann and Libhaber (2007).

Stages and phases of labour are artificial constructs, in use for clinical management purposes, rather than physiological markers (Steer 1994). Timing of the different stages of labour have become a key means for determining 'normal' labour from 'abnormal labour' worldwide, although there is little consensus on the time parameters. It is acknowledged by medical authorities worldwide, that prolonged labour can increase maternal and infant morbidity and mortality, without a definition

of what exactly constitutes prolonged labour (Gould 2000). Silverton (1993) states that for progress of labour to be considered 'normal', it should be within normal limits, but fails to specify the limits, perhaps because of national and international variations. However, Friedman, (1954); O'Driscoll, Meagher and Boylan (1995), WHO (1999) and Enkin, Keirse, Neilson, Crowther Duley, Hodnett and Hofmeyr (2000) have taken the concept of progress in 'normal labour' further, and have set actual time parameters. Yet, these time parameters used to determine 'normal labour' are inconsistent. As Gould (2000) suggests this is probably because they are based on dubious evidence, and do not take cognisance of the latest research by Lavender, Alfievic and Walkinshaw (1998).

Despite disparity between knowledge and practice when it comes to timing of labour and essentially the use of arbitrary time parameters imposed on imprecise measurable parameters (cervical dilatation) of normal labour, midwives and obstetricians use time to determine prolonged labour. This is evidenced by the use of cervical dilatation rate alone, as an indicator of progress in labour and the consequent use of set alert and action lines in the WHO partogrammes (WHO 1999) which determines when to intervene. The alert line is set at a cervical dilatation rate of 1cm per hour in the progressive phase of labour, and WHO defines active labour as beginning from 3cm dilatation. If cervical dilation is slower than 1cm, WHO recommends transfer to a unit with facilities for CS, if already in such a unit, intervention that increases the rate of dilatation (Gould 2000). Prompt diagnosis of prolonged labour is of importance in underdeveloped countries, where easy access to good medical aid in an emergency is not always possible, and involves a lengthy journey (Gould 2000), but there is less justification in the developed world for such a proscriptive protocol.

In summary, an appreciation of the tremendous range of normal is critical for the management of the 1st stage of labour. The primary goals are to monitor the baby's well-being, support the woman through what can be a very long and uncomfortable time and offer intervention when it becomes appropriate (Farrington and Ward 1999). Although not often regarded as an instrument of technology, the Clock is omnipresent in all delivery/labour rooms, and Time dominates birth in the 21st Century. Time is the basis of all the arbitrary parameters attached to 'normal' labour

and, due to non-adherence to these timescales, the basis for all the other technology and obstetric interventions that are employed.

Almost all women, in most developed countries, give birth in hospitals, which leads to providers of maternity services with no genuine yardstick against which their care is measured. The entire modern obstetric and neonatology literature is essentially based on observations of medicalised birth (WHO 1985b; Wagner 1999). The stages and phases of labour are artificial constructs rather than physiological markers. Inappropriate management of individual women can result, if fixed parameters are used to define all aspects of labour. Inappropriate management may be more marked in women after LETZ, due to the changes in the cervix.

To define the transition from 'passive' to 'progressive' stages, the study presented uses a definition of 4cm dilatation of the cervix. From the Pilot Study a Bishop's Score of 11, one of the definitions of 'progressive' 1st stage of labour (Steer and Flint 1999), is more often associated with 4cm dilatation. Vaginal examinations are subjective assessments, one examiner defines a woman's cervix as 3cm dilated, and another examiner defines the same cervix as 2cm or 4cm dilated. Three centimetres was the criteria for progressive labour in the guidelines of the study hospital, at the time of this study. Taking 4cm as the starting point for progressive phase in the qualitative part of this study, also accounts for variations in measurement from different examiners.

2.4 Effects on women of progress, language and attitudes

If cervical treatments have an effect on labour, then this leads to an effect on women and the way they perceive their labours. From the woman's point of view, progress in labour, interventions in labour and instrumental births are as important as the outcome. Not only have interventions, and instrumental births, been shown to decrease women's satisfaction with their birth experience and increase the length of hospital stays, but they are identified as predictors of Post Traumatic Stress Disorder (PTSD) and Postnatal Depression (Prince and Adams 1987; Creedy, Shochet et al. 2000; Soet, Brack et al. 2003). The literature on women's experiences is arranged to follow the themes present in the women's stories of their births in the study, to allow easier cross referencing.

2.4.1 Negative language/attitudes and feelings of failure

Research has shown that many women feel inadequate giving birth. Women's perceptions are that they are not adhering to the 'norm', and this is partly due to the language used by midwives and obstetricians. Research on language used in labour, reveals that negative language decreases women's self esteem and ability to cope with labour (Bastion 1992; Zander 1997; Fowles 1998; Green and Baston 2003; Kitzinger 2004). Negative medical language affects not only the kind of care received, but also how women think about and experience their bodies. Kitzinger (2005) describes some of the language used; that the woman's cervix is 'failing to dilate' or 'not performing', so medical staff prescribe oxytocin that stimulates the uterus further, which enhances labour or makes it 'perform' better. As LETZ alters the functioning of the cervix, these women could be subject to negative language. This language is often proscriptive and can appear threatening to women, as in the following quotes from calls to a helpline, which was set up to help women talk out their feelings after a bad birth experience -

"I was told I could kill my baby"

"It was my fault because I didn't push hard enough"

"I couldn't move. They said I had to lie on my back. When I moved it interfered with the print-out from the monitor"

(Quotes from women who called the Birth Crisis helpline (Kitzinger 2004)

Simkin (1996) finds that negative caregiver attitudes result in a more negative self-image for women after birth, and positive attitudes result in a more positive self-image. This is especially important, as Waldenstrom (2003) claims that the negative events around birth increase in significance over time, whereas positive aspects stay the same. In a study analysing a convenience sample of 15 women's stories, Vande-Vusse (1999b) states that when decision making is unilateral by the caregivers, women are more negative about their birth experience. Green and Baston (2003) define negative attitudes as staff being unhelpful, rude, offhand, bossy, insensitive, inconsiderate and condescending or any selection of these. Although they state that negative attitudes do not affect women's feelings of control, they find that positive attitudes, defined as being treated with respect and consulted about options, do. It is perhaps a flaw in their questionnaire-based research that these aspects, that are mirror images of each other, do not reflect the same results on feelings of control.

From a convenience sample of seventy-seven women, nine weeks postnatal, Fowles (1998) finds that women are frustrated about; their lack of control in labour, feeling vulnerable in labour, lack of knowledge of what actually happens in labour (how to push, posterior position labour, induction), and negative perceptions of health care providers (perceived rude behaviour, uncaring interactions and undesired actions). As in this woman's experience of VE, reported in Vande-Vusse (1999b) study of women's own birth stories in America, who still has unresolved negative emotions about the birth while preparing to have her next baby –

"...he put his hand inside the vagina to see everything's okay. I understand that. But, it was so uncomfortable. And I said, Please don't do that, it hurts! He didn't say anything; he just got up and sat down... And then I thought, Oh! I offended him...after I listened to this (recording), I thought, how, why was I so polite? He was actually unpleasant a couple of times, just in this real short time that he was there"
(Quote from a woman in Vande-Vusse 1999b, p.45-46)

Women's control may be decreased by the affect of LETZ on the cervix resulting in their labour being defined as 'abnormal', and this can lead to decreased satisfaction with the birth experience. Decreased satisfaction with the birth experience is a contributing factor in postnatal depression (Prince and Adams 1987). In a survey of one hundred and three women in late pregnancy, with follow-up interviews approximately four weeks postnatal, Soet, Brack and Dilorio (2003) find 30% of women are partially symptomatic for PTSD. CEMACH (2005), identifies suicide as the leading cause of maternal death, and the latest figures show that cardiac problems have just overtaken suicide (CEMACH, 2007), leaving no doubt that psychological morbidity in childbearing women is a significant and pressing issue.

2.4.2 Pain relief

Windridge and Berryman (1999) find that women aged 20-29 years report that caregivers intervened in a way that worsened pain, i.e. in being asked to move into certain positions, for VE or EFM that are uncomfortable, or increase the severity of their pain. Soet, Brack and Dilorio (2003) conclude that pain experienced during the birth is a significant predictor of PTSD symptoms, especially pain during the 1st stage of labour. Green and Baston (2003) state that the ways women are helped to deal with pain, affect their perceptions of control. Conversely, McCrea and Wright (1999) find that feelings of personal control influence positively the women's satisfaction with pain relief during labour.

Cunningham (1993) finds that women, who use pain relief, express considerably fewer positive feelings about their birth experience than their peers. In a survey of 295 women's experiences in Sweden, Waldenstrom, Borg, Olsson, Skold and Wall (1996a) conclude that women usually experience severe pain, but despite that most are satisfied with their own achievement and think they have coped better than expected. These findings show that a positive birth experience does not necessarily preclude pain and distress and confirms the multidimensional character of the birth experience. It also shows that women's assessment of their labour is influenced by both physical and psychosocial factors, which highlights the importance of a holistic approach to care in labour.

2.4.3 Interventions lead to negative feelings

The research literature is ambivalent about the effect of the number of obstetric interventions. Green and Baston (2003) state it has no effect on women's feelings of control while Creedy, Shochet and Horsfall (2000), Soet, Brack and Dilorio (2003) and Fowles (1998) contradict this. Kitzinger (2005), talks about the 'cascade of intervention', the application of one intervention leading to other interventions. Such as, obstetric staff prescribing oxytocin to stimulate the uterus further and bring the labour back to the 'normal' parameters. This leads to mandatory use of EFM and increases the severity of contractions. Increased severity of contractions leads to a greater need for pain relief, often an epidural. Epidurals lead to more Instrumental births by forceps (Illuzzi, Magriples et al. 2003) or CS (Fusi, Steer et al. 1989; Goetzl 2008; Steer 2009). Electronic Foetal Monitor use leads to an increase in Instrumental births, and increase in CS (Walsh 2008). Instrumental births by forceps lead to episiotomies, which lead to perineal suturing. Caesarean Sections lead to abdominal wounds, catheterisation of the bladder, and longer recovery time from the birth.

Creedy, Shochet and Horsfall (2000) find women with high levels of obstetric intervention and dissatisfaction with their care, are suffering PTSD, findings echoed by Soet, Brack and Dilorio (2003). Creedy, Shochet and Horsfall conducted telephone interviews with 592 women 4-6 weeks postnatal, and conclude that approximately 1 in 20 women are suffering PTSD, while a third have some of the symptoms, a finding confirmed by Soet, Brack and Dilorio. Creedy, Shochet and Horsfall also find that Instrumental birth by forceps is as traumatic as CS for women,

and that a highly significant correlation between high levels of obstetric intervention and low levels of satisfaction with care, increase the likelihood of acute trauma symptoms after birth. Their solution of preparing women more fully, for the types and levels of interventions in use, seems a complicit acceptance of the obstetric technological model of birth. No mention is made of modelling more holistic care that reduces the level of interventions. No research is found in the literature review on women's feelings about the intervention of LETZ; negative feelings may be reinforced by further intervention and negative language.

2.4.4 Positive language/attitudes from others

Vande-Vusse (1999b) finds that when decision making is shared, women have a more positive view of their birth and Fowles (1998) finds that women identify midwives, husband, 'staff' and doctors as those who help make a positive birth experience, findings confirmed by Fisher, Hauck and Fenwick (2006). Dzakpasu and Chalmers (2005) state that continuity of care is important to mothers. Cunningham (1993) concludes that of midwife attended births, 61% rate midwives as high as possible for support and encouragement, and 63% rate midwives as high as possible for contributing to their feelings of wellbeing.

2.4.5 Loss of control/power

When medical staff in a North American hospital are asked to define a 'good patient' one doctor answers - "She does what I say, hears what I say, believes what I say" (Kitzinger 2004). The emphasis is that a good patient is compliant; she thanks the professionals because they 'save' her baby and she is grateful regardless of what they do to her. Green and Baston (2003) sent questionnaires to 1146 women one month before birth, to assess their preferences and expectations and again at 6 weeks after birth, to discover their experiences and assess psychological outcomes. Whether they already have a baby is strongly associated with feeling in control, with women having their first baby feeling less in control, than women having other births. Feeling in control of what staff are doing, is associated with fewer depressive symptoms after the birth, for both women having their first birth and women having other births.

Women who have to contest medical decisions, or adapt to them when they do not agree with them, are more negative about their births (Vande-Vusse 1999b). As in this woman's experience -

"I mean, we had talked all this over before. And she agreed to everything that I had wanted. Then, at the time of the birth, actually things were a little bit different than I had authored. I was stuck in that bed because of the monitor being there."
(Quote from a woman interviewed in Vande-Vusse 1999b, p.47).

Loss of personal control is identified as the main factor in fear of childbirth by Fisher, Hauck and Fenwick (2006) and is a major concern of postnatal mothers in the study by Fowles (1998). McCrea and Wright (1999) find that being in control is often associated with satisfaction with pain relief in, but loss of control does not always equate to loss of power, as Davis-Floyd (1994) reveals many women feel that strength and power come from relinquishing control to the birth process.

2.4.5.1 Relinquishing responsibility and control to authority

Davis-Floyd (1994) documents how women absorb the prevalent technocratic hegemony, and how this translates into their acceptance of someone else, the obstetric authority figure, being in charge of their labour. Kornelsen (2005) study into technology in birth confirms this view. Medical management of labour decreases the control experienced by birthing women, creates a power imbalance between the woman and the midwife/obstetrician, and deprives the woman from a potentially empowering experience.

Kornelsen, in a non-random sample of 25 home birth mothers, and 25 low risk hospital birth mothers (several of whom wanted a natural birth), finds that hospital birth mothers feel they are 'flexible' about obstetric technologies, but that flexibility is a double edged sword. An efficacious strategy when approaching new and unknown situations, it also creates an opening for the imperatives of technology, and a more extreme form of flexibility results in the relinquishing of responsibility and control to medical practitioners. Kornelsen contends that at the heart of a woman's ability to question, is the ability to conceive of an alternative and that alternatives are not often presented to labouring women, they are only presented with the established practice. Women who have LETZ are only presented with the established practice; as to date no research evidence shows the patterns of their labours are affected.

Vande-Vusse (1999b) reports that many women relinquish control to authority, on the assumption that caregivers' professional knowledge and technological expertise are superior to their own innate knowledge, a view echoed by Harrison, Kushner, Benzies, Rempei and Kimak (2003). Women report numerous instances of control in their birth stories, predominantly exercised by the health caregivers, particularly through the application of various obstetric technologies and procedures.

Sometimes that control is reluctantly given as in this woman's experience of EFM –

"I said, Why, I can take the cords with me, and they wouldn't let me....I had to use a bedpan. And that upset me... I had to have a bowel movement, so I had to sit up; meantime, the IV is getting all messed up, the blood is coming through the tubes...I'm crying, Just let me go to the bathroom. No, they wouldn't let me...."
(Quote from a woman in Vande-Vusse 1999b, p.46)

2.4.5.2 Helplessness

Many women feel helpless in their lack of knowledge, about specific problems or procedures, during and after childbirth (Fowles 1998), and feelings of helplessness or powerlessness are significant contributors to PTSD symptoms in the study by Soet, Brack and Dilorio (2003). In a study of 22 women by Fisher, Hauck and Fenwick (2006), women feel helpless due to - fear of the unknown; horror stories; general fear for the well being of the baby; fear of pain; losing control and disempowerment; and uniqueness of each birth.

2.4.6 Intuition

Some women follow the 'alternative ideologies' to the prevailing technocratic birth. These women believe that themselves and their baby are one, (that is they do not believe in the mind-body divide that is central to Western medicine), are more likely to believe in their power to give birth and to listen to their intuition or 'birthing force' (Davis-Floyd 1994; Viisainen 2001; Kornelsen 2005). Most of these women choose to give birth at home. These women feel deeply that female physiological processes, including birth, are healthy and safe, that mother and baby are one and that there is an inner knowing that can be relied upon during their births (Davis-Floyd 1994). These women often regard their intuition or 'inner knowing' more highly than the medical authoritative knowledge. None of the women in the study by Davis-Floyd (1994) who chose to give birth in hospital report much respect for or reliance on their own intuition or 'inner knowing'.

In Kornelsen's study the intuition is rephrased as the 'birthing force' ((Kornelsen 2005). Many of the women in that research study who plan to have home births saw birth as the link between their internal and highly individual processes and a 'birthing force'. Some refer to a kind of inner logic within the birth process that is beyond understanding. All of these women describe something that has its own reasons, a force greater than women, even if, as is the case in childbirth, it is realized through women and is a resource for women during birth. Kornelsen indicates that fear and pain are affected by acceptance of and surrender to the 'birthing force'.

Viisainen (2001) is another researcher who also stresses the importance of intuitive knowledge during pregnancy and women being able to trust their intuitive knowledge and trust their ability to give birth. Trusting their ability and intuitions and being in control are key determinants of a 'natural' birth in the women's stories in her study. The atmosphere at the woman's own home, the presence of the husband, family and an experienced midwife, all help women to trust their own abilities. One woman is astonished by her own strength -

"One thing that became clear to me in this birth is that I gave birth trusting my own strength. We have such powers inside if we only knew how to use them; So that we would dare to go against the directions given by society and do what we feel is right."
(Viisainen 2001, p.1114)

2.5 Summary

From its introduction in 1989, various authors have researched a variety of pregnancy outcomes after LETZ. From a quality of research perspective, the various choices of statistical tests are worrying. Tests usually used in randomised control studies are used, without taking note of the type of data they are analysing. Most studies investigate both mothers having their first baby and mothers having other births. Although all emphasise the need to include both groups and cite the differences in the pattern and progress of labour in these groups as justification, only Cruikshank, Flannelly, Campbell and Kitchener (1995) do any sub-analysis by parity. They find no difference in pregnancy outcomes, or the length of the 1st stage of labour, which is that part which involves the cervix. The study that plans, at the outset, an analysis by parity groups is long overdue.

The previous studies vary in methodology, and therefore it is difficult to aggregate them. Indeed, their results vary and therefore the evidence to date is equivocal until the recent research by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaïdis (2006) and Bruinsma, Lumley, Tan and Quinn (2007). None of the published research in the literature review into the effects of LETZ took cognisance of the woman's experience during labour. Although the exact process of ripening and dilation of the cervix is still unknown, LETZ is not thought to alter this process in labour. There is little work on which to base this assumption. The study seeks to provide the evidence that there is an association between LETZ and progress in labour. It seeks to use these results to change the expectation that the labours of women after LETZ conform to the 'normal' pattern. The study's results, once disseminated, will improve the quality of care for these women.

Measurement of the dilatation of the cervix is a relatively modern phenomenon. Obstetricians dislike uncertainty; therefore, division of labour into discrete parts, division of the interplay of forces in labour into three physical parameters and the definition of an active phase at 3cm dilatation, all reassure that labour can be controlled. Although medical education, and medical textbooks, strive to ensure evidence-based practice in medicine, with a low value on authority, and a high value on evidence in decision making; practice is often still based on authority or 'expert opinion', what experts think is right will be right (Peterson, Meikle et al. 1999). The definition of normal labour varies throughout maternity units in the UK, and indeed throughout nations of the world (Gould 2000), providing strong indications that these definitions are not evidence based. Vaginal examinations, that are unpleasant for women, are used unnecessarily when there are no problems in labour, and are a very imprecise measurement of progress; the exact flaw obstetricians use to dismiss midwifery methods of assessment. This reliance on VE disadvantages women who have LETZ as their cervix does not dilate in the 'normal' manner.

If labour onset and progression is a seamless transition from pregnancy, which involves a cascade of events that culminate in birth, it seems self-evident that there are multiple control mechanisms and 'fail-safe' pathways, as is the case in other complex biological systems. Although there is increasing knowledge about uterine function and the processes of labour, precise mechanisms remain obscure and incomplete. This leads to the conclusion that, physiologically, there is no distinction

between passive and progressive phases, and that the demarcation point is based on observed events and experience (Cluett 2000). A comprehensive approach to care during labour that considers women's situations and their individual desires, acknowledges that birth is complex. This acknowledgement is particularly relevant to women after LETZ. This enables care for women to be holistic (Vande-Vusse 1999a).

The language used in labour, when their bodies do not 'perform' in the way the medical establishment has decreed as 'normal' affects women negatively. They are made to feel a failure and powerless. When they are supported to give birth naturally, the results are different. If birth really unfolds the way a woman wants, this is not so much a 'nice' experience as a profound one. It increases their self-esteem and confidence, they find the natural process of birth empowering and this seems to last long term (Davis-Floyd 1990; Edwards 1997b).

Definition of a pattern of labour after LETZ will alert both clinicians and women to their 'normal' pattern and perhaps remove unnecessary interventions from their care. However contrived demarcation of labour into various stages is, it has to be acknowledged that to change practice, it is necessary to abide by the terms that are used by the dominant hegemony i.e. obstetrics. From the pilot study, BS of 11 is more often associated with 4cm dilatation and as vaginal examinations are subjective assessments, 4cm is taken as the starting point for the progressive phase, in the Quantitative part of the study.

Chapter 3

Pilot study

3.1 Introduction

Chapter 2 discusses how LETZ became the dominant treatment for CIN and the variety of outcomes in previous research. It describes research looking at all the three stages of labour, when the cervix is the main component of the 1st stage only, and the lack of distinction between the parity of women. The previous Chapter also reviews progress in labour and the ways this is measured, together with the assessment and management of progress in labour via the conflicting paradigms. It examines the views of midwives and concludes by describing and discussing the resulting effects on women when their births do not conform to the 'normal' pattern.

Chapter 3 discusses the pilot study conducted before the main study. As Teddlie and Tashakkori (2009) state, pilot studies are a useful way of developing research questions in an emergent design, demonstrating the feasibility of the study to others, and validating research instruments. A pilot study was necessary in order to determine if the 1st stage of labour could be isolated. It also determined if retrospective delivery notes could be used, to examine the differences in the pattern and progress of the 1st stage of labour, between women who had previous LETZ treatment for abnormal smears of the cervix and women who had not. It was used to establish the types of data that were available for analysis and provided a guide as to expected size of differences, to enable power and sample size calculations to be made for the main study.

Although there had been earlier research into the effect of LETZ on labour, as was illustrated previously in Chp. 2; Section 2.2, p.35, most of the research did not concentrate on the 1st stage. No previous study was found that suggested expected outcomes, to enable calculation of size of difference, power and sample size. This Chapter illuminates the research questions that the pilot study sought to answer. It describes the design and methodology of the pilot study and the methods of data collection. The pilot study raises some interesting points that this Chapter discusses, including the differences between time in the 1st stage of labour, type of delivery of baby and dilatation at admission, some of which contradict the results of previous studies

3.2 Aims

The overall aim of the pilot study was to examine the effect of LETZ of the cervix for abnormal smears on the pattern and progress in the 1st stage of labour. To this end, the pilot study sought to answer two questions:-

1. As the cervix is the major organ involved in the 1st stage of labour, could information from that stage be isolated in order to compare differences?
2. Can delivery data be used to examine whether a difference in labour existed, between women who had a baby after a previous LETZ and those who had a baby after no treatment?

As the information from the 1st stage of labour was routinely gathered in the study hospital, in the form of VE four hourly or less, it was proposed that the information from these examinations could be isolated to compare the differences in women's labours. It was not clear if the delivery notes would have enough detail, for examination of the differences, therefore a pilot study was required. This was fundamental to the study, as in order to convince clinicians of the need for change; 'hard' quantitative data was necessary to augment the qualitative data from women.

3.3 Design and Methodology

The design of the pilot study replicated previous studies' design (see Chp. 2; Section 2.2, p.35), as it used retrospective data from notes and frequency-matched 2 controls for each subject. It was a retrospective case control design (Bowling 2009), with information from women's obstetric notes and colposcopy database. This choice reflected the pragmatic stance of the author but the design varied from the design of previous studies, in that it planned at the outset to examine and analyse the data by parity groups (how many babies women had before the birth). This was one of the limitations identified in most of the previous studies, that although all mentioned including women of all parities in their studies, because of the difference parity makes to the woman's labour, none of the studies had analysed by parity. This pilot study was the first step in addressing this omission.

Another limitation of previous studies was the lack of definition of the 1st stage of labour and the point from which calculations were based. The pilot study established a point at which the measurement of time in the 1st stage was taken. As 1st stage was commonly divided into 'passive' and 'progressive' stages and previous studies did not identify if they were using total length of both parts in their measurement of 1st stage, or the dilatation from which their measurements started, the pilot study rectified this and defined both these points. This type of design is discussed more fully in the methodology section of Chp. 4; Section 4.4, p.89.

3.3.1 Sample

The sample was taken from the population of all women living in the North East who delivered at the study hospital in 2001. For feasibility by a lone researcher, it had to be placed in one locality. This did not preclude the results being applicable to the general population of women who had a baby after LETZ, as the catchment area of this hospital included representation from most social groupings. Delivery data were taken from the obstetric notes of women who had given birth in this hospital in 2001.

The notes of women who had LETZ before giving birth were accessed and 2 matched controls identified for each of these women. Control women were matched for age (plus or minus 3 years) and parity at delivery. All were women who gave birth in 2001. All were women who gave birth after 24 weeks gestation. The decision to allocate two controls to each subject woman was to accommodate the range of analgesia options, as these have known effects on progress in labour (Wagner 1996b; Howell, Kidd et al. 2001). It also meant that analgesia options were less likely to confound the variables under study. Statistical advice resulted in the target figures of 30 subject women and 60 control women agreed as being a sample size that would answer the pilot study questions.

Women's details were accessed from the computerised database of all women who delivered in 2001. This enabled the identification of subject women who had LETZ and control women who did not, prior to accessing their notes and prior to accessing subject women's LETZ details from the colposcopy database. The colposcopy database was started in 1997; therefore, it was necessary that subject women had their LETZ after that time. In order to access consistent colposcopy data, as well as

limiting to one locality, only subject women who had their LETZ at the same hospital as the one they gave birth in were chosen.

Time constraints limited the randomisation of subjects and controls; therefore it was a convenience sample that was used (Creswell 2003). Subject women were identified from the computerised database, and then sorted by hospital number. This unique hospital number was allocated to each person on first attendance at hospital for an inpatient or outpatient episode. Therefore listing the women by the number gave a random list. This list was searched in numerical order, until both LETZ and obstetric notes were found in medical records for that subject woman. All available notes were used for the subject women.

Having determined which women in 2001 had no LETZ before the birth; they were first stratified by parity, and then sorted by date of birth. The notes for each control woman were accessed from medical records by taking the 1st date of birth, then the last, then the 2nd, then the 2nd last etc. for each parity group until two control women were allocated to each subject woman. As a quality control check, the first 10 sets of medical notes of control women were also inspected, to ensure that the data in the computerised system was correct and to confirm they had not had LETZ. As all the records were correct it appeared reasonable to no longer ensure both sets of notes were available for the control women.

3.3.2 Ethical considerations

Ethical approval was granted for the pilot study, as part of the ethical permissions granted for the main study. Access to data was already available for research in the study hospital and all women attending for birth or treatment at this teaching hospital were aware that data pertaining to their treatment might be used for research purposes. Despite this, ethical considerations were made, ensuring that no identifying features of the data were included in the dataset used for analysis. (See Appendix B, p. 263 for copies of ethical permissions).

3.3.3 Data Collection

When the LETZ data in the medical notes were examined, several of the notes were incomplete. The medical notes were paper filed and often the colposcopy details had been lost, mislaid or entered in a non-standard format. The colposcopy

practitioners at the hospital had also judged the quality of the colposcopy data in the notes as poor. Therefore, in 1997, a colposcopy database was started for the input of all details, which enabled colposcopy audit to be undertaken and robust statistics to be sent to the national colposcopy register. This database was used to extract the colposcopy data for women in the study.

The data was collected using standardised data collection forms for biographical details; colposcopy details; and delivery details, ensuring consistency (See Appendix C; D and E, p.270-273). The delivery data were taken from the details on the partogrammes in the women's notes. Details of LETZ were taken from the colposcopy database. These details were also transcribed onto a standard data sheet. In order to ensure consistency in data collected and to pilot data collection forms for the main study, data collection forms were produced. These forms were peer reviewed by colposcopists and midwives respectively, and amended as necessary following their comments.

The data was entered from the standardised data collection forms into the statistical package SPSS 11.0 and cross-checked for accuracy before analysis. The process of data collection evolved to ensure that uniformity of information was collected. The peer review of the data collection forms and the use of the colposcopy database, were to ensure uniformity of data collection. Formal identification and use of the procedural steps in the data collection provided internal validity to the data collection process and enabled confidence in the quality of the data.

3.4 Analysis

This section discusses the results and analysis of the pilot study. As well as providing data for use in power and sample size calculations, the pilot study raised some interesting points that this section discusses, some of which contradict the results of previous studies. It also enabled tightening of the parameters of the study in order to produce meaningful data in the main study.

3.4.1 Statistical input

Data was input into SPSS 11.0 and this was used for all analyses. Statistical advice was sought and gained for the sample size for the pilot study and was given on

analysis of the data as it was collected and explored. The distribution of the data did not follow the 'normal' distribution curve. According to Bland (2000), when biological data from human subjects is being dealt with, it very rarely does. Attempts were made to adjust the data into a normal distribution using the logarithms of the numbers but these still resulted in a non-normal distribution. Most statistical tests depend on a normal, or slightly skewed distribution for their validity; therefore it was important to establish that the tests were not dependant on this assumption.

The fact that the numbers of control women were twice the number of subject women also affected some statistical tests. The Mann Whitney U (MWU) test was used to compare the data as this is commonly regarded as the most powerful of the non-parametric tests. Parametric tests, such as the Student-t test used in previous studies, should only be used in data with a normal distribution (Campbell and Machin 1999; Bland 2000). The Mann Whitney U Test was used for all continuous data and Fishers Exact Test was also used which is valid for categorical data using small numbers (Bland 2000). Since the start of the pilot study, the reporting of clinical research results in medical journals had changed to using Relative Risk (RR) or Odds Ratios (OR). Therefore, both were calculated for the pilot study where possible.

3.4.2 Passive and progressive definitions

As the pilot study investigated whether LETZ for abnormal smears of the cervix affected the 1st stage of labour, i.e. that part of labour where the cervix softens, thins and dilates; it focused on the period from start of progressive labour to full dilatation. The measure already in use in the study hospital was dilatation of the cervix, therefore this measure was chosen. Unfortunately, it was difficult to determine the start of the progressive phase, due to the arbitrary time during their labours at which women presented to hospital. It was equally impossible to know what the detail of their progress in labour was when they were still in their own homes. Only on admission to hospital were women examined vaginally, and so had their dilatation of the cervix estimated.

This made comparisons difficult, because like was not being compared with like. The starting point varied between 1cm and 10cm. It became necessary to define the point in their labour from which the comparisons in time were made. In order to

better understand the data, it was necessary to divide the labour into early 1st stage 'passive' and later 1st stage 'progressive'. It still left various dilatations to contend with, but all within the definition of either progressive or passive phase of the 1st stage of labour. These phases and the definition of 'progressive' used in this study is discussed in Chp. 2; Section 2.3.3, p. 53.

For the purposes of the pilot study a dilatation of 4cm on VE, accompanied by regular painful contractions, was taken as the start of the progressive phase of labour. Measurement of time of 1st stage was taken from examination greater than or equal to 4cm, to full dilatation (approximately 10 cm).

3.4.3 Demographics

Thirty women in the study had LETZ and 60 did not. Parity (how many births the women had previously) was from 0 to 4 (see Table 6 below).

Parity at birth of baby						
LETZ women Controls	Parity at birth of baby					Total
	0	1	2	3	4	
	6	11	10	2	1	30
	12	22	20	4	2	60

Table 6: Parity at birth of total sample.

The age range was 20 years to 37 years. Each subject woman was frequency matched to two control women who were within three years of their age. Subject women were also frequency matched for parity and year of baby's birth. In practice the control women only varied from the subject women in age by up to two years, 9 (30%) had controls exactly the same age, 18 (60%) had controls within one year of their age and 3 (10%) had controls within 2 years.

3.4.4 Division into sub-groups

A major premise of this study is that other research stated the effects of parity on the length of labour (Read and Wellby 1985; Dudley 1999), but then ignored parity in their analyses (see Chp. 2; Section 2.2, p.37). Therefore, this section describes the division of the data into parity and the removal of cases with confounding variables. Further tightening of the definitions of the groups, aided the examination of the data and enabled comparisons that were more meaningful. Even with the small subject

numbers in the pilot study, many differences were clinically relevant and some were statistically significant. The removal of cases with confounding variables was reasoned and did not seek to corrupt the data but to enhance it.

The first step in removal of cases with confounding variables was to exclude women induced for going past the estimated date the baby was due, where the birth was started by the use of drugs and/or Artificial Rupture of Membranes (ARM)). Next was the removal of women who had their labour augmented for Premature Rupture of Membranes (PROM), where the birth was started by use of drugs, the membranes around the baby having already ruptured spontaneously. These were excluded as induction/augmentation might alter the progress in labour. This left only those women who went into labour spontaneously. The next step was to exclude data that came from a birth that ended in Caesarean Section (CS), as the part of labour investigated was from onset of labour to full dilatation and these women did not reach full dilatation. Women were also excluded who were fully dilated on admission, as no data was available for 1st stage. Although this reduced the amount of births in the analyses (see Table 7 below), removing obvious confounding factors was justified in order to increase the rigor of the results.

Parity at birth of baby.

		Parity at birth of baby					Total
		0	1	2	3	4	0
Colposcopy treatment.	Yes	5	9	8	1	1	24
	No	11	15	15	3	1	45
Total		16	24	23	4	2	69

Table 7: Numbers of women by parity after removal of cases with confounding variables.

The data were then examined over the entire sample, before cases with confounding variables were removed, to compare the secondary outcome results, such as gestation, type of birth, birth weight and incidence of CS to results from previous research studies that did not remove cases with confounding factors.

3.5 Results

In health service research, clinically relevant findings that make a difference to the outcomes under consideration are often not statistically significant. In order to explore data that might be clinically relevant, that would make a difference in clinical

practice, all differences are examined. As expected with such a small data set, most of the analyses did not yield statistically significant results. The immediate variables of interest were those concerned with time in the passive and progressive phases of the 1st stage of labour.

3.5.1 Women who had their first baby after removal of cases with confounding variables

In the subject women 4 out of 5 were 4cm or greater on admission and 1 woman took 4 hours to reach 4cm or greater. The control women had 2 out of 11 women at 4cm or greater on admission, 9 of 11 women took from 2 to 8 hours 20 minutes to reach 4cm or greater (see Table 8 below). The reasons for the clinically relevant differences in subject women admitted later in their labour were unclear, but might be due to alterations in the ripening of the cervix on VE after LETZ.

Results comparisons		
	P0 LETZ	P0 Controls
n =	5	11
>4cms on admission	4	2
<4cms on admission	1	9
<6hrs to full dilatation	1	5
>6hrs to full dilatation	4	6

Table 8 Comparisons of women who had their first baby after removal of cases with confounding variables.

Statistically, the time to reach 4cm dilated or greater did not reach significance, $p=0.06$ using MWU test; Fishers Exact $p=0.08$. Using the Odds Ratio (OR) calculations, $OR=16$, 95% Confidence Interval (CI) 1.09 – 234.25, therefore confidence interval too wide for the OR to be statistically significant. Using the Relative Risk (RR) calculations, $RR=6$, 95% CI 0.87 – 41.44, therefore the relative risk was clinically relevant, with subject women 6 times more likely to be admitted later in their labours once they reached 4cm dilated. However, the confidence interval passed through 1.0 and therefore was not statistically significant.

There were clinically relevant differences between subject and control women who had their first baby in time to reach full dilatation from 4cm or more. Progress expected under active management is 1cm per hour i.e. reaching full dilatation within 6 hours (see Chp. 2; Section 2.3.1.2, p.45). One of the 5 subject women took

less than 6 hours and 4 subject women took from 7 hours 15 minutes to 15 hours 35 minutes (see Table 8 above). In the control women, 5 out of 11 took less than 6 hours and 6 took from 7 to 11 hours 30 minutes. This difference was not statistically significant, Mann-Whitney U test $p=0.46$; OR=0.38, CI 0.03 – 4.71; RR=1.33, CI 0.68 – 2.60.

Clinically there was little difference in type of birth. One of the 5 subject women had a Spontaneous Vaginal birth (birthed vaginally but with interventions such as Epidural, Artificial Rupture of Membranes, or Syntocinon) versus 2 of 11 control women. Four of the 5 subject women had Instrumental births versus 9 of 11 control women. The type of birth was not statistically significant with MWU $p=0.40$. See Table 9 below.

Type of birth of baby		Normal birth	Spontaneous vaginal delivery	Ventouse extraction	Forceps extraction	Total
Colposcopy treatment.	Yes	0	1	1	3	5
	No	0	2	6	3	11
Total		0	3	7	6	16

Table 9: Type of birth for women who had their first baby after removal of cases with confounding variables.

Interestingly the data indicated that no woman who had her first baby was capable of giving birth normally as defined by the World Health Organisation (WHO 1985a). The World Health Organisation (WHO) defined Normal birth as a woman who has the ability to mobilise, goes into labour spontaneously, has Spontaneous Rupture of Membranes and proceeds without the aid of Epidural or Syntocinon to birth of the baby vaginally without resort to episiotomies or instruments.

Premature birth differences are clinically relevant as 2 of the 5 subject women had a premature birth (babies born before 37 weeks), while there were no premature births in the control women (see Table 10, p. 76). Relative Risk was not calculated, as there were no premature births in the control group. It was not statistically significant MWU $p=0.28$; Fishers Exact=0.08.

		Gestation in completed weeks					Total
		34	36	38	39	40	
Colposcopy treatment	yes	1	1	1		2	5
	no			3	3	5	11
Total		1	1	4	3	7	16

Table 10: Gestation at birth for women who had their first baby after removal of cases with confounding variables.

Clinically there were no relevant differences in birth weight, as neither group had babies below 2500grams. This weight is deemed clinically important as babies less than 2500g often require more support, with more intensive observation, feeding, heating and potential respiratory support (Seubert, Stetzer et al. 1999; Steer 2005).

3.5.2 Women who had their second baby after removal of cases with confounding variables

In women who had their second baby, there were no clinically relevant differences in time to reach 4cm dilatation and it was also not statistically significant, MWU $p=0.25$; Fishers Exact $p=0.42$; OR=1.75, RR=1.44 CI 0.39-5.30. There were clinically relevant differences in time to reach full dilatation from 4cm or more. Six of the 9 subject women took less than 6 hours and 3 took from 6hours 49 minutes to 10 hours 40 minutes. All 15 of the control women took less than 6hours; no control woman took longer than 5 hours 30 minutes. Fishers Exact Test for less than or greater than 6 hours was also statistically significant, $p=0.006$. Relative Risk was not calculated as none of the control women took more than 6 hours.

Clinically, there were no apparent differences in type of birth as 5 of the 9 subject women had a Normal birth as defined by the WHO ((WHO 1985a) versus 6 of the 11 control women. Three of the subject women and 7 of the control women had a Spontaneous Vaginal birth. Instrumental births accounted for only 1 of the subject women and 2 of the control women (see Table 11, p. 77). The differences were not statistically significant, MWU $p=0.49$.

Type of birth of baby		Normal birth	Spontaneous vaginal	Ventouse extraction	Forceps extraction	Total
Colposcopy treatment.	Yes	5	3	1		9
	No	6	7	1	1	15
Total		11	10	2	1	24

Table 11: Type of birth for women who had their second baby after removing of cases with confounding variables. .

Premature birth differences are clinically relevant. One of the subject women gave birth before 37 weeks and none of the control women. This meant that Relative Risk was not calculated. It was not statistically significant with MWU $p=0.13$. There was also a clinically relevant difference in birth weight, with 2 of the subject women and 1 of the control women who had a baby below 2500grams. The result was not statistically significant, MWU $p=0.13$. .

3.5.3 Women who had their second baby, but first baby after LETZ after removal of cases with confounding variables

In women who had their second baby, but first baby after LETZ, there were clinically relevant differences in time to reach 4cm dilated. This group had 6 subject women and 12 control women. Two of the 6 subject women were 4cm or greater on admission and 4 subject women took from 4 hours to 9 hours 55 minutes to reach 4cm or greater. Seven of the 12 control women were 4cm or greater on admission, 5 control women took from 40 minutes to 8 hours 30 minutes to reach 4cm or greater. This difference in time to reach 4cm dilated was not statistically significant, MWU $p=0.09$; Fishers Exact $p=0.11$; OR=0.21, RR=0.82, CI 0.72 – 4.57.

There were also clinically relevant differences in time to reach full dilatation from 4cm or more. In the subject women 3 (50%) took less than 6 hours and 3 (50%) took from 6 hours 49 minutes to 10 hours 40 minutes. All the 12 control women took less than 6hrs; this meant that RR was not calculated. Fishers Exact Test for less than or greater than 6 hours was highly statistically significant at $p=0.001$. In other words, 3 subject women were defined as in slow labour via active management guidelines. This potentially involved these women in interventions to make their labours conform to the expectation of 1cm per hour dilatation. However, only 2 of the 3 had Artificial Rupture of Membranes (ARM), all had Diamorphine and only one had Syntocinon. Compared to the 3 subject women who took less than 6 hours, 1 had an ARM, 1

had Diamorphine and 1 had an Epidural. In the 12 control women who reached full dilatation in less than 6 hours, 6 had ARM, 7 had Diamorphine, 5 had Epidural and 2 had Syntocinon.

There were slight clinically relevant differences in type of birth. Three of the 6 subject women had a Normal birth versus 4 of the 12 control women. This was not statistically significant MWU $p=0.58$; OR=2, CI 0.27-14.78; RR=1.57, CI 0.43-5.71. Two subject women and 6 control women had a Spontaneous Vaginal birth. Instrumental births accounted for only 1 subject woman and 2 control women. Both these results were neither clinically relevant nor statistically significant.

Premature births showed clinically relevant differences. One of the six subject women and none of the control women gave birth below 37 weeks. These results were not statistically significant, MWU $p=0.62$. Relative Risk was not calculated for premature birth, as there were no premature births in the control women. Two of the six subject women and none of the control women had babies below 2500grams in weight but these results were also not statistically significant, MWU $p=0.85$.

3.5.4 Women who had their third baby or more after removal of cases with confounding variables

This group had 10 subject women and 19 control women. There were clinically relevant differences in time to reach 4cm dilated. Four of 10 subject women were 4cm or greater on admission and 6 women took from 2 hours 30 minutes to 4 hours to reach 4cm or greater. Thirteen of the 19 control women were 4cm or greater on admission, and 6 women took from 40 minutes to 8 hours 30 minutes to reach 4cm or greater. The results were not statistically significant, MWU $p=0.25$; OR=0.31; RR=1.53, CI 0.78–3.00. There were clinically relevant differences in time to reach full dilatation from 4cm or more, OR=1.60; RR=1.39. However this was not statistically significant, with non-significance confirmed by MWU $p=0.41$ for exact times.

There were no clinically relevant differences in type of birth and this was not statistically significant, MWU $p=0.48$. There were clinically relevant differences in premature births. Two (20%) of the subject women and none of the control women had births below 37 weeks, therefore RR was not calculated. It was not statistically

significant, MWU $p=0.87$. Birth weight showed no clinically relevant differences and was also not statistically significant, MWU $p=0.85$.

3.5.5 Differences in analgesia/interventions in all parities after removal of cases with confounding variables

Clinically relevant differences were found in the group of all parities after removal of cases with confounding variables. One of the subject women who had their second baby used Epidural for pain relief compared to 6 in the control women. It was not statistically significant. Investigation of interventions found the following in Table 12:

Analgesia and interventions of all parities

	1 st baby LETZ	1 st baby Controls	2 nd baby LETZ	2 nd baby Controls	3 rd or more baby LETZ	3 rd or more baby Controls
n =	5	11	9	15	10	19
ARM	3	3	4	6	4	10
Syntocinon	2	4	1	3	1	3
Epidural	3	5	1	6	2	5
Diamorphine	3	10	6	10	5	10

Table 12: Analgesia and interventions of all parities after removal of cases with confounding variables.

When the timing of interventions was investigated, the subject women had later analgesia, with a minimum 140 minutes before 4cm dilated, and a maximum of 265 minutes after 4cm dilated. The control women had a minimum of 390 minutes before 4cm dilated, maximum 95 minutes after 4cm dilated. The intervention of Syntocinon, which accelerates labour with an artificial hormone, was later in the subject women at 595 minutes after 4cm dilation and for the control women 300 minutes before 4cm dilation and at 60 minutes after 4cm. Care needs to be taken against making inferences with a small pilot study dataset. Of the 4 women from both subject and control women who were admitted under 4cm; the control women made more use of Syntocinon and Epidural analgesia, as illustrated in Table 13, below.

	Subjects (n = 4)	Controls (n = 4)
ARM	2 (50%)	3 (75%)
Syntocinon used	0	2 (50%)
Diamorphine used	3 (75%)	2 (50%)
Epidural used	1 (25%)	4 (100%)

Table 13: Analgesia and interventions of all parities admitted under 4cm dilated after removal of cases with confounding variables.

3.5.6 Outcomes of the total sample

Initial analysis of the total sample of 30 subject women and 60 control women, before limiting to remove cases with confounding variables, indicated some interesting points. For instance, there were clinically relevant differences in type of birth (illustrated in Figures 2 and 3, p. 81). There were no cases of Caesarean Section (CS) for the subject women, while 6 of the 60 control women had CS. This agrees with the previous studies by Blomfield, Buxton, Dunn and Luesley (1993; Rooijen and Persson (1999) and Tan, Pepira and Haloob (2004) that find slightly less CS in their study groups compared to controls. However it contrasts with Samson, Bentley, Fahey, McKay and Gill (2005) who find slightly more CS in their study group.

There were also far more Normal births in the subject women. Twelve of the 30 subject women had a Normal birth compared to 16 of the 60 control women. Other studies did not differentiate between Normal birth and Spontaneous Vaginal birth, classing all these births as Spontaneous Vaginal Delivery (SVD). If classed together Normal births and Spontaneous Vaginal birth in the pilot study were 23 of the 30 subject women and 40 of the 60 control women. However the results are ambivalent in previous studies, Tan, Pepira and Haloob (2004) and Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) claim slightly more SVD in their subject groups as compared to the controls, while Samson, Bentley, Fahey, McKay and Gill (2005) find slightly less. Instrumental births accounted for 7 of the subject women and 14 of the controls (see Figures 2 and 3 p. 81).

Type of birth of baby for all subject women in sample.

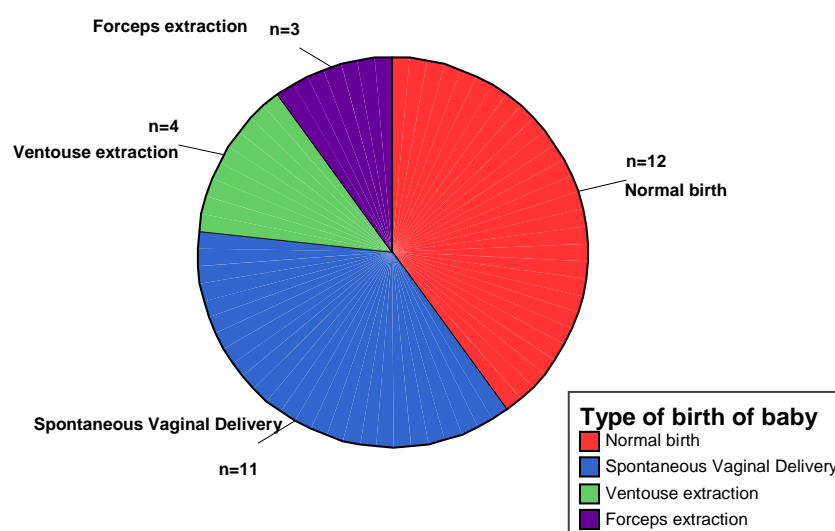


Figure 2: Type of birth for all subject women in sample.

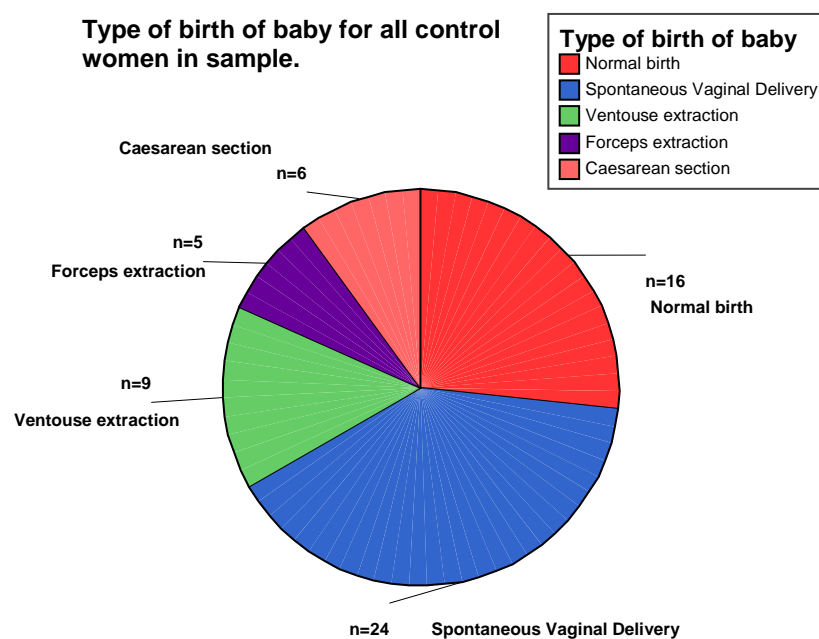


Figure 3: Type of birth of all control women in sample.

There were clinically relevant differences in the range of gestation in weeks. Subject women gave birth between 30 to 41 weeks; there were 5 out of 30 births before 37 weeks. Control women had a much tighter range of 37 to 43 weeks; there were no births before 37 weeks. Any birth before 37 weeks is classed as premature, which has the potential to affect birth weight and lead to long-term problems for the baby (Seubert, Stetzer et al. 1999; Steer 2005). The result for premature births was not statistically significant, MWU $p=0.88$. This clinically relevant difference was reflected in the weights of the babies. Subject women had four babies below 2500g, which is the weight below which babies potentially need more intensive observation, feeding, heating and possibly respiratory support (Seubert, Stetzer et al. 1999; Steer 2005). Control women had two babies below 2500g. The result was not statistically significant, MWU $p=0.86$.

3.6 Summary

The pilot findings answer the research questions posed:-

- It was possible to isolate the information of the 1st stage from the delivery details.
- The delivery details can be used to compare the two groups of women.

The pilot study enabled the data for the main study to be identified and led to a tightening of concepts, such as point of identification of onset of progressive labour. Analyses in the pilot study enabled meaningful identification of relevant measures. However, the pilot study used a very small number in the sample and therefore the results need to be treated with caution. As it is a small sample the statistically significant results are worthy of attention and the sample may be too small to detect other differences (Bowling 2009).

Although the pilot study answered the research questions posed, it also stimulated new questions to be included in the main study. The clinical differences found in both women who had their first or second baby justified expanding the investigation of this topic to a larger study. When larger numbers are examined, this may lead to statistically significant differences being identified. The pilot study data is used to inform sample sizes for the main study.

It was difficult to see why, in context of anatomy of the cervix, there was a difference after LETZ between women who had their first baby, and women who had their second baby but first after LETZ. See Table 14 below.

Results comparisons

	P0 LETZ	P0 Controls	*P1 LETZ	P1 Controls
n =	5	11	6	12
>4cms on admission	4	2	2	7
<4cms on admission	1	9	4	5
<6hrs to full dilatation	1	5	3	12
>6hrs to full dilatation	4	6	3	0
Normal birth	0	0	3	4
SVD	1	2	2	6
Ventouse extraction	1	6	1	1
Forceps extraction	3	3	0	1
ARM	3	3	3	6
Syntocinon	2	4	1	2
Epidural	3	5	1	5
Diamorphine	3	10	4	7

* 2nd baby but 1st after LETZ

Table 14: Results comparisons for women who had their first baby (P0) and women who had their second baby (P1) after removal of cases with confounding variables.

The majority of subject women (4 of 5) who had their first baby were admitted more than 4cm dilated compared to the majority of the control women (9 of 11) admitted before 4cm dilated. In the subject women who had their second baby but first after LETZ, the majority of women (4 of 6) were admitted less than 4cm dilated, compared to control women, the majority of which (7 of 12) were admitted more than 4cm dilated. The majority of subject women (4 of 5) who had their first baby took more than 6 hours to reach full dilatation compared to the control women's 6 of 11. In the subject women who had their second baby but first after LETZ, half took more than 6 hours to reach full dilatation (3 of 6) compared to all the control women (12) who all took less than 6 hours.

Subject women who had their first baby had no Normal births; neither did any of the control women who had their first baby. Subject women who had their first baby had less Ventouse extractions than controls and more Forceps extractions. In contrast half the subject women who had their second baby (3 of 6), but first after LETZ, had a Normal birth, while only a third of control women (4 of 12) had a Normal birth. Spontaneous Vaginal birth accounted for 2 of 6 subject women who had their

second baby and half the control women (6 of 12). Instrumental births were roughly equivalent; subject women had one and control women two.

In management of labour issues, a woman having her first baby is labelled as 'problematic', the medical view being that normal labour is only possible in retrospect (Al-Azzawi 1998; Scott, Saia et al. 1999). Therefore the guidelines of management of women having their first baby are very proscriptive, even more so than with other women, as we see in the delivery statistics for women who had their first baby in the pilot study. All women who had their first baby, whether subject or control, had interventions. Interventions such as Diamorphine and/or Epidural for pain relief and in women who had their first baby 3 of the 5 subject women and 5 of the 11 control women had ARM and/or Syntocinon infusion. These interventions are used to accelerate labour. Resorting to interventions was the norm as opposed to the exception. This difference in management might account for the lack of appreciable differences in time from 4cm dilated to full dilatation of women who had their first baby in the pilot study.

Although the preliminary findings, such as type of birth, were used to compare the results to other studies, the previous studies results were equivocal. The pilot study reinforced the results of the previous studies by Tan, Pepra and Haloob (2004) and Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) that there may be a difference in type of birth. The dearth of studies in this area and especially the ones that identify the 1st stage as the variable of interest means that more work is needed to extend knowledge of the effects on type of birth.

The main study uses a mixed methodologies design, which reflects the researcher's philosophical perspective and obtains a fuller investigation of the effect of LETZ on labour. It uses retrospective notes to illuminate clinically relevant differences and feeds that information into a case study investigation of women having their second baby and women having their first baby. In that way the tentative theory is examined that proposes that the different ways in which these women's labours are 'managed' might mask true differences. All parities were investigated in the pilot study, but the main study concentrates on women having their first baby after LETZ. Women having their first baby and women having their second baby, but first after LETZ, are included in the main study.

After removal of cases with confounding variables, the pilot study found a difference of 31% in the mean times for women who had their second baby to get to full dilatation and 38% for women who had their second baby, but their first after LETZ. There was only a difference of 23% between subject women and control women who had their first baby. In the sample size calculations a clinically relevant figure of 25% is taken for women having their first baby (the difference between taking 6 hours and taking 8 hours to get to fully dilated). The aim is to use an α -value of 5% with a power of 80% for the main study; the anticipated differences will be clinically relevant and important. Inputting these figures into Relative Risk power calculations for unequal samples of 1:2 gives a sample size of 46 subject women and 92 matched controls after removal of cases with confounding variables. For women having their second baby, but first after LETZ, a difference of 30% is taken from the pilot study that gives a sample size of 32 subject women and 63 matched controls (Fleiss 1981).

Chapter 4 discusses the methodological approach of the main study. It examines the pluralist approach and case study strategy. That Chapter makes explicit the aims of the main study and the research questions it seeks to answer. The research design of the study and the rationale behind that design is explained, within a conceptual framework. The combination of quantitative and qualitative approaches is used to enhance understanding of the effect of LETZ on labour.

Chapter 4

Main study

4.1 Introduction

Chapter 3 discusses the methodology and results from the pilot study. It concludes that it is now possible to isolate the information of the 1st stage from the delivery details. Although this pilot study answers the research questions posed, it is difficult to see why, in context of anatomy of the cervix, there is a difference after LETZ in women having their first baby and women having their second baby, but their first baby after LETZ.

Chapter 4 discusses the methodological approach of the main study, in particular the use of a pluralist approach and case study strategy. The methodology of the study reflects the pragmatic, pluralistic basis of knowledge, builds on, and refines the methods already used in previous research studies in this area. The context, in which the study is set, and its boundaries, is identified and this Chapter encompasses a discussion on bias, validity and reliability.

Chapter 4 makes explicit the aims of the study and the research questions it seeks to answer. It sets out the design of the study and the rationale behind that design. According to Bowling (2009), providing the link between the perspectives that inform the research, on the one hand, and the material collected on the other, is a critical part of research and research design. The research design and the selection of participants and cases are integral to building the conceptual framework of the research. The sampling techniques and the statistical tests in the quantitative arm, and the purposive sampling and the selection of documentary evidence in the qualitative arm are explained, as are the methods of randomisation and the instruments for data collection.

Given the philosophical stance of the researcher (as explained in Chp. 1; Section 1.2.1, p. 4), a pluralistic approach is an inevitable reflection of not only post modernism but also feminism. A retrospective case control study is used, that is embedded in a case study examination of the perceived differences of effect of LETZ on progress in the 1st stage of labour, in women having their first baby and women having their second baby, but their first baby after LETZ. In the study, the combination of quantitative and qualitative approaches in a case study strategy is

used to enhance understanding (Teddle and Tashakkori 2009), and to set the whole study in a feminist framework.

4.2 Study Aims

The overall aim of the study is to investigate whether LETZ treatment for abnormal smears of the cervix has an effect on progress in the 1st stage of labour. The aim is refined from the initial stage of the research, informed particularly by the pilot study.

The case study strategy investigates the effect of LETZ on the first stage of labour, the anomaly of the apparent clinical differences seen, in the Pilot Study, between women having their first baby after LETZ and women having their second baby, but first baby after LETZ and it explores women's views of their labour.

4.3 Research questions

This study aims to answer the following research questions-

1. Do women feel that LETZ makes a difference to their labours?
2. Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour.
3. Are the differences clinically relevant?
4. Are the differences statistically significant?
5. Are there differences seen in both women having their first baby after LETZ and women having their second baby, but their first after LETZ?
6. Can differences in the management of women having their first baby and women having their second baby be identified that may mask true differences?

To compare the study with previous research, the following secondary outcomes are examined. Including major constructs identified by other researchers, allow validation of part of the results.

- A. Are there differences in type of birth?
- B. Are there differences in number of premature births?
- C. Are there differences in birth weight of the babies?
- D. Are there differences in onset of labour?

In summary, the overall aim is to determine whether LETZ has an effect on progress in the 1st stage of labour.

4.4 Study Design

The 1st stage of labour is defined as both passive and progressive phases in Chp. 2; Section 2.3.1.2, p. 45. The quantitative part of the study concentrates on the progressive phase of the 1st stage of labour, from 4cm dilated to the point at which 1st stage ceases, which is at full dilatation; and the passive stage which is up to the point of 4cm dilated. The cervix is only involved in the 1st stage and so investigation of any other stage of labour does not add to the study. Only women who have LETZ treatment after 1997 are included in the study, which removes one variable, LETZ being the treatment of choice in the study hospital since then.

The study wishes to establish whether there is an effect on pattern and progress in labour after LETZ. The research problem in the study requires more than one methodology for the problem to be adequately investigated. The design for the study reflects the pragmatic approach of the author. Although the author would prefer a qualitative approach to the problem, which reflects the holistic, post modern feminist approach, a pragmatic view accepts that if the study produces findings that lead to a need to change practice, a quantitative part of the study is necessary. This can be presented as data to the medical personnel in obstetrics, to convince them that a change in practice is necessary. Although the bias towards positivism in medical

research is slowly changing, it is not yet at the position where qualitative studies and quantitative studies are given equal weight. The approach adopted for the study reflects that medical hegemony.

Although several authorities still maintain that methodology is influenced by one's epistemology, others such as Firestone (1990) disagree and maintain that in the real world of research, the methods used are those that investigate the problem of interest. As this author's background is holistic, pragmatic, post-modern feminism (see Chp. 1; Section 1.2.1, p. 4), methods that investigate the area of interest fully are more important than the arbitrary assignment of methods to epistemologies. Therefore, it is logical that a pluralist methodology be employed.

Qualitative and quantitative methods are often used effectively in the same research study, but most researchers place their emphasis on one form or another. This is partly out of conviction, but also because of their training and the nature of the problems that they study. Alan Bryman (1988) makes a strong case that many of the differences between the two traditions of quantitative and qualitative research are in the minds of the philosophers and theorists, rather than in the practice of researchers. He concludes that –

“the suggestion that quantitative research is associated with the testing of theories, whilst qualitative research is associated with the generation of theories, can ...be viewed as a convention that has little to do with either the practices of many researchers within the two traditions or the potential of the methods of data collection themselves”
(Bryman 1988, p.172)

A quasi-experimental approach, is used to investigate the differences between the groups of women, but does not fit within a feminist framework, therefore pluralist methodologies are required. A holistic methodology that looks to research the phenomenon as a whole from the viewpoint of those experiencing the problem is proposed. Part of that methodology, used in a pragmatic manner, leads to a case study methodological approach that examines the views of women and incorporates quantitative data as part of a wider investigation. The whole of the methodology is based in a feminist framework that seeks to place women, their views and needs at the centre of the research. It was not feasible to involve women in the design and implementation of the research. However personal communication i.e. conversations with women who have experiences relevant to this research, validate

its importance to them. The ultimate study goal is to review and change hospital policy and practice, for the benefit of the women for whom the study is designed.

The approach adopted for the study recognises that a combination of methods allow a more comprehensive view of progress in the 1st stage of labour after LETZ (Guba 1990). In the study the combination of both quantitative and qualitative approaches are used to enhance understanding of the initial data analysis of the Pilot Study. That analysis suggests a difference in women having their first baby after LETZ and those having their second baby, LETZ being performed between babies. This led to a theory generation which is used as one of the bases for the qualitative case study approach.

4.4.1 Case study strategy

Stake (1995, p.xi) states that at the heart of a case study is the idea that “case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances”. It is an intensive study of a specific individual or specific context. There is no single way to conduct a case study and a combination of methods can be used (Trochim 2006). The ‘multiple sources of evidence’ commonly produce not only quantitative data, but copious amounts of qualitative data as well (Bowling 2002, p.3).

A case study focus is on relationships, processes and these tend to be interconnected, and interrelated (Creswell 2003). Understanding a process often involves an understanding of many others and, crucially, how the various processes are linked. The case study approach does this well because it offers a chance of going into sufficient detail to unravel the complexities of a given situation. In dealing with the case as a whole, in its entirety, there is a chance of discovering how the many parts affect one another. One of the strengths of the case study strategy is that it allows the researcher the use a variety of sources, a variety of types of data and a variety of research methods as part of the investigation. In this respect, case studies tend to be holistic, rather than studies that deal with isolated factors. This study uses the case study strategy, in particular the distinct features of in depth focus and understanding of relationships and processes, which provides an underlying rationale for the whole study (Stake 1995; Yin 2009).

4.4.1.1 Case study framework

A declaration of the boundaries of any case study is important and defines what is included and what is excluded. The study is bounded by the women's progress in the 1st stage of labour, from admission to hospital until full dilatation, in the context of the effect on the women and the management of their labour and the basis for clinical decisions made by the professionals involved in her care. Therefore, data from the quantitative arm of the study is included; as is documentary evidence from protocols and guidelines used in the study hospital; as are national recommendations that clinical staff use as a basis for their decision-making. This complements the interview data from the women and midwives.

It is important at the outset that the implementation sequence of the quantitative and qualitative data collection is defined. The implementation sequence is shown below in the case study framework (Figure 4, below). This makes clear that the quantitative data is collected concurrently with the qualitative data. This is not an illustration of the priority given to each method, as the qualitative data has more priority in the study in terms of analysis. Equally important is the defining of the stage at which the two types of findings are integrated and this is shown in the case study framework. The overall framework for the study is holistic, pragmatic post-modern feminism and that is reflected in the type of methodology, methods and data used.

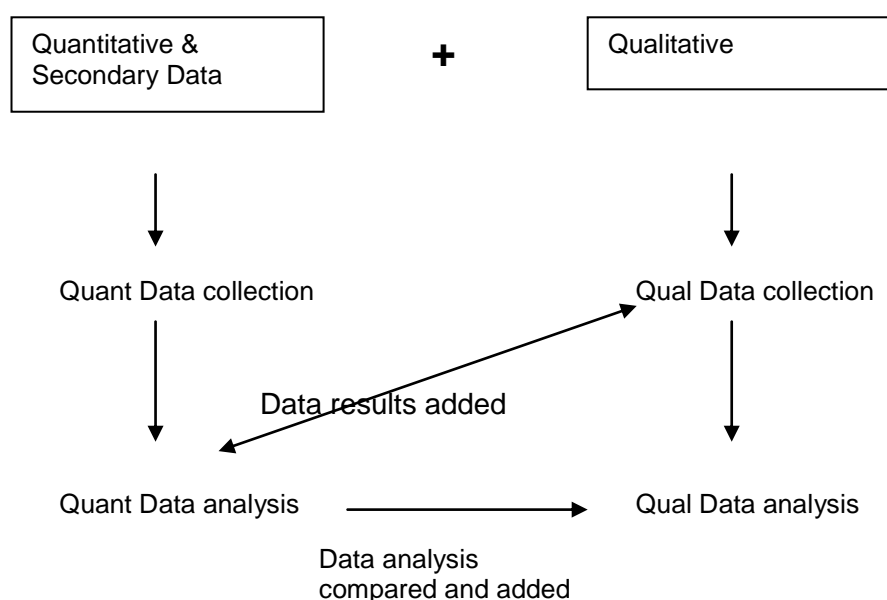


Figure 4: Case study framework.

The case study strategy investigates the experiences of the women involved and it also investigates the theory generated by the Pilot Study. It uses case studies of four women to test the generated theory that -

'The differences in effect on the 1st stage of labour of LETZ between women having their first baby after LETZ and women, having their second babies but their first after LETZ, is a measure of the different management applied to these groups'.

(See also Research Question 6 of this Chapter).

4.4.1.2 Purposive sampling

Cases in a case study can be seen as 'typical' cases, that is, they are similar to the other cases that might be chosen and are representative of that particular type of event. Cases in the study are selected as not only a 'typical' case but also as a case that tests the tentative theory hypothesised from Chp 3; Section 3.6, p. 84, that the different ways in which women having their first baby and women having their second baby's labours are 'managed', result in a masking of the true differences.

As the name implies, purposive sampling is sampling with a purpose in mind. It is not meant to be proportional or representative of the population as a whole, but is used to reach a targeted group of participants in order to get their opinions. From the results of the Pilot Study, a purposive sample is used to identify 'typical' women of interest for the interviews, from those women who have already consented to participation in the study and for whom quantitative data has been collected. Their Community Midwife is the first point of contact in recruiting these women, and women are asked to contact the researcher once they have delivered their baby. These typical cases are:

1. A woman having her first baby after LETZ.
2. A woman having her second baby, but her first baby after LETZ.
3. A woman having her first baby.
4. A woman having her second baby.

A further purposive approach is used to select the focus group midwives, but essentially the main selection is the availability of the midwife. However, a fair mix of experience is included, as indicated in the results Chp. 5: Part Two; 5.2.1, p.147.

4.4.2 Quantitative retrospective case control

As in all Health Service research, there is the inevitable disadvantage of being unable to randomise participants to having a particular condition or disease. For the study, it is obviously unethical to randomise women to having LETZ if they do not require it for a clinical reason. Therefore, a retrospective design is chosen. As the number of study subjects left after exclusions is small, all suitable study subjects are used. This enables the number of study subjects to be feasible for a lone researcher.

Robson (1993) argues that one of the strengths of retrospective studies is they deal with situations that have already happened; therefore the situation cannot be controlled or manipulated by the researcher. There are strong similarities between experimental and retrospective research. In both cases, the interest is in discovery or confirmation of relationships among variables. Both answer questions and test hypotheses, about the relationships between independent and dependent variables. The aim in retrospective studies is to compare two groups, equivalent in all relevant characteristics but the one(s) under investigation, so the effect of that characteristic is measured.

Another strength is that in retrospective studies the documents are stable; they can be reviewed repeatedly, are unobtrusive in nature and are not created as a result of the study. Gray (2004) and Higgins (1996) affirm that retrospective records have not been manipulated by the author of the data, in the knowledge that the material is going to be studied and that they contain precise details of names, positions, events and settings. They also avoid some or all of the artificiality involved in experimentation (in connection with the manipulation of the independent variable). Campbell and Machin (1999) and Bland (2000) claim another advantage of a retrospective study is that it enables a quasi-experimental style of research to be carried out in situations, like the study presented, where it is impossible, impracticable or unethical to have manipulated the independent variable of LETZ. This type of design is strong in providing internal validity.

In a case-control study, the experiences of individuals with and without a particular intervention/treatment are analysed retrospectively to identify putative causative events. The process in this type of study that is most open to bias is not the assessment of outcome, but the inclusion criteria (Bowling 2009). The selection of a comparable control group is one of the most difficult decisions in a case-control study. Subjects are matched to two controls for age, year of delivery and parity, the single difference is their exposure to LETZ. All these characteristics have an effect on the pattern and progress of the 1st stage of labour. No event happens in a vacuum. The guidelines and policies in a particular year on the Labour Suite change from those in use in another year and these changes have an effect on the management and assessment of progress in the 1st stage of labour. The age of a participant may have an effect. The parity of a woman definitely has an effect on progress in labour, as previously explained in Chp. 2; Section 2.3.1.3, p. 47, so that each woman is not only matched by this characteristic but data is also grouped for analysis by parity (how many births a woman has previously). The design of the study takes these most relevant characteristics and matches them at selection of participants' stage, and not at the analysis stage.

4.4.2.1 Necessity of investigating only some subgroups

Although it would have been interesting and worthwhile if differences in all parities and in all babies born after LETZ are investigated, a self-funded single researcher study has to make choices around what is achievable within the resource limitations. For this reason, it is decided that the focus of the study is on women having their first baby after LETZ, whether that is to women having their first baby or women having their second babies. This is also the group under investigation in the case studies.

4.4.2.2 Quantitative sampling techniques

All eligible subject women who met the inclusion criteria in the years 2004-2005 are included. Control women are randomly selected from those with the same year of birth, same year of delivery and same parity as the subject women. Randomisation is done using computer random number generation in Excel.

All the control women, for a particular year of birth and parity, are given a computer generated random number between 0 and 1. This random number is used to sort the lists, and control women are taken from that sorted list sequentially. They are

checked for inclusion/exclusion criteria. This constitutes an example of simple random sampling. As it is an unbiased way to select a sample, it is reasonable that results are generalised to the target population.

As discussed in Chp.3, Section 3.3.1, p.68 , allocating two controls to each subject woman accommodates the range of analgesia options, as these have known effects on progress in labour (Wagner 1996b; Howell, Kidd et al. 2001).

4.4.2.3 Inclusions

Subject women who meet the following inclusion criteria are chosen for the study –

- Pregnant with one child only.
- Booked to give birth at the target hospital.
- Over the age of 20 years (the start age for cervical screening)
- Have colposcopy treatment noted at booking.
- Have colposcopy treatment at the target hospital after April 1997.
- Have LETZ as their colposcopy treatment.

And for the control women –

- Pregnant with one child only.
- Booked to give birth at the target hospital.
- Over the age of 20 years.

Including only those women who were pregnant with one child excludes births that are more complex and prone to early medical intervention. In order to gain the relevant data women had to give birth at the study hospital. Including women younger than 20 years would have meant that they were not eligible for the screening programme. In order to identify women who had LETZ it was necessary to retrieve the records of those women identified as having had colposcopy treatment when they booked to give birth at the hospital. Using only notes of subject women who had their LETZ after the colposcopy database was started in 1997, ensured the colposcopy data was available in the study hospital.

4.4.2.4 Exclusions

The following women are not entered into the study, for both subject women and control women –

- Pregnant with more than one child.

- Give birth at home without midwifery assistance.
- Planned caesarean sections.
- Developed pre-eclampsia and are started on the pre-eclampsia protocol.
- Have induction of labour for any reason other than post-maturity.
- Diabetic women.
- Give birth before 24 weeks gestation.

4.4.2.5 Statistical tests

An aspect of internal validity is to ensure that data are analysed according to the original design. The statistical test chosen for the study design is Mann Whitney U test (MWU) as it is a non-parametric test, with Relative Risk (RR) calculated for dichotomous variables. For dichotomous variables where RR cannot be calculated, Pearson Chi-square is used. Spearman Rho is used for correlations that are performed for grade of CIN and depth of tissue excised, as well as checking for other correlations between LETZ, demographics and the main quantitative results. Part of the analysis design also compares the data by parity groups. It is important from a validity perspective that analysis by groups is defined at the beginning of the study, trawling over study data looking for interesting sub-group results negates validity.

4.4.2.6 Sample size

From the pilot study the size of difference is obtained for women having their first baby and for women having their second baby that will be clinically relevant. This is used in the sample size calculations that results in the numbers to be included in the main study, using a power of 80 and α of 5. Forty-six subject women having their first baby with 92 control women, and 32 subject women having their second baby, but their first after LETZ, with 64 control women are needed for Relative Risk calculations that have 80% power to detect a 1.3 RR (Fleiss, 1981). However, a larger sample is taken before removal of cases with confounding variables in order to compare with previous research, 111 subject women and 214 controls.

4.4.3 Data Collection

Data collection uses the standard data forms described in Chp. 3; Section 3.3.3, p.70. These forms are peer reviewed and amended. Standard forms are used to ensure consistency in data collection. Once the quantitative data is transcribed onto

the forms, the data is entered into an SPSS 15 database. Once in SPSS 15 the data is rechecked to ensure accuracy.

Biographical details are collected from the registration form in the hospital notes and the booking for maternity care notes. These are transcribed into a standard Biographical Details Form (Appendix C, p.270). The LETZ data is taken from the colposcopy database and transcribed onto a standard Colposcopy Details Form (Appendix D, p. 271). The delivery data is taken from the delivery partogrammes and associated notes in their hospital records. It is transcribed onto standard PLACT (Progress in Labour After Colposcopy Treatment) Data Forms (Appendix E, p. 272).

4.4.3.1 Interview data

Interview data collection involves interviews with:-

- Women in order that their views, attitudes and expectations of the labour are ascertained.
- Midwives in order that their attitudes to the labour and their sources of clinical decision-making are determined.

All interviews are semi-structured (Bowling 2009; Teddlie and Tashakkori 2009) and use a framework (see Appendix L, p. 310) to identify key areas of discussion.

Interviews with women and midwives are completed at a time and place convenient to the participants. Interviews are recorded digitally, with the participant's permission. The purpose of the interviews is to probe the ideas of the participants about the area of interest. The time taken for the interviews is approximately one hour and are conducted at a time and place to suit the interviewees. The researcher conducts the interviews and has met with the women previously at the point they are recruited to the study in pregnancy. As the researcher is a midwife in the study hospital, the researcher is known to most of the midwives interviewed.

These recordings are transferred to computer and transcribed into QSR NVIVO 7. They are rendered anonymous, being identified only by a study number.

Identification of participants from study number is kept secure in the University until the end of the study when they will be destroyed. Participants are assured that no data used will allow them to be identified and all interview transcripts are offered to participants to review their accuracy before being analysed.

A framework approach is used to code the interview data into QSR Nvivo 7. These codes are then used to link the data or integrate the data into meaningful concepts. Core themes are identified from these concepts and tentative linkages are developed between the themes and the data. The interview as a whole is used as the basis for the case study of that particular participant. Analysis of the interview is integrated with the quantitative analysis.

4.4.3.2 Semi structured interviewing

Semi structured interviewing represents a compromise. Unstructured interviewing involves direct interaction between the researcher and participant. There are several differences between it and more formal structured interviewing. Although the researcher may have some initial guiding questions or core concepts to ask about, there is no formal structured instrument or protocol, the researcher is free to move the conversation in any direction of interest that may come up. Therefore, unstructured interviewing is particularly useful for exploring a topic in depth. The drawback to this lack of structure is that because each interview tends to be unique with no predetermined set of questions asked of all respondents, it is usually more difficult to analyse the interview data.

Therefore semi structured interviewing represents the compromise between the freedom of the participant to include in the conversation any item of interest to them and therefore to explore the topic in depth, while at the same time the researcher has a partial structure of areas that need to be covered in the interviews (Bowling 2009; Teddlie and Tashakkori 2009). This semi structure enables the analysis of the data in the interviews to be less complex.

4.4.3.3 Focus group

Focus groups can draw together groups when it is difficult to access individuals. The focus group in this study is conceived to allow the researcher access to midwives in a manner that did not impact on their clinical duties to the detriment of the unit. The focus group is conducted in the unit in which the midwives work before commencement of their scheduled duties. The typical focus group protocol is semi-structured (Teddlie and Tashakkori 2009), interactions within the group are initiated by the researcher asking key questions, and the group allowed to discuss the topic between themselves. The interview is recorded by the researcher and lasts approximately 45 minutes.

A key point in focus groups are that they allow a researcher to empower the participants to discuss an issue, especially as the participants know each other before the interview. Conflicts and debates are just as important in a focus group as consensus. However, the setting of the focus group at the participants place of work may have influenced the free exchange of ideas (Bowling 2009).

4.5 Validity

Validity is the best available approximation to the truth of a given proposition, inference, or conclusion (Trochim 2006). The theory of validity provides a useful tool for assessing the quality of research conclusions. Unfortunately, a definition of validity is difficult to obtain, as most authors offer their own interpretations and often these are conflicting. In the study, the quantitative and qualitative methods used both attract their own definitions of validity.

4.5.1 Quantitative validity

For the quantitative part of the study a framework of validity as steps in a process, which ends with a valid conclusion is used (Trochim 2006). The first step is conclusion validity and the examination of the results which establish that there is a relationship between LETZ and progress in the 1st stage of labour. Discussion of this is better left to the results section of Chp. 5: Part One; Section 5.1.3, p. 110 and is dealt with there.

The next step to establish is internal validity. The study is designed to remove other causes for the results, which leaves a causal relationship. The key question in internal validity, in the study, is whether the noted effects are attributed to the intervention (LETZ) and not to other possible causes. That is why research design is such an important issue and why it is intimately linked to the idea of internal validity. Part of ensuring internal validity in the study is the analysis of women by parity, which removes one of the most prevalent other causes explanations for differences in pattern and progress in the 1st stage of labour. As discussed previously in this Chapter, in quasi-experimental studies, a control group is necessary and it is important that the control group is matched by year of delivery, age of woman and parity at birth, all important characteristics that can confound the results. It is also

important that the control is randomly selected. Other confounding variables are dealt with in the analysis section of Chp. 5: Part One; Section 5.1.2.1, p. 109.

The next step is construct validity, which explores whether, if there is a causal relationship between progress in labour and LETZ, can it be claimed that the measure used actually measures what it is planned to measure. As has been discussed in Chp. 2; Section 2.3.1.3, p.47, VE is an imprecise measure. However, it is all that is available to obstetricians and midwives and is the measure used in all obstetric/ midwifery research to define progress in the 1st stage of labour. The last step is external validity. The demographics make it clear that these women are representative of women in society in general, the women for the controls are chosen randomly and so satisfy the criteria that these results apply both to other women in labour and to other areas of the country.

4.5.2 Qualitative validity

Guba (1990) disagrees with other authors who claim validity in qualitative research follows the same framework as quantitative research. Guba argues for different methods of judging validity in qualitative research, and develops his own framework of trustworthiness, transferability, dependability and conformability. Although debate still ensues about using alternative or traditional measures of validity, if the measures used are explicit, this enables readers to judge the quality of research for themselves.

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An essential part of developing trustworthiness in the research is establishing that the results are credible from the perspective of the study participants. Ensuring that all transcripts of interviews are sent to the participants enables them to comment on the credibility of the interviews. Thoroughly describing the research context and the assumptions that are central to the research enables judgements of transferability to be made.

Describing the guidelines and protocols in place at the time of the research is important in establishing dependability. This ensures account is taken of the ever-changing context within which this research occurs. Documentation of the procedures for checking and rechecking the data throughout the study, documentation of the data collection and analysis procedures, description of the

judgements made about the potential for bias or distortion, are all ways of achieving confirmability. All of these allow corroboration or confirmation of the results by other researchers.

4.5.2.1 Concurrent triangulation strategy

Quantitative and qualitative research methods are combined in order to construct the case. Qualitative and quantitative research methods are used concurrently (see Figure 5, below), as the quantitative study results are embedded in the case studies of the women interviewed. This equates to Denzin's 'between methods' triangulation. Denzin (1989) suggests the value of triangulated approaches 'elevates' the researcher above the biases of single methods.

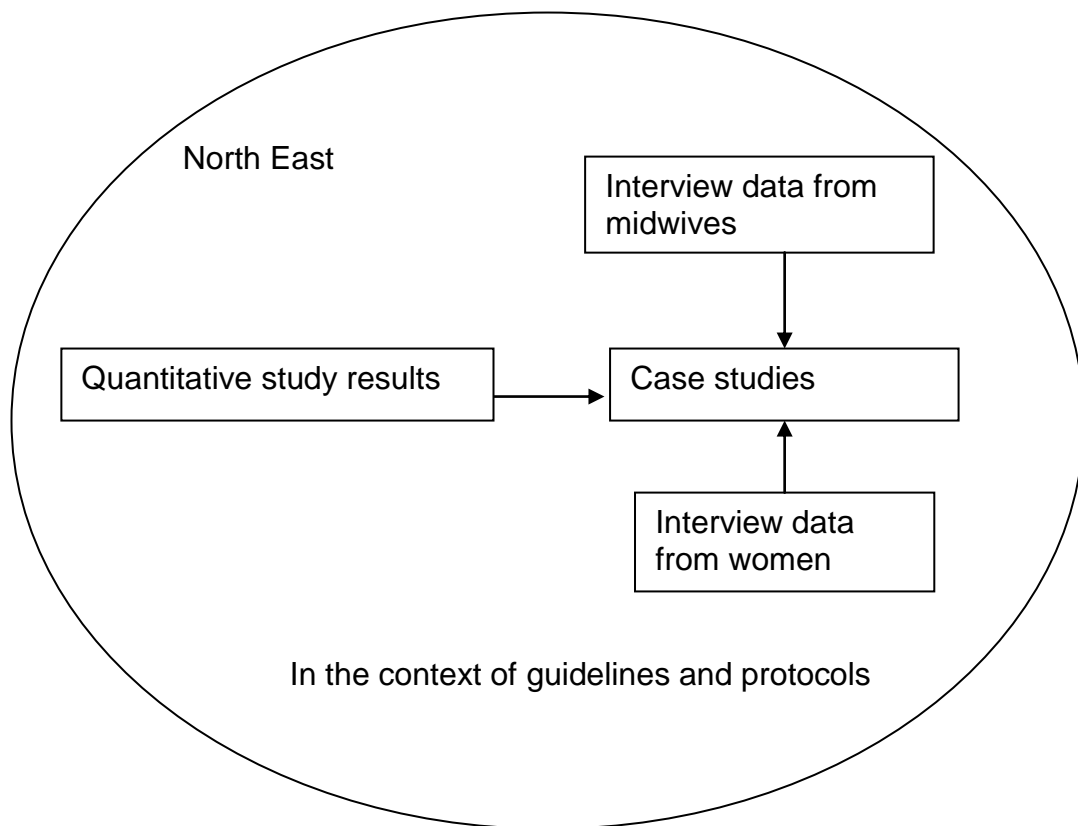


Figure 5: Concurrent Triangulation.

4.6 Ethical considerations

Ethical approval is sought and granted for the Main Study, with part of the ethical permissions being for the Pilot Study. All women who attend for birth, or treatment, at the study hospital are aware that data pertaining to their treatment can be used for research purposes. Ethical considerations ensure that all data are anonymous in the dataset used for analyses. As it is a University supervised study, which takes place in a health setting in the National Health Service, permission is required from more than one Ethical Committee. A change to the scope of the original study, after the Pilot Study is completed, is re-submitted to LREC and permission granted (see Appendix B, p. 265 for copies of ethical permissions). Throughout this ethical process, the focus is to ensure that the women and staff who take part will be fully informed and will not feel pressured to take part in the research. The most important points, from that point of view, are the information and consent forms (see Appendix H, I, J and K. p.302-309).

4.6.1 Gatekeepers

Access to the records of women in the Health Service is not an easy matter of simply requiring the four layers of ethical permissions necessary. All Consultants in the hospital and General Practitioners in the community require a written explanation of the research and a request that women in their care may be approached to take part. Access to the computer database also requires further permissions from the Caldecott Guardian and Information Technology Services, as well as permission from the Medical Records manager. A signed statement from this researcher that the data is used for research purposes and that no individual will be able to be identified is necessary.

Access to potential interview women is through their first point of contact with the Maternity Services, the Community Midwife. These midwives are involved in recruiting women and have the study and its inclusion criteria explained to them. Written information is also left for the midwives and women, as well as a contact number for notification of any potential recruits.

4.7 Summary

The methodological considerations in the research led to the adoption of the case study strategy. This reflects this researcher's holistic, pragmatic, post-modern, feminist approach. Embedding both quantitative and qualitative approaches in a case study design enables the affect of LETZ on progress in the 1st stage of labour to be fully investigated. Mixed methodologies are more acceptable to modern researchers who believe that the traditionalist's differences are more a convention that has little to do with the practice of research. Both Bryman (1988) and Silverman (2005) have put forward powerful pragmatic arguments in favour of a combined methodological approach, with many social scientists now believing that a single methodological approach leads to superficial findings. The emphasis on wholeness means a rejection of fragmented and theoretical knowledge that is separated from experience and clinical practice.

Identification of the relative importance given to each method within the analysis stage is important to define at the outset. In the study, it is clear that the qualitative data forms the basis for the case study, with the quantitative data collection feeding into that analysis. Not only do the interviews form the basis of the case study reports, but they are also analysed to produce current themes in the narratives.

Researchers while conducting research make many different inferences or conclusions. Many of these are related to the process of doing research and are not the major hypotheses of the study. Nevertheless, like the bricks that go into building a wall, these intermediate processes and methodological propositions provide the foundation for the substantive conclusions that are drawn.

Creswell (2003) posits that research design is a vital part of research; it is an intricate part of building the validity of conclusions reached in a study. The case study overall aims to investigate whether LETZ treatment for abnormal smears of the cervix has an effect on progress in the 1st stage of labour. This aim is articulated in six research questions that the study answers. The design of the study is a case study framework that incorporates interview data with data from policies and guidelines, as well as a quasi-experimental retrospective case control study. It

produces findings that can be viewed in the context of the clinical and social environment, and not as isolated dependent and independent variables which are usually associated with experimental research. In the study, a restricted approach has been rejected in favour of pragmatism or methodological eclecticism, i.e. the freedom to choose different methods that provide a more comprehensive view of the field of study. A combined approach, which recognises both quantitative and qualitative methods of data collection, is therefore used to provide a holistic picture on which to base practice.

In order that practice is changed if necessary, and the findings generalised to a larger population, a quantitative method is used to obtain data that can be analysed that answers 4 of the 6 research questions in the study (numbering reflects place in original research question list)–

2. Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour?
3. Are the differences clinically relevant?
4. Are the differences statistically significant?
5. Are there differences seen in both women having their first baby after LETZ and women having their second baby, but their first after LETZ?

The quantitative findings are used as part of the information input into the qualitative case studies. The case study strategy determines what the quantitative results mean to both the women involved and their carers. It also determines the different effects found in women having the LETZ between their first and second births and women having their first birth after LETZ to be determined. In this way, the problem researched is better understood.

Chapter 5

Data Analysis and Results

Introduction

Chapter 4 describes the case study design chosen for the study that reflects the pragmatic approach within a feminist framework. It makes explicit the aims of the study, the research questions it answers regarding the effects of LETZ on progress in labour and the data collection methods used. The research design provides the link between the perspectives that inform the research, on the one hand, and the material collected on the other. Chapter 4 also describes the conceptual framework of the research and the sequential triangulation strategy.

Chapter 5 details the analysis of, and discusses the results of, the Quantitative data and the Qualitative interview data. It gives an overview of the individual strands and then Chapter 6 combines these strands into Case Studies that examine the combined results and their implications.

Therefore, this Chapter is divided into 2 parts -

Part One - Quantitative analysis and results.

Part Two - Qualitative interview analysis and results.

5.1 Part One: Quantitative analysis and results

5.1.1 Introduction

This section describes the retrospective case control part of the study. The demographics of the sample used are described. The removal of cases with confounding variables, the details of the analysis by parity group and the results of these analyses are detailed. This quantitative part of the study aims to answer 4 of the 6 research questions –

2. Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour?
3. Are the differences clinically relevant?
4. Are the differences statistically significant?
5. Are there differences seen in both women having their first baby after LETZ, and women having their second baby, but their first after LETZ?

It also seeks to compare the data with previous studies by answering the questions-

- A. Are there differences in type of birth?
- B. Are there differences in number of premature births?
- C. Are there differences in birth weight of the babies?
- D. Are there differences in onset of labour?

A description of the total sample outcomes that are processed to compare this study's results to the results of other studies is given. An overview of the implications of the results is given. The full discussion of the results is kept for the Case Studies Discussion Chapter 6 and Chapter 7: Discussion.

5.1.2 Analysis

Data is input into the statistical software application SPSS 15.0 and this is used for all analyses. Analysis often neglects clinically relevant outcomes when only statistically significant outcomes are examined (Bowling 2009). For this reason, clinical relevance is examined for all outcomes. The only variables missing are in the biographical details of some women.

5.1.2.1 *Division into sub-groups*

The major premise of the study is that other research states the effects of parity on the length of labour (Al-Azzawi 1998) but ignores parity in their analyses. Although the data is scrutinised for the total sample to compare the secondary outcome results with other research studies, the main results of the study are examined by parity. The data used for analysis is further restricted by the removal of cases with confounding variables. A description of this can be found in Chp. 3; Section 3.4.4, p.72. Women who are induced for being past their estimated date of birth, women who are augmented for premature rupture of membranes, women whose births ends in Caesarean Section (CS) and women who are admitted already fully dilated are excluded. This removal of cases with confounding variables further defines the groups and aids more robust examination of the data, which enables more meaningful comparisons to be made.

5.1.2.2 *Statistical tests*

Relative Risk (RR) and Odds Ratio (OR) are used for dichotomous variables, as this method of signifying clinical relevance is now the norm in medical journals in the UK ((Nguyen, Montz et al. 2000; Paraskevaidis, Koliopoulos et al. 2002; Acharya, Kjeldberg et al. 2005). Clinically relevant findings i.e. which would make a difference in clinical practice, were being dismissed when they were not statistically significant using standard tests (Bowling 2009). For calculations with no comparison numbers, in either group, Pearson Chi-Square is also used. The types of statistical tests favoured in most of the previous research did not take cognisance of the distribution and type of data presented. The Mann Whitney U test (MWU) is used for continuous data as this is regarded as the most powerful of the non-parametric tests. Parametric tests, such as the Student-t test used in previous studies, are more valid when the data has a normal distribution.

After removal of cases with confounding variables the number of cases is less than the specified number for 2 controls to each subject, 32 subject women versus 64 control women (37 versus 62) having their second baby and 46 subject women versus 92 control women (57 versus 88) having their first baby. However, the number of cases is greater than the specified number for 1.5 controls to each subject, 35 subject women versus 53 controls having their second baby and 51 subject women versus 77 controls having their first baby. According to Friedman (1994) if resources permit the inclusion of more study subjects but no more cases are available, the control group may be enlarged to decrease sampling variation. This maintains the power of the study. These unequal groups also affect some statistical tests. Due to the non-normal distribution, Spearman Rho is used for correlations of ordinal data. The total sample is 111 subject women and 214 controls.

5.1.3 Results

As well as being reported as statistically significant or not, all the results are reported as being clinically relevant or not. This is to include results that many authorities felt were being missed as not statistically significant, but the differences would make a difference in clinical practice, therefore were clinically relevant.

The data is prepared by checking the data input to the SPSS 15.0 database for accuracy. The parameters of the variables are checked to ensure that they have not been exceeded, as this indicates incorrect data entry. Participant's records are spot checked on a random basis. The frequencies are checked to see if the premise from the Pilot Study holds true that the distribution is skewed and therefore non-parametric tests are suitable. See graphs Fig 6 and Fig 7, p.111. The premise holds true and the distributions are still skewed. The data reflect the division into passive and progressive stages that are part of the design of the standardised data collection forms (see Appendices C, D and E, p.270-272).

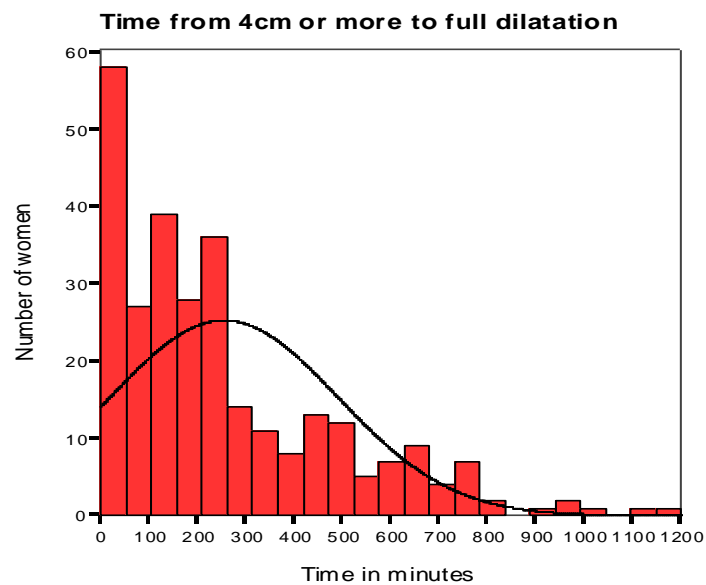


Figure 6: Distribution of times from 4cm or more to full dilatation of all women in study.

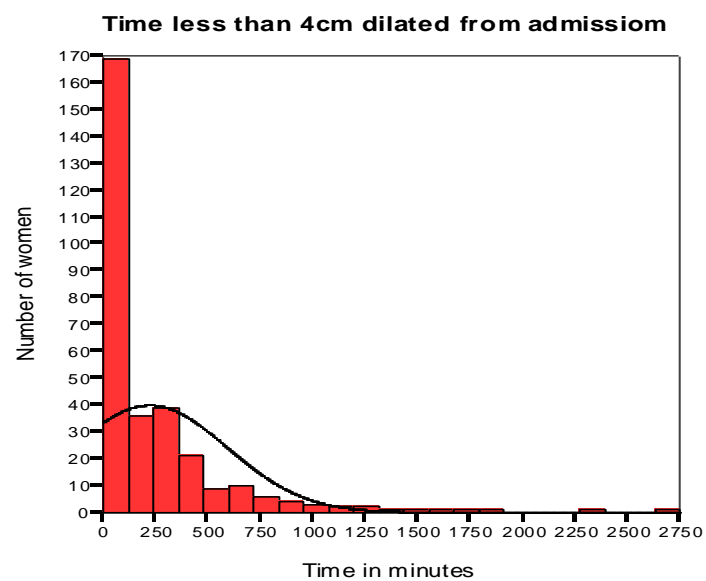


Figure 7: Distribution of times from admission to 4cm or more dilated of all women in study.

5.1.3.1 Sample

One hundred and eleven women have LETZ and 214 do not. When cases with confounding variables are removed, it results in 57 subject women having their first baby and 37 subject women having their second baby, who have LETZ between

their first and second births. Control women are 88 having their first baby and 62 women having their second baby. This included 2 subject women and 3 control women having their second baby who had a previous CS.

5.1.3.2 Demographics

The demographics of the subject and the control women are very similar. The only missing variables in the study were from the biographical details and missing variables are not processed.

5.1.3.2.1 Age

The age range is 20 years to 39 years in the subject women and 21 to 40 years in the control women. There are no clinically relevant or statistically significant differences in the ages, with a median age of 29 in the subject women and 30 in the control women.

5.1.3.2.2 Social class of mother and father

When the National Statistics Socio-economic Classifications (Office of National Statistics 2006) are used, there are no significant differences between the groups in social scale of the mother, or social scale of the father. Both the subject and control women span all social ranges in social scale of the mother, with 45% of the subject women in the lower socio-economic ranges 4-8 and 38% of the control women in those ranges. They also span all social ranges in social scale of the father, with 57% of the subject women's partners and 42% of the control women's partners in the lower socio-economic ranges 4-8 (Office of National Statistics 2006).

5.1.3.2.3 Area of residence by social deprivation scale

There are no significant differences between subject and control women in areas of deprivation. Thirty-nine percent of the subject women and 37% of the control women live in the 10 most deprived areas of the study locale as defined in the Multiple Deprivation Index for Wards (Office of National Statistics 2006). Both groups span all areas of the city.

5.1.3.2.4 Smoking status at the birth of the baby

Smokers in the study are defined as those who smoke or have given up smoking for less than 1 year. The study definition of non-smokers include those who gave up smoking over a year ago. In the subject women, the smokers make up 47% with

29% in the control women. Calculations reveal the Relative Risk (RR) for smoking in the subject women is 1.64, therefore clinically relevant, with 95% Confidence Interval (CI) of 1.22 - 2.20, therefore this result is also statistically significant (see Table 15, below). In other words, the subject women are 1.6 times more likely to smoke or have recently quit and control women 25% less likely.

RR and OR for all women who smoked at birth or have just given up smoking.

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for smoker or non-smoker	.456	.282	.739
Control women who smoked or had just given up	.748	.616	.908
Subject women who smoked or had just given up	1.639	1.218	2.204
N of Valid Cases	315		

Table 15: Relative Risk and Odds Ratio of all women who smoked or have recently given up smoking at birth of baby.

5.1.3.3 Women having their first baby after removal of cases with confounding variables

The distribution of the sub group of women having their first baby is checked to ensure that the distribution remains skewed even when transformed using logarithms. Both distributions using minutes and distribution using transformed logarithms are skewed; see Figures 8 and 9, p.114, Figures 10 and 11, p.115.

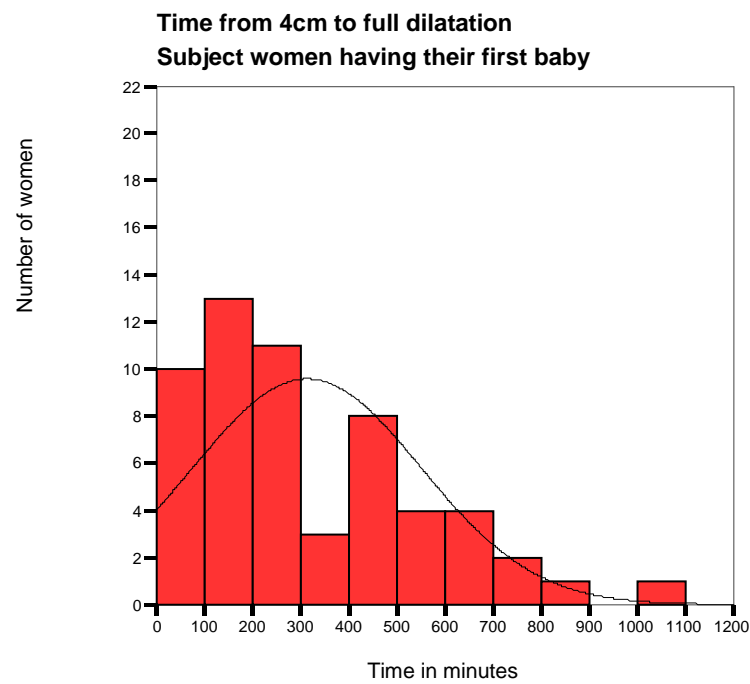


Figure 8: Distributions of time from 4cm to full dilatation in minutes of subject women having their first baby after removal of cases with confounding variables.

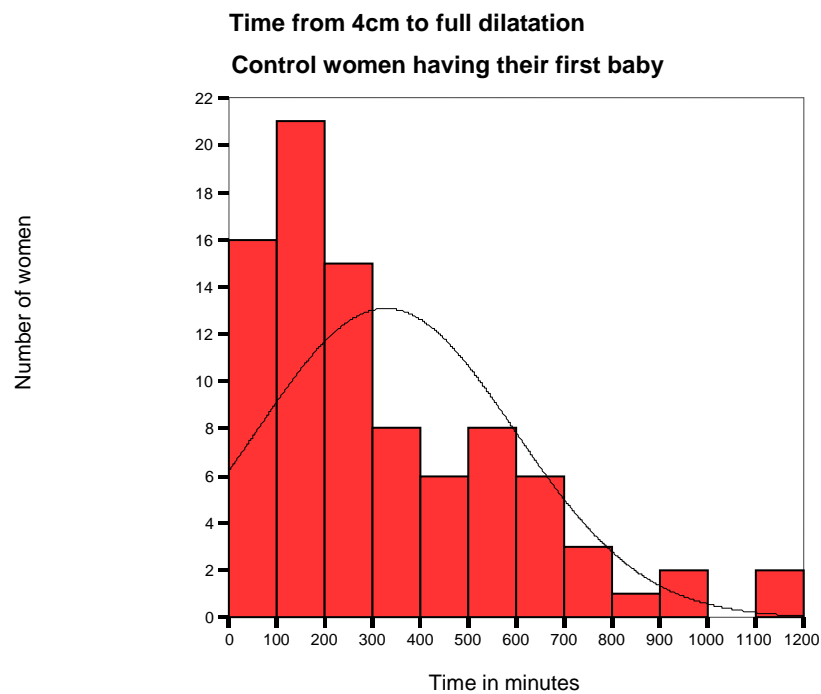


Figure 9: Distributions of time from 4cm to full dilatation in minutes of control women having their first baby after removal of cases with confounding variables.

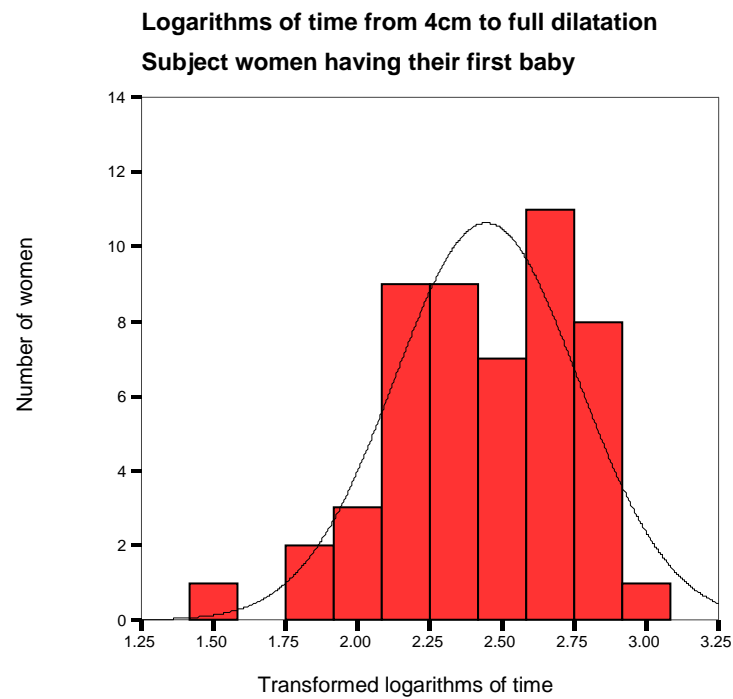


Figure 10: Distributions of time from 4cm or more to full dilatation in transformed logarithms of subject women having their first baby after removal of cases with confounding variables.

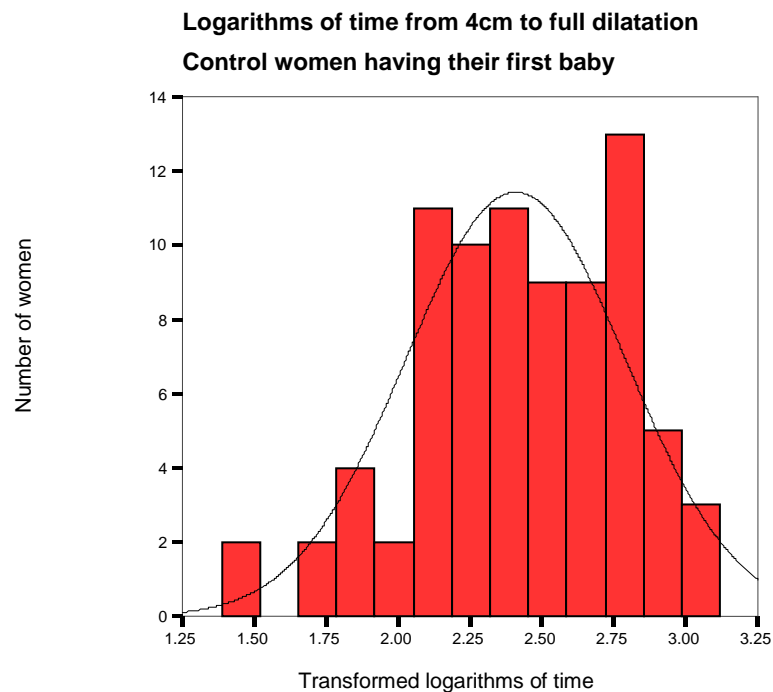


Figure 11: Distributions of time from 4cm or more to full dilatation in transformed logarithms of control women having their first baby after removal of cases with confounding variables.

5.1.3.3.1 Time from 4cm or more to full dilatation of women having their first baby after removal of cases with confounding variables

Time taken from 4cm or more dilated to full dilatation is not clinically relevant as there is no difference between the groups. Thirty-six (63%) of the subject women having their first baby took less than 6 hours to reach full dilatation, compared to 57 (65%) control women having their first baby. OR=0.93; RR for taking less than 6 hours to reach full dilatation is 0.96, CI 0.63-1.46 therefore not statistically significant (see Table 16 below). This non-significance is confirmed by Mann Whitney U test (MWU) for exact times, $p=0.94$.

RR and OR for women having their first baby taking less than 6 hours to reach full dilatation

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for less than 6 hrs / more than 6 hrs to fully	.932	.466	1.865
Subject women who took less than 6 hrs	.959	.631	1.455
Control women who took less than 6 hrs	1.028	.780	1.355
N of Valid Cases	145		

Table 16: Relative Risk and Odds Ratio for women having their first baby taking less than 6 hours to reach full dilatation from 4cm.

5.1.3.3.2 Time from admission to 4cm or more dilated of women having their first baby after removal of cases with confounding variables

This is clinically relevant as 41 (72%) of subject women having their first baby and only 45 (51%) of control women having their first baby, are admitted when already 4cm or more dilated. Odds Ratio =2.45; RR=1.76, CI 1.10–2.82, therefore this result is also statistically significant (see Table 17, p.117). This means that subject women having their first baby are 1.8 times more likely to be admitted at 4cm or more dilated and control women are 28% less likely to be admitted more than 4cm dilated. This statistical significance is reaffirmed by $p=0.005$ (MWU) for exact times. Given the guidelines in place at the time of the study, admission of both groups should have been similar.

RR and OR for women having their first baby being admitted more than 4cm dilated

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for admitted 4cm or greater / admitted less than 4 cm	2.449	1.200	4.996
Subject women admitted more than 4cm	1.758	1.095	2.822
Control women admitted more than 4cm	.718	.556	.926
N of Valid Cases	145		

Table 17: Relative Risk and Odds Ratio for women having their first baby who are more than 4cm dilated on admission to hospital.

5.1.3.3.3 Gestation in completed weeks of women having their first baby after removal of cases with confounding variables

Six (11%) of the subject women having their first baby have premature births (babies born before 37 weeks) while there is only 1 (1%) premature birth in the control women. The one control woman gives birth prematurely at 36 weeks. Premature births in the subject women range from 24 to 36 weeks gestation (24, 27, 35, 35, 35 and 36). This is clinically relevant with OR=10.24; RR=2.32. In other words, subject women having their first baby are 2.3 times more likely to have a premature birth, with control women 77% less likely (see Table 18, p.118). This is clinically relevant as premature birth brings associated complications of effects on birth weight and long-term effects on the baby (Seubert, Stetzer et al. 1999; Steer 2005). It is also statistically significant with 95% CI 1.60 -3.37.

RR and OR for women having their first baby as a premature birth (less than 37 weeks)

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for premature births/ term birth	10.235	1.198	87.433
Subject women who had premature birth	2.319	1.598	3.367
Control women who had premature birth	.227	.037	1.397
N of Valid Cases	145		

Table 18: Relative Risk and Odds Ratio for women having their first baby as a premature birth.

5.1.3.3.4 Weight of baby of women having their first baby after removal of cases with confounding variables

The clinically relevant difference in premature births is reflected in the birth weight, with 5 babies in the subject women having their first baby whose weight is under 2500g. This is clinically relevant, as these babies require more support, with more intensive observation, feeding, heating and potential respiratory support (Seubert, Stetzer et al. 1999; Steer 2005). It is also statistically significant, $p=0.005$ Pearson Chi-Square. Relative Risk cannot be calculated, as there are no babies under 2500g born to control women.

When premature births are removed from the birth weight comparisons, there is only one baby in the subject women whose weight is under 2500g. It is not clinically relevant nor statistically significant, with $p=0.449$ MWU and $p=0.190$ Pearson Chi-Square.

5.1.3.3.5 Type of birth of women having their first baby after removal of cases with confounding variables

Type of birth is not clinically relevant, as there is little difference. Of the subject women having their first baby 20 (35%) have a Normal birth as defined by (WHO 1985a) (see Chp. 3; Section 3.5.1, p.75), versus 31 (35%) of the control women. Odds Ratio=0.99; RR=1.00, CI 0.65–1.52, therefore this is also not statistically significant. Spontaneous Vaginal birth (birthed vaginally but with interventions such as Epidural, Artificial Rupture of Membranes, or Syntocinon) is 14 (25%) in the subject women having their first baby versus 23 (26%) in the control women, OR=0.92; RR=0.95, while 23 (40%) versus 34 (39%) have an Instrumental birth

(forceps or vacuum extraction), $OR=1.07$; $RR=1.04$. These are also not statistically significant results at the 95% CI level. This non-significance is confirmed by $p=0.77$ Pearson Chi-Square. See charts Figures 12 below and 13, p.120. However, these figures do imply that 65% of women having their first baby are unable to give birth without medical intervention. This is discussed further in Chapter 6 Case studies discussion and Chapter 7: Discussion.

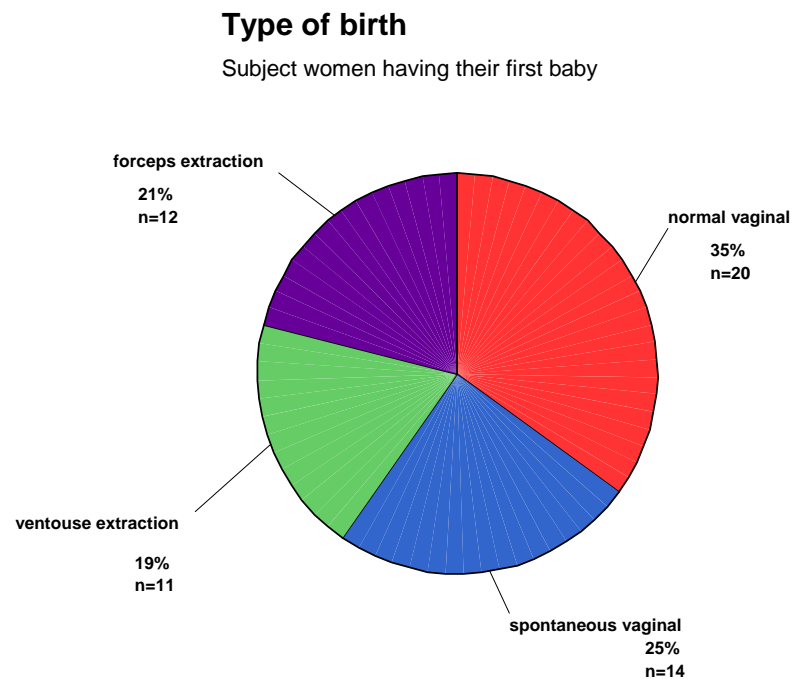


Figure 12: Type of birth of subject women having their first baby after removal of cases with confounding variables.

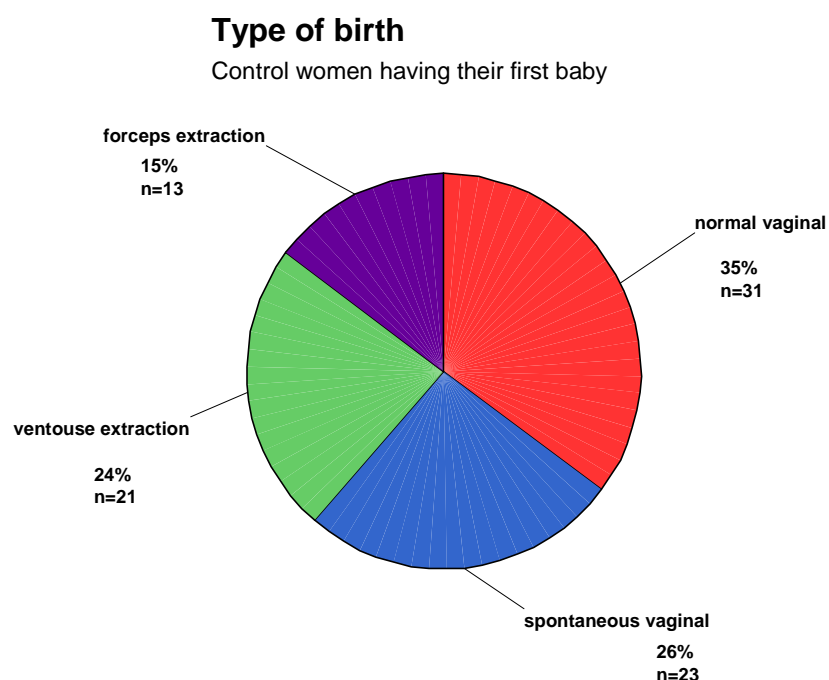


Figure 13: Type of birth of control women having their first baby after removal of cases with confounding variables.

5.1.3.3.6 Correlations with LETZ treatment of women having their first baby after removal of cases with confounding variables

When only premature births are scrutinised, (as opposed to other subject women having their first baby) only the practice of 'See and Treat' (being seen and treated at the same clinic visit) is absent in the premature births. All of these women have a punch biopsy first to define grade of CIN. Three of the 6 premature births in the subject women have LETZ for CIN 3. The depths of tissue excision in the 6 premature births varies between 3-18mm, only 2 are less than 10mm in depth.

5.1.3.3.7 Correlations with analgesia or interventions of women having their first baby after removal of cases with confounding variables

Diamorphine use for pain relief is clinically relevant with 31 (54%) of the subject women having Diamorphine compared to 35 (40%) of control women, OR 1.81; RR=1.43. Therefore, subject women having their first baby are 1.4 times more likely to have Diamorphine, but it is not statistically significant as CI 0.95–2.14 (see Table 19, p.121). Diamorphine is known to limit women's mobility in labour and therefore slow the labour.

**RR and OR of women having their first baby and have
Diamorphine**

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Diamorphine/ not	1.805	.920	3.542
Subject women who have Diamorphine	1.427	.951	2.142
Control women who have Diamorphine	.790	.601	1.040
N of Valid Cases	145		

Table 19: Relative Risk and Odds Ratio of women having their first baby and have Diamorphine.

Use of Epidural overall is not clinically relevant, with 22 (39%) of the subject women versus 32 (37%) of the control women, OR=1.10; RR=1.06, CI 0.70-1.60; therefore this result is also not statistically significant. Ten women in each group, i.e. 18% in the subject women and 11% in the control women, use both Diamorphine and Epidural. Subject women are 1.3 times more likely to have both, but this is not statistically significant, OR=1.66; RR=1.33, CI 0.81-2.18.

The number of women in which Syntocinon is used is not clinically relevant OR=0.87; RR=0.92. Use of Artificial Rupture of Membranes (ARM) is clinically relevant and it is used in 12 (21%) of the subject women versus 34 (39%) of the control women. Control women are 1.4 times more likely to have intervention by ARM, OR=0.42; RR=1.36, CI 1.06-1.74, therefore also statistically significant. This statistical significance is confirmed by $p=0.02$ MWU. This means that subject women are 43% less likely to have ARM (see Table 20, p.122). This is clinically relevant as ARM is performed to accelerate the rate of dilatation of the cervix in labour. This implies that the time in labour, of control women having their first baby, is artificially decreased. This may be confounding the results for differences.

RR and OR for women having their first baby and have ARM

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for ARM/not	.424	.197	.913
Subject women who have ARM	.574	.337	.977
Control women who have ARM	1.355	1.057	1.738
N of Valid Cases	145		

Table 20: Relative Risk and Odds Ratio for Artificial Rupture of Membranes of women having their first baby.

Overall the majority (75 of 145) of women having their first baby, whether subject or control women, have interventions such as ARM, Diamorphine, Epidural and Syntocinon. Thirty of 57 subject women having their first baby have these interventions, compared to 45 of 88 control women. When interventions at actual birth are added, i.e. Ventouse extraction at birth or Forceps extraction at birth, the numbers with interventions rise slightly. Thirty-eight of 57 subject women have interventions as opposed to 57 of 88 control women. These differences are neither clinically relevant nor statistically significant.

5.1.3.3.8 Correlations with demographics of women having their first baby after removal of cases with confounding variables

There is a clinically relevant difference in smoking status. Twenty-eight (49%) of subject women having their first baby versus 25 (28%) of control women are smokers (defined in Section 5.1.3.2.4, p.112). Details for 4 women are missing but this is unlikely to alter the results. Subject women having their first baby are 1.6 times more likely to be smokers, with control women 31% less likely, OR=2.40; RR=1.60, CI 1.12-2.47, therefore this is also statistically significant. This correlation is expected as it confirms previous research on increased risk for CIN (Bristow and Karlan 1999; Nguyen, Montz et al. 2000; Villa, Costa et al. 2005).

5.1.3.3.9 Summary of women having their first baby after removal of cases with confounding variables

The finding of premature births being clinically relevant and statistically significant between the two groups is a confirmation of the finding for women having their first baby in the Pilot Study. The RR of 2.3 times more likely to have a premature birth,

which is also statistically significant due to the 95% Confidence Interval, is clinically relevant. The finding that all premature births have previous punch biopsy before LETZ, and that 3 of the 6 have LETZ for CIN 3, reinforces the view of this researcher and other authors that premature birth after LETZ potentially reflects the area of tissue excised.

The findings of low numbers of normal births (35%) in women having their first baby, as defined by the (WHO 1985a), is a replication of the findings in the Pilot Study. This may be a reflection of increased intervention for women having their first baby due to the medical view that birth is only normal in retrospect (Al-Azzawi 1998).

As found in the Chapter 3: Pilot Study, the differences between subject women and control women in the time they take to get to full dilatation from 4cm dilated, are neither clinically relevant nor statistically significant. However, the clinically relevant differences in the number of control women who have ARM, which accelerates the dilatation of the cervix, confound these figures. That intervention aims to decrease the time in labour.

Unlike the Pilot Study, there is a clinically relevant difference between the subject women and control women in time they take to get to 4cm dilated from admission to hospital. This difference is also statistically significant. This particular hospital's practice of sending mothers home, especially first time mothers, until well established in labour should have resulted in equal amounts of women in each group being admitted already 4cm dilated. Are subject women sent home more than once as not being in labour? Unfortunately, this information is missing from the delivery data of most of the participants. This is discussed more fully in Chapter 6: Discussion.

5.1.3.4 Women having their second baby after removal of cases with confounding variables

The distribution of the sub group of women who have their second baby is checked to ensure that the distribution remains skewed even when transformed using logarithms. See Figures 14 and 15, p. 124 and Figure 16, p.125. This sub group includes subject women having their second baby, with LETZ between the birth of

their first and second babies, and control women having their second baby. This includes 2 subject women and 3 control women who had a previous CS.

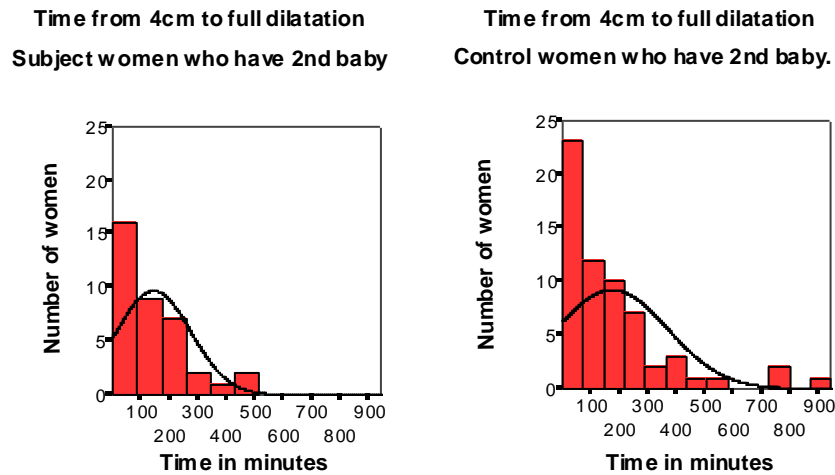


Figure 14: Distributions of times from 4cm to full dilatation in minutes of subject and control women having their second baby after removal of cases with confounding variables.

Logarithms of time from 4cm to full dilatation
Subject women who have 2nd baby

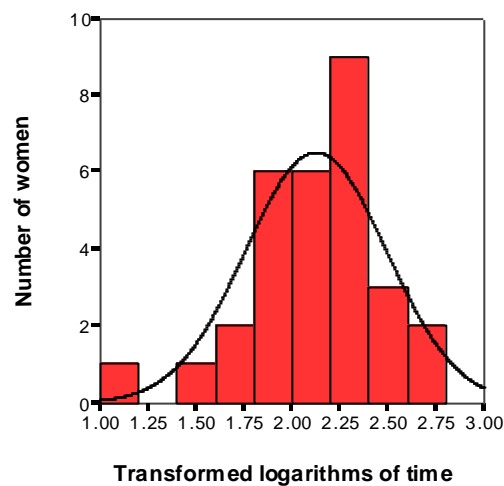


Figure 15: Distributions of times from 4cm to full dilatation in transformed logarithms of subject women having their second baby after removal of cases with confounding variables.

Logarithms of time from 4cm to full dilatation
Control women who have 2nd baby

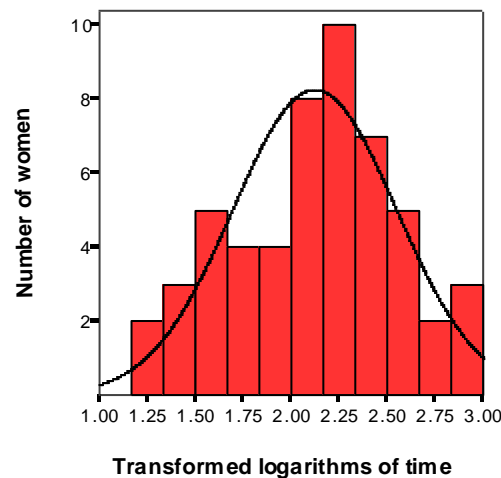


Figure 16: Distributions of times from 4cm to full dilatation in transformed logarithms of control women having their second baby after removal of cases with confounding variables.

5.1.3.4.1 Time from 4cm or more to full dilatation of women having their second baby after removal of cases with confounding variables

There is a clinically relevant difference between the groups. Thirty-four subject women (92%) take less than 6 hours and 54 control women (87%), OR=1.68; RR = 1.42, therefore subject women are 1.4 times more likely to take less than 6 hours to reach full dilatation from 4cm. However CI = 0.52-3.85 therefore this result is not statistically significant (see Table 21 below). This non-significance is confirmed when the actual times taken to reach fully dilated are examined, $p=0.755$, MWU. A discussion of this clinically relevant result is to be found in Chapter 7: Discussion.

RR and OR of women having their second baby taking less than 6 hours to reach full dilatation

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for less than 6 hrs / more than 6 hrs	1.679	.416	6.772
Subject women taking less than 6 hrs	1.417	.521	3.852
Control women taking less than 6 hrs	.844	.567	1.256
N of Valid Cases	99		

Table 21: Relative Risk and Odds Ratio for women having their second baby and taking less than 6 hours to reach full dilatation from 4cm.

5.1.3.4.2 Time from admission to 4cm or more dilated of women having their second baby after removal of cases with confounding variables

The time women having their second baby take to reach 4cm dilatation from when they are admitted is not clinically relevant, as there is no difference between the groups. Twenty-two subject women (60%) and 39 control women (63%) are admitted already at 4cm dilated, OR=0.87; RR= 0.91, CI 0.55-1.53, therefore this result is also not statistically significant (see Table 22, below). This is confirmed by examining the exact times, $p=0.90$, MWU.

RR and OR for women having their second baby being admitted more than 4cm dilated

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for admission at 4cm or greater / admission less than 4cm	.865	.376	1.992
Subject women admission greater than 4cm	.914	.545	1.531
Control women admission greater than 4cm	1.056	.768	1.453
N of Valid Cases	99		

Table 22: Relative Risk and Odds Ratio for women having their second baby being admitted after 4cm dilated.

5.1.3.4.3 Gestation in completed weeks of women having their second baby after removal of cases with confounding variables

Differences in gestation are clinically relevant, 9 (24%) of the subject women have a premature birth (babies born before 37 weeks) while there are only 3 (5%) premature births to the control women. Odds Ratio =6.32; RR=2.33, CI 1.49-3.64, therefore this finding is also statistically significant (see Table 23, p.127). Subject women are 2.3 times more likely to have a premature birth and control women are 63% less likely. The premature births in the control women range from 33 to 36 weeks gestation (33, 33 and 36). The premature births in the subject women range from 30 to 36 weeks gestation (30, 31, 33, 33, 34, 36, 36, 36 and 36). As the section on women having their first baby discusses, premature birth brings associated complications (Seubert, Stetzer et al. 1999; Steer 2005).

RR and OR for women having their second baby as premature birth (less than 37 weeks)

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for premature births/ term birth	6.321	1.587	25.175
Subject women premature birth	2.330	1.490	3.644
Control women premature birth	.369	.137	.993
N of Valid Cases	99		

Table 23: Relative Risk and Odds Ratio for women having their second baby as a premature birth.

5.1.3.4.4 Weight of baby of women having their second baby after removal of cases with confounding variables

The difference in premature birth is partly reflected in the birth weight of babies. Clinically there are relevant differences with 5 (14%) babies in the subject women versus 4 (7%) babies in the control women who are less than 2500gram, OR=2.26; RR=1.56 (see Table 24, p.128). Babies of subject women are 1.6 times more likely to be low birthweight and babies of control women are 31% less likely to be low birthweight. This is clinically relevant, as these babies require more support and more intensive observation, feeding, heating and potential respiratory support (Seubert, Stetzer et al. 1999; Steer, P. 2005). However, it is not statistically significant, CI 0.82-2.99. It is also relevant that only 5 of the 9 premature births in the subject women are less than 2500g, versus 2 of the 3 premature births in the control women; and that the control women also have 2 normal gestation babies that are less than 2500g.

**RR and OR for women having their second baby
less than 2500g in weight**

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for baby weight less than/ more than 2500g	2.266	.568	9.040
Subject women baby below 2500g	1.563	.818	2.985
Control women baby below 2500g	.690	.327	1.455
N of Valid Cases	99		

Table 24: Relative Risk and Odds Ratio for women having their second baby born less than 2500g in weight.

When premature births are removed from the birth weight comparisons, there are two babies in the control women whose weight is under 2500g and no babies in the subject women. It is not clinically relevant or statistically significant, with $p=0.866$ MWU and $p=0.324$ Pearson Chi-Square. Relative Risk cannot be calculated, as there are no low birthweight in the subject women.

5.1.3.4.5 Type of birth of women having their second baby after removal of cases with confounding variables

Clinically there are relevant differences in Normal births and Instrumental births. (See Figures 17 and 18, p.129).

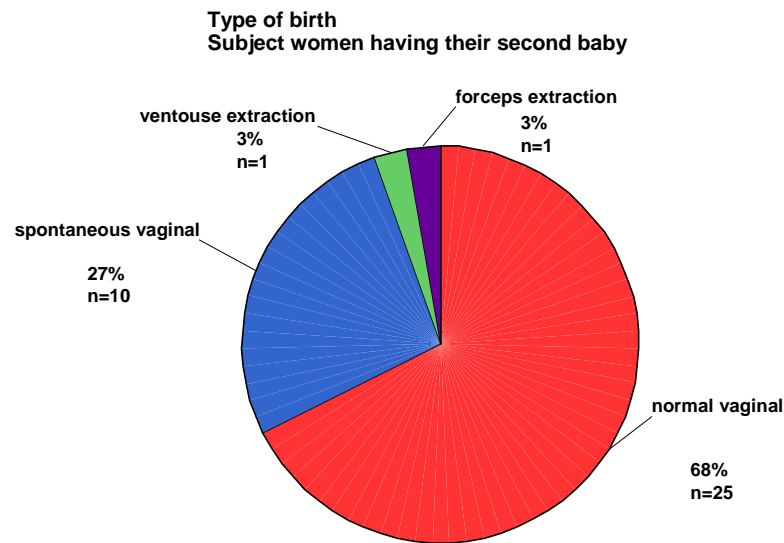


Figure 17: Type of birth of subject women having their second baby after removal of cases with confounding variables.

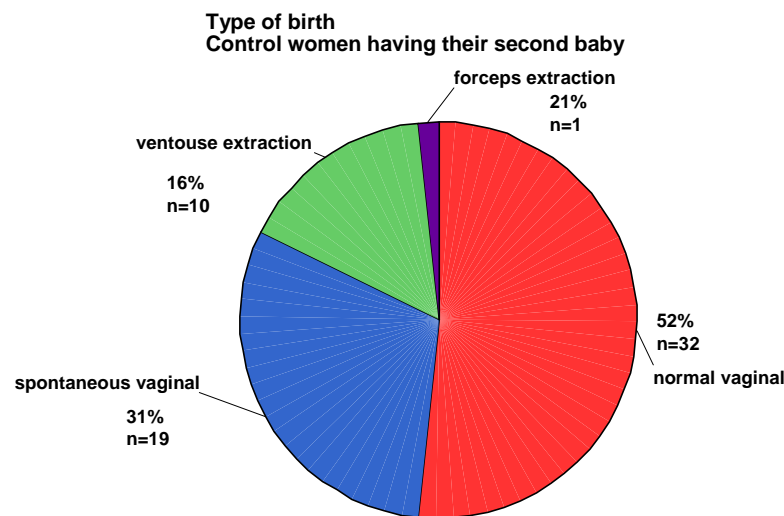


Figure 18: Type of birth of control women having their second baby after removal of cases with confounding variables.

Twenty-five (68%) of the subject women , including one who had a previous CS, versus 32 (52%) of the control women have a Normal birth as defined by (WHO 1985a) (see Chp. 3; Section 3.5.1, p.75). The subject women are 1.5 times more

likely to have a Normal birth and control women 21% less likely, OR=1.95; RR=1.54, CI 0.88-2.70, therefore the difference is not statistically significant. Ten (27%) subject women versus 19 (31%) control women, including one who had a previous CS, have a Spontaneous Vaginal birth (delivered vaginally but with interventions such as Epidural, ARM or Syntocinon), OR=0.84; RR=0.89, CI 0.50-1.60, this is therefore neither clinically relevant nor statistically significant. Of the subject women 2 (5%) versus 11(18%) control women have an Instrumental birth (Forceps or Vacuum extraction), with the associated increase in suturing and associated healing times and risk of 3rd degree tears (Thompson, Roberts et al. 2002). This includes one subject woman and two control women who have had previous CS. The control women are 1.4 times more likely to have an Instrumental birth, and the subject women 62% less likely, OR=0.27; RR=1.43, CI 1.07-1.91 (see Table 25 below). This finding therefore is also statistically significant.

RR and OR for women having their second baby as an Instrumental birth

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Instrumental birth / not	.265	.055	1.269
Subject women Instrumental birth	.378	.103	1.387
Control women Instrumental birth	1.427	1.067	1.908
N of Valid Cases	99		

Table 25: Relative Risk and Odds Ratio for women having their second baby as an Instrumental birth.

5.1.3.4.6 Correlations with LETZ treatment of women having their second baby after removal of cases with confounding variables

The finding that women with CIN 3 are 1.7 times more likely to be treated at the first visit is clinically relevant, OR=6.36; RR=1.67, CI 1.07-2.61, therefore this is also statistically significant (see Table 26, p. 131). Women with CIN 1 and CIN 2 are 74% less likely to be treated at the first visit, i.e. they have a punch biopsy first to confirm grade of CIN.

RR and OR of subject women having their second baby with CIN 3 treated at first visit

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for See and treat / not CIN 3 subject women treated at first visit	6.364	1.149	35.229
CIN 1 or 2 subject women treated at first visit	1.670	1.067	2.614
N of Valid Cases	.263	.067	1.035
	37		

Table 26: Relative Risk and Odds Ratio of LETZ at first visit for women with CIN 3 as opposed to women with CIN 1 or CIN 2 for subject women having their second baby.

Women in the group who have CIN 3 also take less time to get to full dilatation from 4cm or more, this is clinically relevant with all 25 of these women delivering in less than 6 hours. The implications of this finding are discussed in Chapter 6: Case studies discussion and Chapter 7: Discussion. This statistical significance is confirmed with correlation calculations, $p=0.000$ correlation coefficient -0.545 for less than 6 hours.

Of the subject women who have premature births, 7 of the 9 women have LETZ for CIN 3. Five of those 7 women who have CIN 3 are treated at the first colposcopy visit without previous punch biopsy. The depths of tissue excision in the subject women who have premature births vary from 7-25mm. Only one woman has depth of less than 10mm. Only one woman has immediate complications after treatment, and she is a woman who is having her second LETZ treatment.

5.1.3.4.7 Correlations with analgesia or interventions of women having their second baby after removal of cases with confounding variables

Diamorphine and Epidural use for pain relief is clinically relevant between the two groups of women having their second baby. Subject women are 1.4 times more likely to have Diamorphine, 20 (54%) of the subject women versus 25 (40%) of the control women, $OR=1.74$; $RR=1.41$, $CI\ 0.85-2.35$, therefore not statistically significant. Epidural use for pain relief is also clinically relevant. Seven (19%) of the subject women and 19 (31%) of the control women have Epidurals. Subject women are 34% less likely to have an Epidural and control women 1.2 times more likely,

OR=0.53; RR=1.24, CI 0.92-1.68, therefore not statistically significant. Diamorphine is used earlier in their labours for women with CIN 3, $p=0.006$ (Spearman's rho), correlation coefficient -0.591 .

Syntocinon and Artificial Rupture of Membranes use are clinically relevant, with control women 1.5 times more likely to have Syntocinon and subject women 72% less likely. Eight (13%) of the control women and 1 (3%) of the subject women have syntocinon, OR=0.19; RR=1.48, CI 1.11-1.97, therefore it is also statistically significant (see Table 27 below). This is clinically relevant as Syntocinon is used to accelerate the rate of dilatation of the cervix. Therefore, the control women's time to full dilatation is artificially decreased.

RR and OR for women having their second baby and use syntocinon

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for syntocinon / not	.188	.022	1.564
Control women who have Syntocinon	1.481	1.113	1.972
Subject women who have Syntocinon	.278	.043	1.794
N of Valid Cases	99		

Table 27: Relative Risk and Odds Ratio for women having their second baby and have Syntocinon.

Eight (22%) subject women versus 24 (39%) control women have Artificial Rupture of Membranes (ARM). Control women are 1.3 times more likely to have ARM with subject women 42% less likely, OR=0.44; RR=1.32, CI 0.99-1.77, therefore clinically relevant but not statistically significant (see Table 28, p. 133).

RR and OR for women having their second baby and have ARM

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for arm / not	.437	.172	1.112
Control women who have ARM	1.322	.990	1.766
Subject women who have ARM	.578	.299	1.117
N of Valid Cases	99		

Table 28: Relative Risk and Odds Ratio for women having their second baby and have Artificial Rupture of Membranes.

Overall, only a substantial minority of both subject and control women having their second baby have interventions (44 of 99 or 44%). Among subject women having their second baby 14 of 37 women have interventions (38%) as have 30 of 62 control women (48%). When interventions at actual birth are added, 15 of 37 subject women (41%) and 32 of 62 control women (52%) have interventions. These differences are not clinically relevant or statistically significant.

5.1.3.4.8 Correlations with demographics of women having their second baby after removal of cases with confounding variables

The Social Class of the mother has a good negative correlation with the age at cervical treatment, $p=0.000$ (Spearman's rho), correlation coefficient -0.562 , as does the Social Class of the father. This agrees with the previous research by Bristow and Karlan (1999) and Nguyen, Montz and Bristow (2000) that social class is a risk factor for abnormal cells of the cervix, as these women of the lower Social Class classifications have LETZ at an earlier age.

There are clinically relevant differences in smoking status. This agrees with previous research by Bristow and Karlan (1999), Nguyen, Montz and Bristow (2000) and Villa, Costa, et al. (2005) that cigarette smoking is a risk factor. Nineteen (51%) subject women having their second baby versus 20 (32%) control women are smokers as defined in the study. Subject women are 1.6 times more likely to be smokers, with control women 26% less likely, $OR=2.11$; $RR=1.57$, $CI\ 0.95 - 2.59$, therefore this is not statistically significant.

5.1.3.4.9 Summary of women having their second baby after removal of cases with confounding variables

The finding of differences in type of birth, with control women 1.4 times more likely to have an Instrumental birth is also statistically significant at the 95% Confidence level. Subject women are 1.5 times more likely to have a Normal birth, but this is not statistically significant. These findings reflect the trend in births in the Pilot Study. These differences in type of birth also reflect the increased use of Artificial Rupture of Membranes and Syntocinon in the control women, as discussed in Chapter 6: Discussion.

The findings of premature birth confirms the findings from both the Pilot Study and the meta-analysis and research by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) and Bruinsma, Lumley, Tan and Quinn (2007) respectively, with subject women having their second baby 2.3 times more likely to have a premature birth. This result is both clinically relevant and statistically significant. These findings are reflected in the subject women who are 1.6 times more likely to have a low birthweight baby, less than 2500g in weight; however, this is not statistically significant. However, there are no clinically relevant or statistically significant findings for birthweight once the premature births are removed.

The results for time from 4cm or more dilated to full dilatation finds only slight differences, though subject women are 1.4 times more likely to take less than 6 hours to get to full dilatation. This is not statistically significant when the 95% Confidence Interval is examined. This only partially confirms the Pilot Study (see Chp. 3; Section 3.5.3, p.77), results that subject women take less time to get to full dilatation. Only the correlation between grade of CIN 3 and less time taken to get to fully dilated from 4cm or more is found. There is no correlation with depth.

The combination of more Syntocinon and ARM in the controls confounds the results for differences in time to reach full dilatation, as both interventions are designed to accelerate the rate of dilatation of the cervix and decrease the time in labour. This difference in management may account for the lack of statistically significant differences in time from 4cm dilated to full dilatation for women having their second baby in the study. There are no clinically relevant or statistically significant

differences in women having their second baby who are more than 4cm dilated on admission.

5.1.3.5 All women in sample

The total sample of women, before any removal of cases with confounding variables or division into parity, is used to compare secondary outcomes to previous research studies. The secondary outcomes are onset of labour, type of birth, weight of baby and gestation of the baby at birth in completed weeks. This replicates the methods used in those previous studies. Pearson Chi-Square is used in most of the previous studies so is included in these results as well as Relative Risk (RR) and the Mann Whitney U test (MWU) statistic where appropriate.

5.1.3.5.1 Onset of labour of all women in sample

Of clinical importance is that subject women are 1.8 times more likely to go into labour spontaneously, and control women 20% less likely. OR=2.22; RR=1.77, CI 1.02-3.07, therefore also statistically significant (see Table 29 below). Eleven (10%) subject women have their labour induced or augmented compared to 42 (20%) control women.

RR and OR for all women in sample going into labour spontaneously

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for spontaneous onset / not	2.220	1.093	4.507
Subject women who have spontaneous onset	1.771	1.023	3.066
Control women who have spontaneous onset	.798	.677	.941
N of Valid Cases	325		

Table 29: Relative Risk and Odds Ratio for all women in sample going into labour spontaneously.

The statistical significance of the onset of labour is confirmed by Pearson Chi-Square, $p=0.03$ and MWU $p=0.017$, see Table 30, p.136.

MWU of onset of labour for all women in sample

	Onset of labour
Mann-Whitney U	10648.500
Asymp. Sig. (2-tailed)	.017
Exact Sig. (2-tailed)	.017
Point Probability	.000

Table 30: Mann Whitney U test for onset of labour of all women in sample.

5.1.3.5.2 Type of birth of all women in sample

Type of birth is both clinically relevant and statistically significant. This sample includes 3 subject women and 9 control women having their second baby who had a previous CS. Forty-five (41%) of subject women have a Normal birth, including one who had a previous CS, compared to only 62 (29%) of control women, OR=1.67; RR=1.39, CI 1.03-1.88, therefore also statistically significant (see Table 31 below). Subject women are 1.4 times more likely to have a Normal birth and control women 20% less likely. The statistical significance of type of birth is confirmed by Pearson Chi-Square, $p=0.04$, and MWU, $p=0.02$. Emergency Caesarean Sections (CS) are less in the subject women with 8 (7%) compared to 33 (15%) in control women. Of the women who ended with CS, none of the subject women had a previous CS and four of the control women.

Control women are 1.3 times more likely to have a Caesarean Section at birth and subject women 46% less likely. OR=0.43; RR=1.26, CI 1.06-1.50, this is therefore also statistically significant (see Table 32, p.137). This statistical significance is confirmed by $p=0.03$, Pearson Chi Square. See Figures 19, p.137 and 20, p.138 for type of birth.

RR and OR for all women in sample who have a normal birth

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for normal birth / not	1.672	1.034	2.702
Subject women who have a normal birth	1.389	1.029	1.875
Control women who have a normal birth	.831	.692	.999
N of Valid Cases	325		

Table 31: Relative Risk and Odds Ratio for all women in sample who have a normal birth.

RR and OR of all women in sample who have CS

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for CS/ not	.426	.190	.957
Subject women who have CS	.538	.284	1.021
Control women who have CS	1.263	1.061	1.504
N of Valid Cases	325		

Table 32: Relative risk and Odds Ratio for all women in sample who have a birth by CS.

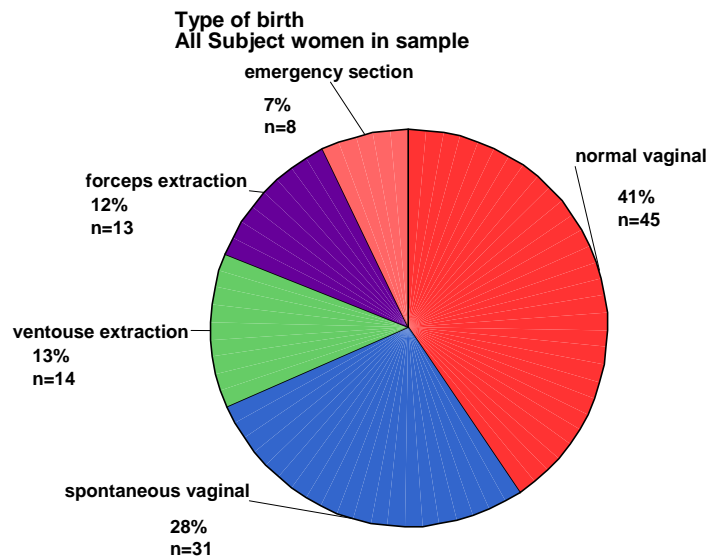


Figure 19: Type of birth of all subject women in sample.

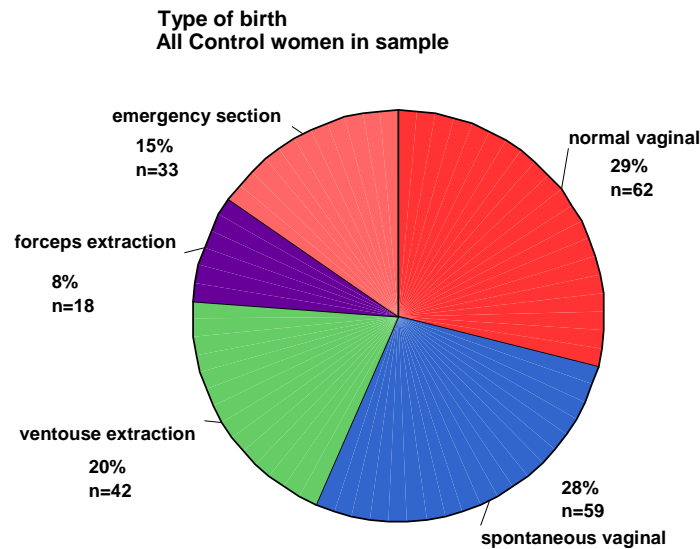


Figure 20: Type of birth of all control women in sample.

As previous studies have not differentiated between Normal birth and Spontaneous Vaginal births, statistics for both of these are combined to produce the equivalent in previous studies of Spontaneous Vaginal Deliveries. Odds Ratio=1.67; RR=1.41, CI 1.01-1.97, therefore subject women are 1.4 times more likely to have a Spontaneous Vaginal Delivery (as defined in previous studies as any baby delivered vaginally without the aid of instruments), with control women 15% less likely, this is also statistically significant by the 95% CI (see Table 33 below). These figures include one subject woman and one control woman who had previous CS. This statistical significance is confirmed by $p=0.04$, Pearson Chi-Square.

RR and OR of all women in sample who have the equivalent of Spontaneous Vaginal deliveries in previous research.

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for SVD or not	1.669	1.030	2.705
Subject women who have SVD	1.411	1.011	1.968
Control women who have SVD	.845	.725	.986
N of Valid Cases	325		

Table 33: Relative Risk and Odds ratio of all women in sample who have a Spontaneous Vaginal Delivery (Normal births and Spontaneous Vaginal births as defined in this study combined).

5.1.3.5.3 Gestation in completed weeks of all women in sample

The gestation in completed weeks is clinically relevant. Premature births in the control women range from 33 to 36 weeks gestation and in subject women range is from 24 to 36 weeks (see Table 34 below). The subject women are 2.4 times more likely to have a premature birth, with the control women 64% less likely (see Table 35 below). Eighteen (16%) subject women have a premature birth (below 37 weeks) compared to 6 (3%) in the control women, OR=6.71; RR=2.43, CI 1.82-3.23, therefore this is also statistically significant.

Premature Births									
Weeks	24	27	29	30	31	33	34	35	36
Subject	1	1	1	1	1	2	1	3	7
Controls						2			4

Table 34: Range of weeks of premature births in total sample.

RR and OR for all women in sample who have a premature birth (less than 37 weeks)

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for premature births / not	6.710	2.580	17.449
Subject women who have premature birth	2.427	1.823	3.232
Control women who have premature birth	.362	.180	.726
N of Valid Cases	325		

Table 35: Relative Risk and Odds Ratio for all women in sample who have a premature birth.

This statistical significance is confirmed by $p=0.000$ Pearson Chi-Square, and $p=0.000$ MWU for all completed weeks gestation. This is clinically relevant in that any birth before 37 weeks is premature with effects on birth weight and long-term effects on the baby (Seubert, Stetzer et al. 1999; Steer, P. 2005).

5.1.3.5.4 Weight of baby of all women in sample

This difference in premature births is reflected in the weights of the babies. There is a clinically relevant difference in that babies born to subject women are 2 times more likely to be low birthweight (less than 2500g), with babies born to control women 48% less likely (see Table 36, p. 140). Eleven (10%) babies in the subject

women versus 6 (3%) babies of control women are below 2500grams, OR=3.81; RR=1.99, CI 1.35-2.93, therefore this is also statistically significant. This statistical significance is confirmed by the p-values of 0.006 (Pearson Chi-Square) and 0.04 (MWU) for all weights. This is clinically relevant as this is the weight below which babies need more intensive observation, feeding, heating and potential respiratory support (Seubert, Stetzer et al. 1999; Steer 2005).

RR and OR for all women in sample who have a baby less than 2500g in weight

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for baby weight less than 2500g / not	3.813	1.371	10.606
Subject women who have baby below 2500g	1.993	1.354	2.933
Control women who have baby below 2500g	.523	.273	.999
N of Valid Cases	325		

Table 36: Relative Risk and Odds Ratio for all women in sample who have a baby less than 2500g in weight.

When premature births are removed from the birth weight comparisons, there are two babies in the control women whose weight is under 2500g and one baby in the subject women. It is not clinically relevant or statistically significant, with $p=0.532$ MWU and $p=1.0$ Pearson Chi-Square and Relative Risk.=1.0.

5.1.3.5.5 Summary of all women in sample

The results for type of birth replicates the results from Tan, Pepra and Haloob (2004) who also find fewer CS. As previous studies have not divided births into Normal and Spontaneous Vaginal, both are combined to give the equivalent in previous studies of Spontaneous Vaginal Delivery. When this is examined, the study finding confirms the results of Tan, Pepra and Haloob (2004) who find more Spontaneous Vaginal Deliveries in the subject women, but conflicts with the findings of Crane (2003) and Acharya, Kjeldberg, Hansen, Sorheim, Jacobsen and Maltau (2005) both of which find no difference in type of birth. Why more subject women go into labour spontaneously is unclear and needs exploration in future studies.

The results for premature births before 37 weeks, and corresponding low birthweight, confirm the indicative findings by several researchers (Bigrigg, Codling et al. 1991; Braet, Peel et al. 1994; Blomfield, Buxton et al. 1993; Haffenden, Bigrigg et al. 1993; Cruikshank, Flannelly et al. 1995; Ferenczy, Choukroun et al. 1995; Crane 2003; Sadler 2004; Bruinsma, Lumley et al. 2007; Tan, Pepira et al. 2004; Samson, Bentley et al. 2005). However, there are no clinically relevant or statistically significant findings for birthweight once the premature births are removed.

This study is the only single study to have the power to find statistical significance in the differences between premature births. The findings of the study presented adds to and confirms the results in Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) meta-analysis for premature births.

5.1.4 Summary

Clinically there are relevant differences in women having their second baby, but not women having their first baby, in type of birth; especially with regard to Normal and Instrumental births. Subject women having their second baby are 1.5 times more likely to have a Normal birth and 62% less likely to have an Instrumental birth. Both types of birth are not statistically significant. The low figure of 35% of Normal births in both groups of women having their first baby is of concern, as it implies that 65% of women having their first baby are unable to give birth without the help of medical intervention. The percentage of Instrumental births in women having their first baby is also of concern, 40% in subject women and 39% in control women. These births increase the risk of vaginal or perineal trauma, damage to the anal sphincter (3rd degree tears) with associated bowel problems and sexual problems (Thompson, Roberts et al. 2002). The study by Thompson, Roberts, Currie and Ellwood (2002) finds women with Instrumental births (Forceps or Vacuum extraction) report more perineal pain and sexual problems than those with Normal births after adjusting for parity, perineal trauma and length of labour.

These results confirm that differences between the groups in premature birth are clinically relevant. The subject women having their first baby are 2.3 times more likely to have a premature birth, with control women 77% less likely. Subject women

having their second baby are 2.3 times more likely to have a premature birth, with control women 63% less likely. This trend towards premature birth after LETZ has been equivocal in the research literature in the past, none of which have enough data for statistical significance. The study confirms statistical significance for premature birth, which is the indication in the meta-analysis of previous research by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006).

‘See and Treat’ (as described in Chp. 1; Section 1.4.1, p.18) at the same clinic visit is absent in the premature births of subject women having their first baby. All of these subject women have a prior punch biopsy to define CIN. There is no significant correlation between premature birth and depth of tissue excised. Although the p-value is significant, the strength of the correlation is very weak. However, the fact that these women who have LETZ also have at least one punch biopsy prior to LETZ, and that 3 of the 6 have LETZ for CIN 3, may indicate that perhaps there is a correlation with total area excised as opposed to depth alone. This is a point also made by Bruinsma, Lumley, Tan and Quinn (2007).

In the premature births of subject women having their second baby, 7 of the 9 premature births have LETZ for CIN 3. Five of that seven have LETZ at first visit and therefore have no definition of CIN before LETZ. Although not a strong correlation, the correlation between CIN 3 and having LETZ at first visit is statistically significant at $p=0.001$. That is 36 (55%) of those with CIN 3 have LETZ at first visit as opposed to 4 (18%) with CIN 2 and 1 (14%) with CIN 1. The changes in the cervix after childbirth may alter the appearance of the area of abnormal cells such that the colposcopist are inclined to remove a larger area. This again suggests a correlation with total area excised. Unfortunately, the width of the excised tissue is no longer recorded in the colposcopy database in use in the study hospital. The findings of premature birth in both women having their first baby and women having their second baby after LETZ, is also reflected in the findings of more low birthweight babies in the subject women. This finding is clinically relevant in both women having their first baby and women having their second baby. It is only statistically significant in women having their first baby.

The division of labour into stages and the further division of the 1st stage into ‘passive’ and ‘progressive’ phases are artificial constructs. The definition of 4cm as

the start of 'progressive' labour used in the study is also artificial, however since 2007 is used as the definition in the Intrapartum Care Guidelines (NICE 2007). The definitions have to be tightened in order to conduct the study and produce respectable 'hard' data for obstetric and midwifery personnel who remain wedded to the positivist model. Therefore, the study uses the definition of 4cm dilated as the start of the 'progressive' phase of the 1st stage of labour (see Chp. 3; Section 3.4.2, p.71).

The difference in time taken between the groups of women in the 'passive' phase is neither clinically relevant nor statistically significant for women having their second baby. There are clinically relevant differences between groups in women having their first baby. Greater numbers of subject women are admitted when they are already 4cm or more dilated. Subject women having their first baby are 1.8 times more likely to be greater than 4cm on admission, with control women having their first baby 28% less likely. The statistical significance of this is confirmed by $p=0.005$, MWU, for time taken to get to 4cm from admission. Without full and accurate notes of women's pre-admission examinations, when they are examined and sent home, it is difficult to ascertain why this happens. However, when other data available for the time some women are in pain before admission is checked, no significant correlations with admission before 4cm dilated are revealed.

The difference between the groups of the time women take in the 'progressive' phase (from 4cm dilated to full dilatation), is neither clinically relevant nor statistically significant in women having their first baby. Subject women having their second baby are 1.4 times more likely to take less than 6 hours to reach full dilatation, with control women 16% less likely. This difference is clinically relevant in that women who take more than 6 hours are in the definition of dystocia by most authorities (see Chp. 2; Section 2.3.1.5, p.50). However, this is not statistically significant. There is a good, highly significant negative correlation between CIN 3 and time taken to get from 4cm to full dilatation for subject women having their second baby. These women take less time to get to full dilatation than women do with CIN 1 or CIN 2.

Artificial Rupture of Membranes use, which accelerates contractions and increases dilatation of the cervix in labour are clinically relevant in both women having their first baby and women having their second baby. Subject women having their first

baby are 45% less likely to have ARM. Subject women having their second baby are 42% less likely. However, it is only statistically significant at the 95% CI level for subject women having their first baby. Syntocinon use to accelerate labour is also clinically relevant in women having their second baby, with subject women 72% less likely to have Syntocinon, but this is not statistically significant. The increased use of these interventions in the control women confounds more statistically significant results for time in labour. This increased use of interventions is reflected in the differences in types of birth, as these interventions often lead to foetal distress and the need for Instrumental births.

The quantitative part of the study is used as part of the case study strategy and combined with the qualitative data from women and midwives, to enhance our understanding of the factors that affect their progress in the 1st stage of labour. As seen from the above conclusions the quantitative part of the study answers the original research questions 2, 3, 4 and 5 –

2. Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour?
3. Are the differences clinically relevant?
4. Are the differences statistically significant?
5. Are there differences seen in both women having their first baby after LETZ and women having their second baby, but their first after LETZ?

The answers are that it does affect progress in the 1st stage of labour. The finding of differences in time to reach full dilatation is clinically relevant. The finding of differences in admission greater than 4cm dilated, premature birth, low birthweight babies and type of birth, are not only clinically relevant but also statistically significant. The study also confirms that women having their first birth and women having their second birth are affected but in different ways. These points are discussed more fully in Chapter 6: Case studies discussion, and Chapter 7: Discussion.

The questions that compare this study with previous studies are answered –

- A. Are there differences in type of birth?
- B. Are there differences in number of premature births?
- C. Are there differences in birth weight of the babies?
- D. Are there differences in onset of labour?

There are differences in type of birth of women having their second baby but not women having their first baby. There are also differences in the number of premature births and there are differences in birth weight of the babies mostly due to the differences in premature birth. There are differences in onset of labour between all subject women in the study and all control women. These points are discussed more fully in Chapter 7: Discussion.

5.2 Part Two: Interview Analysis

5.2.1 Introduction

Part One details the analysis of the quantitative data in the study. It describes the methods used in analysis of the quantitative data and details the findings obtained. It gives a brief overview of these findings but reserves the main interpretation for the Chapter 6: Case studies discussion and Chapter 7: Discussion.

Part Two describes the analysis of the data from the qualitative interviews that are part of the input into the case studies. As discussed in Chp.4; Section 4.4.3.1, p.98, the interviews are semi-structured and recorded on digital recorder. It describes the methods used to analyse the data and gives the findings of the analysis. It also compares the findings to previous studies. It discusses the themes that emerged from the interviews. It also highlights that Research Question 1 is not answered in the interviews. An overview of the implication of the findings is given but the full discussion is reserved for the Chapter 6: Case studies discussion and Chapter 7: Discussion.

This qualitative section of the study aims to contribute to the answer of the original research questions (numbers refer to the original research question list)–

1. Do women feel that LETZ makes a difference to their labours?

6. Could differences in the management of women having their first baby and women having their second baby be identified that may mask true differences?

The women's interview data came from four women: -

1. Faith, a woman having her first baby after LETZ.

2. Keyra, a woman having her second baby, but her first baby after LETZ. .

3. Jill, a woman having her first baby.
4. Lynzi, a woman having her second baby

The midwives interview data comes from one focus group and three individual interviews. The focus group consists of four midwives, working on Labour Suite at the time of the interviews: -

- One based permanently on Labour suite, with 25 years experience.
- One based permanently on Labour suite, with 15 years experience.
- One rotating between all areas of the maternity unit (Labour suite, assessment unit, postnatal wards, antenatal wards), with 6 months experience.
- One rotating between all areas of the maternity unit, with 5 years experience.

The individual interviews come from 3 midwives based on Labour suite at the time they are caring for one of the subject women interviewed. Their experience ranges from 4 to 9 years.

The focus group interviews are integrated with the individual midwife interview analysis. This is dual purpose. The focus group is conceived as a way to access midwives when it became apparent that accessing individual midwives was not working, and the themes emerging were apparent in both the focus and individual interviews. Therefore, the focus group is treated as a group interview.

5.2.2 Analysis

The recorded interviews are transcribed into word documents, and then imported into computer package QSR Nvivo 7 in order to aid the work of analysis. The transcripts are checked for accuracy several times against the recorded interviews, and then the participants are sent copies of the transcripts and asked to comment. Few comments are received and those that are, agree the transcripts are accurate.

Nvivo 7 enables thematic analysis of the data. An example of the interview transcripts is given at Appendix F: Example interview notes (Faith 01), p.274.

The transcribed interviews are analysed using a framework approach. The transcribed interviews are read several times to obtain an overview of the material. A coding system is employed to categorise each segment of the interviews into concepts, using the software Nvivo. These concepts are constantly compared and contrasted between the interviews to identify emerging themes to which they belong (Bowling, A. 2009). A diagram of the coding is given in Figure 21, p.149.

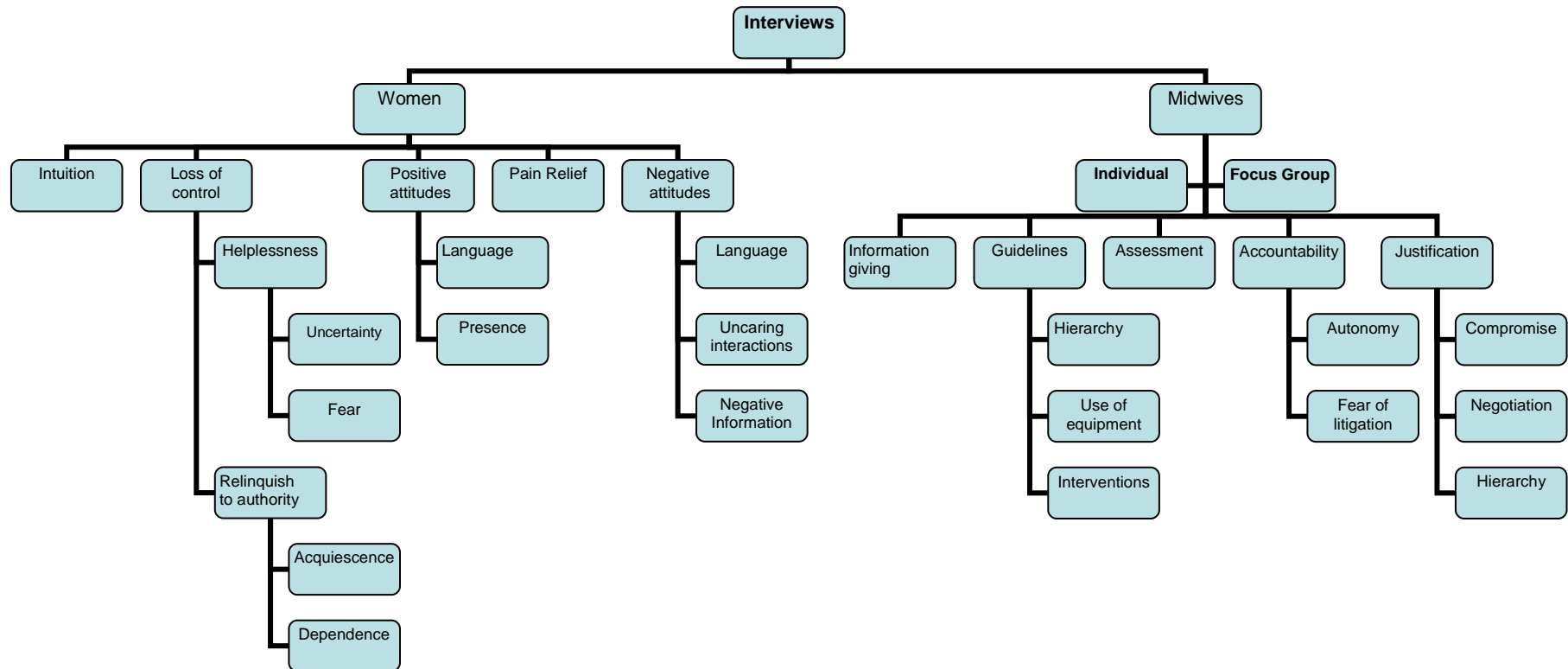


Figure 21: Coding diagram for interview analysis

A framework approach uses all the elements of the more familiar Grounded Theory approach with the exception of the iterative process, as all interviews are completed before the analysis.

5.2.3 Findings and discussion

In the interviews of the women who had LETZ, they have no expectation of their labours being affected by LETZ. LETZ is never identified as affecting their labour by any of the colposcopists who give the treatment to these women, or any of the midwives/obstetricians during their labour. This is despite several research studies over the years suggesting that there is adverse effects. Therefore, it became apparent that interview data would fail to answer Research Question One. Women are therefore asked at the end of the interview if they feel that previous knowledge of any potential affect of LETZ on their labours may be useful. Their replies are ambivalent.

From this analysis, several key themes emerge. These themes differ between the women's interviews and the midwives' interviews. The themes from women reflect their experiences of labour. Simkin (1992) shows that those experiences are important, that they have not only short but also long-term effects on women's lives.

5.2.3.1 Themes from women

The themes that emerged from the women's interviews are: –

- Intuition.
- Loss of control.
- Positive attitudes.
- Pharmacological pain relief.
- Negative attitudes.

5.2.3.1.1 Intuition

Intuition is a concept that is given a theme of its own. Intuition occurs in a couple of the women's interviews. One instance is by the subject Keyra having her second child, on being told she is not really in labour. The definition of established labour is based on the guideline of 3cm dilated, as on examination this women's cervix is only 1-2cm dilated. Keyra decides not to go home but to stay around. She **feels** she is in labour –

“And I just thought, once I'm here, I'll just go for a little walk around.”

(Appendix E: Interview Notes Keyra, Lines 33-34)

The diagnosis of labour is extremely subjective, due to the differences between measurements by different staff, some say 3cm, and others will say 2cm or 4cm (Buchmann and Libhaber 2007). As discussed in Chp. 2; Section 2.3.1.2, p.45, the assessment of 3cm dilatation on vaginal examination and regular contractions, is the baseline used to measure the start of labour in Active Management, in use throughout the Western world and in those countries which have adopted Western healthcare methods. The definition of regular contractions is equally problematic, yet this continues to be the criteria for admission in established labour. The new guidelines from NICE (NICE 2007) Section 7.2, now states that established labour is characterised by regular contractions and cervical dilatation of 4cm. Therefore, the study is highly prescient in its definition of the start of the progressive phase of labour.

The other instance of intuition is by Jill, a control woman having her first child, who says of intuition –

“I had a feeling that she was going to be bang on the day.”

(Appendix F: Interview Notes Jill, Line 13)

Interestingly it is not bang on the hospital date (calculated from an ultrasound scan) but by Jill's own dates (calculated from the date of her last period). This theme of intuition reflects the previous research discussed in Chp. 2; Section 2.4.6, p.61. Davis-Floyd (1994) reports that women, who give birth at home, feel intuition and inner knowledge are authoritative. Kornelsen (2005) finds that women talk about a 'birthing force' and intuition and indicates that fear and pain are affected by acceptance of and surrender to a birthing force. Home birth mothers' resistance to technology stems from a consciousness of its overuse that blocks an awareness of

intuition and authoritative women's knowledge. Women's intuition is acknowledged and used by midwives working in a holistic, midwifery mode of childbirth. Davis-Floyd (1994) illustrates this in the quote from a midwife -.

*"Over my years of doing home birth, if I have learned anything it is to trust what mothers know."
(Davis-Floyd 1994), p.1134)*

5.2.3.1.2 Loss of control

This theme includes the concepts of helplessness and relinquishing to authority. Relinquishing to authority includes acquiescence and dependence. The concept of helplessness includes uncertainty and fear. This theme is more prevalent in women having their first baby, but women having their second baby have times they feel helpless too. These findings that many women feel helpless in their lack of knowledge about specific problems or procedures during and after childbirth are confirmed by Fowles (1998). As in Keyra, a subject women having her second baby, who feels helpless to contradict the professionals' opinion –

*"Which I couldn't believe, cause I mean, I'd been contracting like, I was gutted. She said you can go home if you want. I'd rather not you know"
(Appendix E: Interview Notes Keyra, Lines 31-33)*

In addition, Lynzi, a control woman having her second baby, who feels unsupported and afraid, says –

*"I wished my mum was there"
(Appendix G: Interview Notes Lynzi, Line 12)*

For Jill and Faith having their first baby, the times when they feel helpless are more numerous –

*"you feel like I'm only early on, I should be able to deal with it."
(Appendix D: Interview Notes Faith, Lines 63-64)*

*"you don't know what is happening and they could do anything to you, (on Diamorphine)"
(Appendix D: Interview Notes Faith, Line 91)*

*"being a very, quite a scary situation and quite an overwhelming situation for me,"
(Appendix D: Interview Notes Faith, Line 87)*

*"I didn't feel I needed to be in hospital"
(Appendix F: Interview Notes Jill, Line 26)*

*(on being told was not in labour) "But I mean the, the amniotic fluid was just gushing out of me and it was really, you know, I was pacing, it was very, very painful."
(Appendix F: Interview Notes Jill, Lines 47-48)*

“you know, I can’t do this.”
 (Appendix F: Interview Notes Jill, Line 158)

Fowles (1998) finds in their research on women’s concerns about their labours that women report feelings of regret, displeasure and anger at the helplessness or lack of control they feel during labour. They also feel frustration at their lack of knowledge. Soet, Brack and Dilorio (2003) find that feelings of helplessness or powerlessness are significant contributors to Post Traumatic Stress Disorder (PTSD) symptoms and Fisher, Hauck and Fenwick (2006) find that women feel helpless due to ‘fear of the unknown’, ‘horror stories’, ‘general fear for the well being of the baby’, ‘fear of pain’ and ‘losing control and disempowerment’. Clearly, the women’s lack of knowledge of the affect LETZ has on their labours, disempowers women and increases their sense of helplessness.

Relinquishing to authority, a readiness by women to give up any independence or control to authority figures, includes dependence on others and acquiescence. In the study discussed in Chp. 2; Section 2.4.5.1, p.60, Vande-Vusse (1999b) claims that women who are more involved with the decision making process in their labours or acquiesce to caregivers views, are more positive about the birth and that the opposite is true for women who have to contest medical decisions or adapt to them when they do not agree with them.

Harrison, Kushner, Benzies, Rempei and Kimak (2003) find that women who perceive that there are complications in their birth, feel it limits their opportunities to be involved in decision making and that they have to trust the health professionals. McCourt, Page, Hewison and Vail (1998) state that interventions women are unhappy or unsure about, are accepted as being ‘for the good of the baby’. This is due to a desire to see the maternity services as trustworthy and working in their interests. This acceptance is reflected in this quote from Faith, a woman having her first baby at 35 weeks and 6 days, who wishes she could ask about the use of water but accepts that, as it is not offered, she will not get it.

“It would be nice to get in the water, but I don’t think they would have let me anyway”
 (Appendix D: Interview Notes Faith, Line 100)

Kornelsen (2005) finds that relinquishing to authority puts a woman in a situation where she does not question the use of technological obstetric interventions in the

birth. This is illustrated in the study in Keyra talking about her acceptance of whatever professionals say to her, without questioning -

“you’re in another’s hands totally and you accept that when they say... you just, I’ll do anything!”

(Appendix E: Interview Notes Keyra, Lines 120-121)

Relinquishing to authority has negative connotations as when Lynzi asks for pain relief and is denied the pain relief of her choice (Diamorphine), with the reason being given that the birth is imminent. However, she has an Epidural instead, which takes 60 minutes to be arranged, inserted and built up to cover her pain. Lynzi’s baby is not born until nearly four hours after she has the Epidural -

“I wanted the injection but she said it was too near, the birth”

(Appendix G Interview Notes Lynzi, Line 26)

It also has positive connotations as when Keyra, a subject woman having her second baby, trusts her midwife –

“I felt very safe because I knew; I knew she was competent in what she was doing”

(Appendix E: Interview Notes Keyra, Line 142)

This quote from Keyra confirms McCrea and Wright (1999) findings that women find reassurance in being told what to do by midwives, if they are working in a partnership approach. It shows that if midwives listen to women, women feel empowered. In contrast, medical management of birth decreases the control experienced by birthing women, creates a power imbalance between the woman and the midwives/obstetricians and deprives the woman from a potentially empowering experience. In the case of women after LETZ, it presupposes that the midwife/obstetrician is aware that LETZ affects labour.

5.2.3.1.3 Positive attitudes

Positive attitudes include the concepts of positive language and presence. There are positive comments from all the women interviewed but negative comments are more numerous. The exception is Keyra, a subject woman having her second child, who is admitted at an unusually quiet period, and thinks her care and birth ‘perfect’ –

“I saw one midwife from the moment I walked through into the labour rooms until the moment the baby was born and like nobody else, you know. Which was very personal and very private, really it’s lovely”

(Appendix E: Interview Notes Keyra, Lines 126-128)

“I was in the bath with water and it was lovely”

(Appendix E: Interview Notes Keyra, Line 44)

Keyra also heaps praises on the midwife's abilities -

*"And by midnight she looked at me and said "Oh, you'll have this baby in 2 hours", and sure enough we really did."
(Appendix E: Interview Notes Keyra, Lines 35-36)*

As discussed in Chp. 2; Section 2.4.4, p.59, Simkin (1996) and Waldenstrom (2003) both find that positive attitudes results in more positive self-image after the birth, but significance of positive aspects stay the same over time, whereas significance of negative aspects increase. Even Jill, a control women having her first baby, who does not really have anything good to say about the midwife who looks after her, makes a few positive comments. In a discussion about her lack of rapport Jill says -

*"she (the midwife) was trying to be supportive"
(Appendix F: Interview Notes Jill, Line 149)*

Some women feel more supported than others do. Faith, a subject woman having her first baby, feels that the constant presence of a midwife reassures her -

*"There was a midwife with me constantly, so that was quite nice actually. Cause they were very supportive"
(Appendix D: Interview Notes Faith, Lines 82-83)*

Although no information has been given on pain relief options even though she is admitted in labour, later on Faith feels -

*"...after that they were fantastic and I felt really involved and to be honest they were absolutely brilliant really kind and...."
(Appendix D: Interview Notes Faith, Lines 145-146)*

Even Lynzi, a control woman having her second baby, who feels abandoned up until this point in her labour, now feels the midwife's presence is a positive step -

*"But she stayed with me after that."
(Appendix G: Interview Notes Lynzi, Line 27)*

This quote above confirms the findings by Simkin (1992), Waldenstrom, Borg, Olsson, Skold and Wall (1996a), Fowles (1998) and Fisher, Hauck and Fenwick (2006) that the presence of the midwife is a positive influence on the labour experience. This positive influence and care under a holistic, midwifery model of care is more appropriate for women after LETZ, whose labours are not linear.

5.2.3.1.4 Pharmacological pain relief

The women talk a lot about pain relief with an emphasis on pain relief by drugs. Waldenstrom, Borg, Olsson, Skold and Wall (1996a) find that a positive birth experience does not necessarily preclude pain and distress, and that the experience of birth is multidimensional and midwives/obstetricians at a birth should be more

aware of the negative aspects of interventions than solely reacting to minimise women's pain. Lynzi, a control woman having her second baby, talks about the Diamorphine she is denied as the birth is "too near", but not too near to have an Epidural -

"I'd had that (the epidural) the first time but I thought I'd manage with the injection this time."

(Appendix G: Interview Notes Lynzi, Line 31)

"and then I had the epidural and it took the pain away. I just felt tight when the pains came and it was a lot better."

(Appendix G: Interview Notes Lynzi, Lines 29-30)

McCrea and Wright (1999) find in their study that control is often associated with satisfaction with pain relief. These comments from women confirm this. Faith, a subject woman having her first baby, does not like the side effects of Diamorphine or gas and air, but feels much improved with an Epidural -

"when I was having the gas and air and the Diamorphine, I felt completely out of it and I felt completely out of control"

(Appendix D: Interview Notes Faith, Lines 89-90)

"I had the epidural and I just felt normal, completely normal. I just feel it was very, very calm and yes, it was much, much nicer"

(Appendix D: Interview Notes Faith, Lines 92-93)

Jill, a control woman having her first baby, gives her critique of various pain relief methods –

"I had the tens machine which was hopeless."

(Appendix F: Interview Notes Jill, Line 41)

"the pethidine was hopeless, had no effect at all for me".

(Appendix F: Interview Notes Jill, Line 94)

Jill's statement that the pethidine is not working for her contrasts with her stating that-

"I was in a drug induced state"

(Appendix F: Interview Notes Jill, Line 102)

Although she did not originally ask for an epidural, Jill feels it is very effective -

"and I didn't ask for the epidural. But they said, "Well, we think you'd better"

(Appendix F: Interview Notes Jill, Lines 251-252)

"The epidural, as soon as that went in, I felt an immediate, immediate relief."

(Appendix F: Interview Notes Jill, Line 96)

Cunningham's (1993) study, discussed in Chp. 2; Section 2.4.2, p.58, finds that mothers who use pain relief express considerably fewer positive feelings about their

birth experience than their peers. Waldenstrom, Borg, Olsson, Skold and Wall (1996a) find that women usually experience severe pain, but that despite this most are satisfied with their own achievement and think they have coped better than expected. Both these findings show that a positive birth experience does not necessarily preclude pain and distress and confirms the multidimensional character of the birth experience, which highlights the importance of a holistic approach to care in labour.

5.2.3.1.5 Negative attitudes

Sadly, this is a recurring theme in all of the women's interviews. This theme includes concepts of negative language, uncaring interactions and negative information giving. As detailed in Chp. 2; Section 2.4.1, p.56, Green and Baston (2003) defines negative attitudes as staff who are unhelpful, rude, offhand, bossy, insensitive, inconsiderate and condescending or any selection of those. Simkin (1996) finds that negative caregiver attitudes result in a more negative self-image for women after birth and Waldenstrom (2003) finds that the negative events around birth increase in significance over time, whereas positive aspects stay the same. These events can have long-term effects on women. These effects range from postnatal depression after a traumatic birth (as defined by the women) (Green and Baston 2003), to the decision to delay or not have another birth (Waldenstrom 2003)

The effect of negative attitude and uncaring interaction is apparent in this quote from Lynzi, a control woman having her second baby –

"I needed something for the pain but they wouldn't give me anything. I had to wait ages before anyone saw me cause it was busy, there was about 4 of us in that tiny waiting room all in pain, it wasn't fair."

(Appendix G: Interview Notes Lynzi, Lines 14-16)

This unattended wait leaves Lynzi feeling abandoned and afraid –

"I wish I'd had my mum with me because the midwife was in and out and it was only me and him."

(Appendix G: Interview Notes Lynzi, Line 22)

Negative attitudes include negative information giving, this includes no information, reflected in this quote from Faith, a subject woman having her first baby, who is not told that she can be mobile -

"I felt like I was on the bed and I couldn't move"

(Appendix D: Interview Notes Faith, Line 140)

In addition, Faith's first information on pain relief leaves her feeling she should not need it –

"they kind of said, well if you want it you can have it... and they sort of went"

(Appendix D: Interview Notes Faith, Line 66)

Fowles (1998) finds that uncaring interactions are a source of frustration for women in their study. Jill, a control woman having her first baby, feels that this uncaring attitude is not the first impression of the hospital she wants –

"I think when you arrive, and they said, "Oh, we haven't got a labour suite (room) and they put you in a side room, that was a bit, and you just think, Oh God!"

(Appendix F: Interview Notes Jill, Lines 182-183)

Then Jill is given information on the availability of a birthing pool, which is unfortunately phrased in a negative manner and negative language –

"They did say, "If you want a waterbirth, forget it, because there aren't any birthing pools"."

(Appendix F: Interview Notes Jill, Lines 245-246)

Lynzi, a control woman having her second baby, feels the midwife is uncaring when the VE is performed –

"She (midwife) checked me to see if I was far on or not and it hurt but she kept doing it."

(Appendix G: Interview Notes Lynzi, Line 17)

Creedy, Shochet and Horsfall (2000) and Soet, Brack and Dilorio (2003) find that low levels of satisfaction with care and high levels of obstetric interventions, increase the likelihood of acute trauma symptoms after birth and Prince and Adams (1987) that dissatisfaction with care during labour increases the likelihood of Postnatal Depression.

Even for Keyra, a subject woman having her second baby, her 'perfect' labour does not start so well –

"I said don't tell me I'm only 2 cms, I'll cry. And she said, "Actually, you're only 1."

(Appendix E: Interview Notes Keyra, Lines 129-130)

Especially when Keyra is told she is not in labour –

"she said, "In fact you know, it's classed as not being in labour". But I said I feel like I'm in labour, you know."

(Appendix E: Interview Notes Keyra, Lines 135-136)

As LETZ women are not admitted until later in labour, it may be that they are sent home more often than control women. This may be an indication of the affect of LETZ on their cervix and that they are in labour without being that mandatory 3cm, now 4cm dilated. The negative responses they are given from midwives and/or obstetricians because of this can potentially increase their dissatisfaction with the birth experience and leave them more at risk of Postnatal Depression.

5.2.3.2 Themes from midwives

The themes from the midwives interviewed differs from those of the women. The themes that emerged from the midwives interviews are-

- Information giving.
- Guidelines.
- Assessment.
- Accountability.
- Justification.

Proctor (1998) is one of the few previous studies that compare women's views with midwives' views. She postulates that midwives underestimate the importance of information giving, the importance of continuity during labour, the need for control, confidence in adjusting to the maternal role and involvement of the woman's partner in the delivery of care. However, their study also shows that midwives and women are in agreement about the importance of the relationship between women and midwives, the attributes desirable in staff and the care environment.

5.2.3.2.1 Information giving

Information giving is a surprisingly small part of the descriptions of the whole of their care of women in labour. Perhaps it is so much part of their role that they do not think to mention it, but from the accounts in women's interviews, sometimes it does not happen -

“You explain she’s not yet in labour and move her to the ward or encourage her to go home.”
 (Appendix H: Interview Notes Focus Group; Midwife 13, Lines 69-70)

“...she started using gas and air and I explain to her about all the pain relief we have in labour.”
 (Appendix J: Interview Notes Midwife 02, Lines 40-41)

Although there is a section on the importance of communication early in the Labour Suite Guidelines, only communication between health professionals is mentioned. The guidelines from NICE, however, include women in their section on communication. Indeed, the language in the Labour Suite Guidelines does not often reflect that a woman is the central actor in the process of childbirth and the instructions make little mention of discussion with the woman or gaining consent from her. Such a position clearly reflects the obstetric, technological model of birth, discussed previously in Chp. 1; Section 1.3.2, p.9. Gaining consent is only mentioned in the choice between active or physiological management of the 3rd stage of labour and the choice of giving birth in water.

Proctor (1998) finds that although midwives agree with women that they need information that helps them prepare for parenthood and enables them to make informed choices in their care, women also want information as a source of reassurance. Women identify the importance of being offered information at times when they are not sure what to ask, but need reassurance or help to make a decision; whereas midwives do not mention this type of information giving. As the midwives are unaware that LETZ has an affect on labour, the midwives are unable to offer information as reassurance to these women.

5.2.3.2.2 Guidelines

This is a frequent theme in not only the focus group interviews but also the individual midwife’s interviews. It includes concepts of hierarchy, use of equipment and interventions. This particular fault in the equipment can have tremendous consequences for the woman, as if not recording on the Electronic Foetal Monitor (EFM) then the contractions have not happened -

“I keep adjusting my toco (part of foetal monitor used to detect contractions on the woman’s abdomen) but it wasn’t picking up contractions and then....”
 (Appendix J: Interview Notes Midwife 02, Lines 106-107)

Midwives quote the guidelines as if they are protocols –

“The guidelines state 3cm for established labour, sometimes they seem to be contracting but if there not doing anything on VE it’s not proper labour”

(Appendix H: Interview Notes Focus Group; Midwife 12, Lines 43-44)

The guidelines for established labour are quoted, with cervical dilatation being the only assessment in use. The ‘deceleration’ phase of Friedman’s curve, is not considered here –

“...she’s fully aware that we do vaginal examination every 4 hours, until when you are 8cm we do it every 2hrly to see if you are progressing and when you are fully”.

(Appendix J: Interview Notes Midwife 02, Lines 69-70)

The guidelines use cervical dilatation as the only tool in assessment of progress.

The ‘rest and be thankful’ state which is acknowledged in midwifery literature is not mentioned in the guidelines and therefore it is seen as an ominous sign –

“since she’d become fully dilated her contractions had gone off, and they’d started syntocinon”.

(Appendix K: Interview Notes Midwife 03, Line 14)

This quote completely ignores the deceleration phase in Friedman's (1954) work, which has its analogy in the ‘rest and be thankful’ stage recognised by holistic midwifery. The guidelines acknowledge that most are not evidence based and rely on local practice. Despite this acknowledgement, midwives often use guidelines as protocols, negating clinical judgement. In other words, this reliance on guidelines and protocols to guide their practice means that, despite being cared for by midwives, women are cared for using a medical, technological model of care and not midwifery, holistic model. Indeed, this situation emphasises that some midwives in hospitals have lost the meaning of autonomous practitioners and have evolved into obstetric assistants. Clearly, it is not only obstetricians who are influenced by the hegemony of technocracy, midwives also live in and are influenced by, this type of society as discussed previously in depth in Ch. 1; Section 1.3.2, p.9.

Although in practice, management of women having their first baby or having subsequent babies differ substantially, this is only partially reflected in the guidelines. In the Labour Suite Guidelines, the only differences in management are indicated in dysfunctional labour. In women having their first baby, Syntocinon augmentation is advised, but for women having other births it is perceived as a more

serious problem. The guidelines are also different in the 2nd stage, when different pathways of pushing and passive descent are given for women having their first or subsequent births. In the guidelines from NICE (NICE 2007), Section 7.3, states 1st stage lasts an average of 8 hours in a first birth and is unlikely to be longer than 18 hours, whereas in a second or subsequent birth the 1st stage lasts an average of 5 hours and is unlikely to last longer than 12 hours. However, in both cases it defines dysfunctional labour as cervical dilatation of less than 2 cm in 4 hours for first or subsequent labour, with the additional definition of the slowing of progress in a second or subsequent labour.

5.2.3.2.3 Assessment of progress

This theme occurs quite frequently and focuses on assessment of the woman's progress in labour. It has a profound effect on the women's experiences, as the midwives definition of progress affects the use of interventions.

"Your experience alerts you to deviations from normal."
(Appendix H: Interview Notes Focus Group; Midwife 12, Line 24)

"It looks as if according to the previous midwife, that there was no change in the descent. Position had changed, from being ROP to DOP, but as I say, the level was exactly the same, it hadn't come down any".
(Appendix K: Interview Notes Midwife 03, Line 47-49)

"...she was doing well from her last examination, she is progressing".
(Appendix J: Interview Notes Midwife 02, Line 58)

Different midwives, dependant on their philosophy of normal labour, assess women's progress in different ways –

"So I took over her when she was in established labour, because you think 3cm is established labour."
(Appendix J: Interview Notes Midwife 02, Line 47)

"Although she's not yet 3cms she's contracting regularly. If they're accompanied by progressive dilation she's in labour. Dilation on VE is imprecise, it varies between midwives and obstetricians, between midwives and midwives, obstetricians and obstetricians, and you have to take that into account"
(Appendix H: Interview Notes Focus Group; Midwife 13, Lines 50-54)

Again, the background to the assessment by midwives depends on their philosophy of practice. If from a medical, technological model, they rely heavily on guidelines and protocols; if from a midwifery, holistic model they also take women's behaviour and other signs of progress into account (see Chp. 2; Section 2.3.2.1, p. 51). The

study is completed before the new guidance on established labour came out, which restates it as from when the cervix is 4cm dilated (NICE 2007). The assessment from a medical, technological model has changed, although childbirth has not.

Women after LETZ differ from the general population in labour and therefore a holistic, midwifery model of care is especially important to this group of women. The holistic use of other signs of progress in labour apart from cervical dilatation is the key.

5.2.3.2.4 Accountability

This theme is common in the midwife individual interviews and focus group interviews. It includes concepts such as autonomy and fear of litigation. This midwife claims autonomy as medical staff are only invited in if the midwife feels there is a problem, but in her interview she refers to the use of the guidelines and protocols exclusively -

“...it’s only if we are worried, and we let them in (the medical staff) that they will know what is actually is happening”.
(Appendix J: Interview Notes Midwife 02, Lines 104-105)

“It’s up to you as a midwife, because you are accountable for what you are doing”.
(Appendix J: Interview Notes Midwife 02, Line 26)

Another midwife feels her autonomy is compromised, as all findings of progress are displayed centrally and are reviewed by the midwife in charge and the medical staff -

“Depends on the other findings. If her contractions have got stronger and more frequent, if her cervix is more effaced, if the foetal head is descending, then she’s in labour and progressing. I’d re-examine in 2 hrs. But I know it would be a struggle to convince anyone higher up that she should be kept.”
(Appendix H: Interview Notes Focus Group; Midwife 14, Lines 71-75)

This compromising of autonomy is described by Kirkham (1999) in her research into culture in the NHS. Fear of litigation is prevalent, and leads to the guidelines being interpreted as rigid protocols, thereby removing autonomy -

“You’d be in court if you did”
(Appendix H: Interview Notes Focus Group; Midwife 11, Line 16)

“You’d have nothing to protect you, if you didn’t follow them.”
(Appendix H: Interview Notes Focus Group; Midwife 12, Line 17)

The fear of litigation and risk averse management is discussed in more depth in Chp. 1; Section 1.3.3, p.12.

5.2.3.2.5 Justification

This theme is prevalent in the midwife interviews, especially in the focus group. It includes concepts such as compromise, negotiation and hierarchy, as in this quote -

“...looking after this woman I used both my experience and hospital guideline.”

(Appendix J: Interview Notes Midwife 02, Line 31)

As part of the focus group discussion, a segment is quite heated on the merits of keeping women in the Labour Suite who are not in labour, by the definition for admission in the guidelines. Mostly revolving around no midwives to look after them and no rooms to put them in. McCourt, Page, Hewison and Vail (1998) state that it appears women are not treated as ‘in labour’ (with attendant support and observations) until they are admitted to the Labour suite, even where admission is delayed due to bed shortages.

“You can’t fill Labour Suite with women who aren’t in labour. 3cms with regular good contractions is the minimum for established labour. That’s in the guidelines for admission and experience tells you that most of these women will take hours to get into labour properly and if they’re here they’ll end up on syntocinon”

(Appendix H: Interview Notes Focus Group; Midwife 11, Lines 45-48)

“I don’t think we’re doing them any favours by admitting them early. It would be better if they could call their community midwife to their home to support them in early labour.”

(Appendix H: Interview Notes Focus Group; Midwife 11, Lines 83-85)

“You discuss with the coordinator and the medical staff, they may send her home or induce her.”

(Appendix H: Interview Notes Focus Group; Midwife 12, Lines 67-68)

“If she’s contracting with progressive dilation as (my colleague) says she’s in labour, whether she’s reached the magical 3 cms or not. That’s just a tool for active management that’s been adopted without proper evaluation.”

(Appendix H: Interview Notes Focus Group; Midwife 14, Lines 55-58)

Some justification is almost defensive –

“Managed to get her contractions up to 3 in 10, they weren’t particularly regular, and a bit uncoordinated. But we decided just to go ahead anyway, because she had been fully dilated since 1.00 or 1.30 in the afternoon. She was preterm, and the coordinator in charge, would have liked us to start pushing.”
(Appendix K: Interview Notes Midwife 03, Lines 27-29)

The focus group midwives are divided over the care given to the women in the unit –

“I think overall we provide a very good service. Perhaps if we had more facilities we would do even better.”
(Appendix H: Interview Notes Focus Group; Midwife 13, Lines 87-88)

“It’s a very patchy service and I think we need to be more flexible and treat women as individuals.”
(Appendix H: Interview Notes Focus Group; Midwife 14, Lines 89-90)

Justification often revolves around guidelines. Some midwives use the guidelines to absolve themselves from the decision-making process. This also enables some midwives not to respond to women’s help seeking behaviour.

5.2.4 Summary and overview

The different themes that emerge from women and midwives are not surprising given that their focus on labour is from different perspectives. The focus on drugs by women is a blow to the campaign for ‘normality’ in maternity units (Fraser 2007), as reliance on Epidurals to ‘retain control’ seems to be preferable. The focus on drugs may have been a reflection of the staffing levels in the Labour suite, or the lack of realistic preparation for labour, or the dependence on technology to provide a quick fix for whatever ails.

It is important to remember that mothers who use pain relief view their birth experiences less positively (Cunningham 1993). Often even severe pain leads to satisfaction in women who feel they have coped better than they expected. Coping which emphasises the multidimensional character of the birth experience and the need for holistic care (Waldenstrom, Borg et al. 1996a). A woman’s comprehensive assessment of her birth, after the event, concentrates more often on the result. When women are interviewed in person about the terms used to describe satisfaction with birth, often via questionnaires, they feel the usual terms in use of

satisfied and dissatisfied are major understatements. They use the terminology delighted and devastated instead (Proctor 1998).

A midwife's assessment of a birth often concentrates more on the process of labour and on whether they can ease the woman's pain. It is important that midwives see beyond the process of labour and understand the importance of a woman's assessment of her birth experience, because the woman's experience is remembered for years into the future (Simkin 1992). Despite low staffing levels it is important that midwives understand the importance of the positive influence on a woman's labour experience that the supportive presence of the midwife brings (Simkin 1992; Waldenstrom, Borg et al. 1996a; Fowles 1998; Fisher, Hauck et al. 2006).

Understanding what influences the birth experience, both physical and obstetric variables, such as pain, duration of labour, CS and Instrumental births, and psychosocial ones, such as support, experience of involvement, and expectations, results in more flexible and individualized care (Waldenstrom, Borg et al. 1996a). This is especially important for women after LETZ because of the different pattern of their labours. The negativity experienced by women and the helplessness they feel, is a reminder to the midwifery profession not to treat the process of labour too lightly. It is normal to the midwives, but women do not understand that and reassurance is needed even when not specifically asked for (Proctor 1998). Midwives should also be aware of the link between dissatisfaction with care during labour and Postnatal Depression and PTSD symptoms after the birth (Prince and Adams 1987; Creedy, Shochet et al. 2000; Soet, Brack et al. 2003). Simkin (1992) and Waldenstrom (2003) concur that the more negative the experience, the more the significance of this intensified with time.

Midwives failure to distinguish a difference between guidelines and protocols is worrying. The reliance on protocols and guidelines, instead of clinical judgement is the reason most midwives no longer practice as autonomous practitioners. It is important to remember that midwives are working under constraints in the health care system where risk management has evolved into a risk averse community. Therefore midwives concentrate on justification of practice (Kirkham 1997) and that sadly reflects the increased use of risk management in midwifery and obstetrics and

elsewhere in the health service. Most midwives do not consciously think of the reason guidelines are deliberately called that, not protocols, as the names effect the legal definition of the hospital's responsibility. Guidelines allow midwives and obstetricians the use of clinical judgement about a woman's care and where appropriate allow deviations from the guidelines when justified. Hospital management define Protocols and these have to be adhered to. Therefore, if any complaint is received it is up to hospital management to justify why their protocols are not in the best interests of a particular woman. No protocol can cover the care that needs to be given in the best interests of all women in labour.

The reliance on guidelines reflects the obstetric, technological model of care in labour and is not in the best interests of women after LETZ as dilatation of the cervix is the main criteria for progress under this model. A more holistic, midwifery approach to their care takes cognisance of other signs of progress apart from cervical dilatation. The difference in views of progress in labour reflects the different paradigms at work in the practice of midwifery and obstetrics. It is not only obstetricians who are influenced by the hegemony of technocracy; midwives also live in, and are influenced by, this type of society.

The interview data is designed to answer the research questions posed in the study (as explained in Chapter 4)–

- 1). Do women feel that LETZ makes a difference to their labours?

- 6). Can differences in the management of women having their first baby and women having their second baby be identified that may mask true differences?

During the interviews of the women who had LETZ it became apparent that interview data would fail to answer Research Question One. The study fails to answer this question as it is based on a false assumption, that colposcopists and caregivers in labour discuss the ambivalent research in the area with women (see Chp. 6: Case studies discussion, Case Study 01, p.181 and Case Study 02, p195). Despite several research studies over the years LETZ is never identified by any of the colposcopists who give the treatment to the women interviewed, or any of the

midwives/obstetricians during their labour. Therefore, women have no expectation of their labours being affected by LETZ. Therefore, the women involved are asked at the end of the interview if they feel that previous knowledge of any potential affect of LETZ on their labours may be useful. Their replies are ambivalent.

Research Question Six is partially answered, in that adherence to guidelines means that women have different time parameters applied to their labours, dependant on whether it is their first or second birth. Therefore, these different ways of management may be masking true differences. These points are discussed more fully in Chapter 6: Case studies discussion and Chapter 7: Discussion.

Chapter 6

Case Studies Discussion

6.1 Introduction

Chapter 5 Part One details the analysis of the quantitative data in the study and describes the methods used in the analysis. This Chapter gives a brief overview of these findings but reserves the main interpretation for Chapter 6, and Chapter 7: Discussion.

Chapter 5 Part Two describes the analysis of the data from the qualitative interviews. It describes the methods used to analyse the data and gives the findings of the analysis. It also compares the findings to previous studies. It discusses the themes that emerged from the interviews. Chapter 5 Part Two gives an implication of the findings but full discussion is reserved for Chapter 6 and Chapter 7: Discussion

Chapter Six seeks to bring together the results of the study in conjunction with the women's experiences and feelings about their 1st stage of labour. It does this by exploring four case studies in which fictitious names are assigned to the participants. Connections are made with the quantitative results of the study and the qualitative interview results. Further links are made with the documents pertaining to their care and previous research. This draws together all the research questions and their answers to provide a holistic picture of the problem. In particular, it highlights that Research Question One is not answered in the interviews.

The case studies aim to investigate the anomalies of apparent clinical differences seen between subject women having their second baby, but first after LETZ, and subject women having their first baby; it also aims to explore women's views of their labour.

The following case studies are from –

1. Faith, a woman having her first baby after LETZ.
2. Keyra, a woman having her second baby, but her first baby after LETZ

3. Jill, a woman having her first baby.
4. Lynzi, a woman having her second baby

The research questions asked at the study's outset, a reminder of which are given next, are answered in the study although some are only partially answered and conclusive answers will require further research.

1. Do women feel that LETZ makes a difference to their labours?
2. Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour.
3. Are the differences clinically relevant?
4. Are the differences statistically significant?
5. Are there differences seen in both women having their first baby after LETZ and women having their second baby, but their first after LETZ?
6. Can differences in the management of women having their first baby and women having their second baby be identified that may mask true differences?

The secondary outcomes that are examined to better compare the study with previous research, listed below, are also answered.

- A. Are there differences in type of birth?
- B. Are there differences in number of premature births?
- C. Are there differences in birth weight of the babies?
- D. Are there differences in onset of labour?

The overall aim of the study, that investigates whether LETZ treatment for abnormal smears of the cervix has an effect on progress in the 1st stage of labour, is discussed in detail in Chapter 7 Discussion.

6.2 Case Study 01: Faith, first baby after LETZ.

The first study examines the case of Faith (not her real name). A synopsis of her birth story is detailed below and the results for subject women having their first baby after LETZ are examined in the light of Faith's journey when she gives birth.

Faith is a professional woman with a professional partner. This is Faith's first birth at 31 years of age and she has no previous miscarriages. She has always been a non-smoker. Faith is 27 years old when she has LETZ after a previous punch biopsy, and Cervical Intraepithelial Neoplasia (CIN) 3 is found, together with the presence of Human Papilloma Virus (HPV). The excision depth is 10mm and one margin is not cleared. There are no immediate or late complications from the treatment.

She has Premature Rupture of Membranes (PROM) at 35 weeks+ 6 days. The sac containing the waters surrounding the baby breaks and she starts to leak this amniotic fluid vaginally. The leakage starts as a dribble of amniotic fluid that she originally thinks is urine. After 36 hours it starts to get heavy so she phones the hospital and goes in to be assessed. The diagnosis of PROM is made at the hospital and they send her home on antibiotics, with an appointment for the antenatal clinic to discuss induction of labour. They have defined Faith as not in labour as her cervix has not started to dilate.

The hospital visit takes three and a half hours. By the time Faith and her partner get home from hospital, she starts to have contractions. The contractions became stronger and two hours later she goes back to the hospital. On Vaginal Examination (VE), her cervix is now 3cm dilated and she is admitted as being in labour. Faith is continuously attached to an Electronic Foetal Monitor (EFM) and she is not encouraged to mobilise. She initially has gas and air for pain relief. Faith then has Diamorphine for pain relief, followed by an Epidural shortly after. After the Epidural, she sleeps. When she has her next VE, 250 minutes after her initial admission, her cervix is now 7cm dilated.

After a further 165 minutes, Faith has her next VE. Her cervix is now fully dilated (10cm). The position of the baby's head is defined as in a posterior position at this time and her labour ends with a forceps birth a further 110 minutes later. Her baby is fine at the birth, requires no resuscitation, and weighs 2500g.

Bruinsma, Lumley, Tan and Quinn (2007) find that number of miscarriages or terminations of pregnancy significantly increase the incidence of premature birth. However, the study presented shows no correlation between miscarriages or terminations and premature birth. In the study, Faith is typical in that all socio-economic status groups are represented and there is no correlation between socio-economic status and LETZ or the study outcomes.

Smoking status is self-reported by the women. Smokers in the study are defined as smokers and those who quit smoking less than one year ago. There is a clinically relevant difference in smoking status. In the subject women having their first baby there are equal amounts of smokers and non-smokers (49%), this compares with (28%) of control women who are smokers. Subject women having their first baby are 1.6 times more likely to be smokers, with control women 31% less likely, this is also statistically significant. This correlation is expected as it confirms previous research on increased risk for CIN (Bristow and Karlan 1999; Nguyen, Montz et al. 2000; Villa, Costa et al. 2005). These percentages of smokers in the subject women also held true for the premature births for subject women having their first baby, where there was an equal amount of smokers and non-smokers.

Faith's higher socio-economic status and the fact she has no previous children are classed as protective factors against CIN (Bristow and Karlan 1999; Nguyen, Montz et al. 2000). Her non-smoker status should also be a protective factor (Bristow and Karlan 1999; Nguyen, Montz et al. 2000; Villa, Costa et al. 2005). In these ways, she is atypical according to the published research and statistics.

Faith is 27 years when she has LETZ after a previous punch biopsy and CIN 3 is found, together with the presence of HPV. This puts her in the commonest age group for cases of CIN 3 as per National Statistics for 2006-2007 (Patnick 2007). She is 31 years when she gives birth, which according to the birth statistics for 2006 puts her in the most common age group, 30 to 34 years (ONS 2007a). In the study

she is slightly older than the mean age for women having their first baby after LETZ and giving birth, she was in the 75th percentile range for both and most women give birth within 5 years of treatment. Faith is typical of women having their first baby in the study, 32 of 57 (56%) of whom have a previous punch biopsy before their LETZ and the majority 39 (68%) have diagnosis of CIN 3. Human Papilloma Virus is present in 52 (91%) of women having their first baby, which confirms claims by Villa, Costa et al. 2005) that it is present in the majority of cases.

The excision depth of Faith's LETZ is 10mm and one margin is not cleared. Depth is not discussed fully in previous research to date but in the study 10mm is the most common depth with women having their first baby, the mean being 9.9mm. Some studies implicate depths greater than 10mm as being associated with an increase in premature births, but the evidence is conflicting when depths less than 10mm are examined (Kyrgiou, Koliopoulos et al. 2006). More important is perhaps the width of excision or total volume (Leiman, Harrison et al. 1980; Raio, Ghezzi et al. 1997; Bruinsma, Lumley et al. 2007). Margins not cleared of CIN by histology report, accounts for 29 (51%) of cases in women having their first baby in the study and again there is no previous research data to compare that with. Faith is in the 56 (98%) of women having their first baby who have no complications from the treatment, immediately or later.

She has PROM at 35 weeks + 6 days. Faith's labour starts as a dribble of amniotic fluid, which she originally thinks is urine. She has no intuition that labour is starting, which is consistent with most of the women interviewed -

"Well, I kind of I started ..., I thought I was wetting myself on Sunday morning, the first thing on Sunday morning. And it starts to dribble and dribble all day and then by... I just thought that maybe it's a change of position you know, causing me to wet myself a little bit."

(Appendix D: Interview Notes Faith, Lines 7-10)

The sac containing the waters which surrounds the baby breaks and she starts to leak this amniotic fluid vaginally. The same pattern occurs in 4 of the 6 subject women having their first baby who have a premature birth. It is not true of the one control woman who has a premature birth. The study finds no association between LETZ and premature rupture of membranes as does Bruinsma, Lumley, Tan and Quinn (2007), while the research by Sadler (2004) and Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) does find an association.

Faith is unsure what is happening at first. Such uncertainty is one of the most common concepts under the theme of helplessness (as defined in the study) in the women's interviews. This is prevalent in women having their first baby and perhaps indicates a gap in antenatal preparation. Despite the availability of antenatal classes, Faith is not allocated a place until she is 36 weeks gestation, which is the norm in her area. The timing of those classes is unfortunate as it indicates that the women, who may need them most, do not have a chance to attend. This may have led to a reduction in information available to Faith that allows her to assess the probability of being in labour. Faith does have the contact number for the hospital and uses it when she feels worried -

*"And then by Monday night it started to get heavy, so I phoned the hospital and they said that it needed to be checked."
(Appendix D: Interview Notes Faith, Lines 11-12)*

She is not sure she is in labour, and with retrospect feels she should have contacted her Community Midwife to discuss the leaking fluid. Faith comments however that she feels she is not in labour as it is too early in her pregnancy (that is before 37 weeks) -

*"I just thought no it can't possibly be!"
(Appendix D: Interview Notes Faith, Line 38)*

After 36 hours the amount of fluid draining vaginally starts to get heavy, this prompts Faith to phone the hospital and she goes in to be examined. The medical staff define her as not in labour, as her cervix has not dilated, they pay no attention to and do not document if her cervix has started to efface. The hospital sends her home on antibiotics with an Antenatal Clinic appointment for discussion of induction of labour with the consultant. The hospital's guidelines stipulate that all women with PROM will be offered antibiotics to reduce the risk of neonatal infection (Labour Suite Guidelines, Section 12.4). These guidelines differ slightly from the RCOG guidelines (Carroll 2006) Section 9, where observation at least 12 hourly for 48-72 hours as an inpatient are recommended. However as Faith is 35 weeks + 6 days at the time, she is so near the cut off point for prematurity (36 weeks plus) that she is given a mixture of premature and normal labour care.

Faith is given information regarding the need for antibiotics by the midwife and the doctor. The hospital visit takes three and a half hours. By the time she and her partner arrive home from hospital her contractions start -

“And I thought I’m imagining it because of what’s happened, but it just got steadily stronger and I phoned the hospital and they said well you could be in labour”

(Appendix D: Interview Notes Faith, Lines 20-21)

At first Faith thinks she imagines the contractions, because of knowledge that her membranes have ruptured, but the contractions steadily become stronger and she contacts the hospital again. Four hours after returning home, she goes back to the hospital. Faith’s cervix is found to be 3cm dilated and she is admitted. In this she is atypical as, in the study, the number of subject women admitted more than 4cm is statistically significant ($p=0.005$, MWU). Forty-one (72%) of the subject women having their first baby and 45 (51%) of the control women having their first baby are more than 4cm on admission. Subject women having their first baby are 1.8 times more likely to be admitted more than 4cm dilated and control women are 29% less likely ($RR=1.76$, 95% CI 1.10-2.82). All subject women are 1.8 times more likely to go into labour spontaneously, with all control women 20% less likely, this is clinically relevant and also statistically significant ($RR=1.77$, CI 1.02-3.07, $p=0.03$ Pearson Chi-Square, $p=0.02$ MWU).

Faith is a bit shocked to find she is in labour and feels that she should have known, but has dismissed the possibility, as she has not reached 37 weeks of pregnancy. As seen from previous analysis of midwives’ interviews in Chp. 5: Part Two; Section 5.2.3.2.3, p.162, the definition of established labour is a very subjective one and depends on the philosophy of normal labour held by the midwife who makes the decision. In this case, because she is under 36 weeks, the medical staff make the decision of established labour -

“I obviously was the one who saw her initially so, so she had questions obviously regarding the ruptured membranes and because she was pre-term she was concerned. But... once obviously the doctor had seen her, it was his decision when she would go to delivery suite.”

(Appendix I: Interview Notes Midwife 01, Lines 19-21)

Premature labour happens more often in the subject women having their first baby in the study, 6 versus 1 of the control women. This is a small but clinically relevant group of women and is also statistically significant. Subject women having their first baby are 2.3 times more likely to have a premature birth, with control women 77% less likely ($RR=2.32$, 95%CI 1.60-3.37). This confirms other previous research by Crane (2003) and Bruinsma, Lumley, Tan and Quinn (2007), and also confirms the

meta-analysis by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaïdis (2006) that shows a statistically significant increase in the numbers of premature births, when several studies that have not achieved statistical significance are combined. The research used in the meta-analysis are of sample sizes of between 12 and 571 subject women of all parities and between 21 and 571 control women of all parities. Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaïdis meta-analysis is considerably weakened by the author's own reports of the use of the fill and trim method to account for publication bias, which shows the theoretical existence of 3 unpublished studies that would negate the statistical significance for the LETZ results.

In recent research by Bruinsma, Lumley, Tan and Quinn (2007), LETZ does not increase the rate of premature birth when confounding factors are taken into consideration in the results. As discussed previously in Chp. 2; Section 2.2, p.41, the study presented is larger for LETZ treatment than the research by Bruinsma, Lumley, Tan and Quinn. In women having their first baby, the study has 57 subject women having their first baby and 37 subject women having their second baby, a total of 94 women in the analysis after excluding women for confounding variables. This compares to the Bruinsma, Lumley, Tan and Quinn study which has a total of 69 women of all parities. Although in the study there is no correlation between grade of CIN and premature birth, 3 (50%) out of the 6 premature births to subject women having their first baby have CIN 3.

The two midwives caring for Faith after her admission refer to her labour as a 'normal' one -

"Just normal care because she's low risk. Although she is 35 weeks plus, she's just normal care."

(Appendix J: Interview Notes Midwife 02, Line 61-62)

"..., no I think she was pretty straightforward and normal and kept within the guidelines as we expected."

(Appendix K; Interview Notes Midwife 03, Line 69)

However, Faith continues to get a combination of normal and premature care. She is continuously attached to an EFM machine and is also told that a Paediatrician will be present at the birth, both part of the premature labour guidelines, -

*"They put me on a monitor straight away, they put me on a foetal heart monitor and they put me on... yes, I think it was just a foetal heart monitor and something to measure my contractions as well."
(Appendix D: Interview Notes Faith, Lines 53-54)*

Her labour options are limited because of the monitoring. This is especially so because she is not encouraged to mobilise. Several times during her interview, Faith mentions that she wanted to move around during the labour instead of labouring on the bed. In retrospect, Faith thinks that, as she cannot cope without the epidural, that she would have been unable to walk around and mobilise. However, walking around and mobilising has been shown to reduce the perception of pain in labouring women (WHO 1999; Enkin, Keirse et al. 2000). Faith's assessment of her ability to cope is based on only one scenario. Although she feels the staff were "*fantastic*" and "*really kind*", she also feels that they –

*"didn't really discuss the pain control options right at the beginning"
(Appendix D: Interview Notes Faith, Line 145)*

Later Faith says that she feels better when she is more in control (of herself). According to Simkin (2007), the way a woman is treated during labour and whether she feels in control or not influences the way she remembers her birth experience (and the staff) for years to come. Simkin's findings endorse the research by Green and Baston (2003).

Acceptance or acquiescence to midwives/obstetricians decisions is one of the concepts, both in the study and in previous research, of relinquishing control to authority (see Chp. 5, Part Two; Section 5.2.3.1.2, p.152). Vande-Vusse (1999b) discovers that women who acquiesce to caregivers views, or are more involved with the decision making process in their labours, are more positive about the birth (see Chp. 2; Section 2.4.4, p.59). Harrison, Kushner, Benzies, Rempei and Kimak (2003) find that women who perceive that there are complications in their birth, feel it limits their opportunities to be involved in decision making and that they have little alternative except to trust the health professionals -

*"I think it would have been nice to have walked about....It would be nice to get in the water, but I don't think they would have let me anyway, with him being so early."
(Appendix D: Interview Notes Faith, Lines 97-101)*

Faith uses gas and air initially as pain relief to help her cope with the contractions. She does not feel that the pain relief options are explained to her at the beginning of her labour and feels embarrassed to ask for pain relief -

"...then it just got, it just got really quite uncomfortable quite quickly. So my husband asked them if I could have some gas and air, cause I'm not very brave... you feel like I'm only early on, I should be able to deal with it... And they kind of said, well if you want it you can have it, and I'm like, right, and they sort of went"
(Appendix D: Interview Notes Faith, Lines 59-66)

She then has Diamorphine followed by an Epidural shortly afterwards. This is typical of the women having their first baby in the study with 31 (54%) of the subject women having Diamorphine and 22 (39%) having an Epidural. Ten women in each group have both Diamorphine and Epidural, 18% of the subject women and 11% of controls. It is clinically relevant in that subject women having their first baby are 1.3 times more likely to have both forms of analgesia, but is not statistically significant. Faith feels that there is a longer length of time between her use of gas and air, when she has Diamorphine and when she has an Epidural. In reality, she has all three within 3 hours of admission. This can explain why she feels she slept all afternoon after the Epidural, as the Diamorphine is still in her system. Faith does not remember clearly when she was examined, whether it was before or after she has the Epidural. She describes the effect Diamorphine has on her as negative, in that she feels out of control and that anyone can do anything to her.

"I felt completely out of it and I felt completely out of control. And you don't know what is happening and they could do anything to you" (on Diamorphine)
(Appendix D: Interview Notes Faith, Lines 89-90)

She much prefers the epidural as she again feels in control -

"...it went from being a very, quite a scary situation and quite an overwhelming situation for me, to being very calm because I had the epidural"
(Appendix D: Interview Notes Faith, Lines 87-88)

Faith does however appreciate the constant presence of a midwife during her labour. She reports being very reassured by that presence. This presence is a positive aspect of Faith's labour –

"There was a midwife with me constantly, so that was quite nice actually. Cause they were very supportive"
(Appendix D: Interview Notes Faith, Lines 82-83)

Unfortunately, she also experiences negative attitudes in her labour when she feels she is restricted to bed and cannot move and when she first tentatively enquires about pain relief, as discussed above.

At the next VE, she is 7cm. This is after 250 minutes, the length of time she has taken to get to 4cm or more. This is not typical of women having their first baby in the study; as 41 of 57 subject women (72%) are over 4cm on admission, with the Mann Whitney U test (MWU) for exact times $p=0.005$. Faith is typical of those subject women admitted before 4cm with 11 of 16 (69%) taking 250 minutes or less to reach 4cm. The baby is defined as anterior position with the head still high after the Epidural.

She does not need Artificial Rupture of Membranes (ARM) as her membranes have already ruptured. In this she is typical of the subject women in the study with the control women having statistically significantly more ARM, 12 (21%) in the subject women and 34 (39%) of controls ($RR= 1.355$, 95% CI 1.057-1.738. $p=0.020$ MWU). This means that control women are 1.4 times more likely to have ARM and subject women 43% less likely. This is clinically relevant, as Sadler, Davison and McCowan (2000) and Fraser, Turcot, Krauss and Brisson-Carrol (2001) have shown that this intervention reduces the length of 1st stage between 30 and 120 minutes. At the next examination, after a further 165 minutes, she has reached full dilatation (10 cm). Thirty-six (63%) of the subject women and 57 (65%) of the control women take less than 6 hours to get from 4cm or more to full dilatation (10cm). There are no clinically relevant or statistically significant differences. However, the intervention of ARM in the control women which reduces the length of time in the 1st stage, may contribute to the lack of difference in the time taken from 4cm to fully dilated.

The baby's position is defined as posterior at this time. Faith ends up with a forceps delivery a further 110 minutes later. In this respect, she is typical of the subject women having their first baby in the study. Twenty-three of 57 (40%) have Instrumental births (Forceps and Ventouse) 12 (21%) have Forceps and 11 (19%) have Ventouse births. This is of particular concern as Thompson, Roberts, Currie and Ellwood (2002) state that Instrumental births increase the incidence of bowel problems and perineal pain at 8, 16 and 24 weeks after birth. Instrumental births are also associated with an increase in suturing and associated healing times and risk of

third degree tears. The number of subject women having their first baby who have a Normal birth as defined by WHO is 20 (35%), with another 14 (25%) who have Spontaneous Vaginal birth with interventions such as ARM, Epidural or Syntocinon. These figures are similar to control women having their first baby, 34 of 88 (39%) have Instrumental births, 30 (34%) have Normal births, and 24 (27%) have Spontaneous Vaginal births with interventions.

The increase in premature births in the subject women having their first baby is reflected in the increase in number of low birthweight babies, with 5 in the subject women and none in the controls. This is clinically relevant in that babies with weights below 2500g normally need more intensive observation, feeding, heating and possibly respiratory support. It is also statistically significant ($p=0.008$ Pearson Chi-Square), RR cannot be calculated as no babies in the control women are low birthweight. Faith's baby is fine at delivery, requires no resuscitation and weighs 2500g. Although premature this baby's weight is 2500g and the baby needs no extra support with feeding, or intensive observation but needs a little initial support with temperature. This is not typical of the premature births in the literature but this baby is almost 36 weeks and at that gestation if their weight is adequate they need very little extra support (Seubert, Stetzer et al. 1999; Steer 2005).

During the interviews it becomes apparent that the subject women have no previous counselling as to the potential affect LETZ may have on their labours, despite previous research by Crane (2003). Therefore, they are asked at the end of the interview if they feel that previous knowledge of any potential affect of LETZ on their labours may be useful. Faith feels she prefers not to know in advance, that LETZ affects her labour. She is ambivalent about the effect that will have on her -

"I don't know to be honest. Because you know, if you know you've got that knowledge and then is it that harder to... I don't know, to sort of adjust and...."

(Appendix D: Interview Notes Faith, Lines 157-159)

6.2.1 Summary

Although Faith acquiesces to caregivers' views (one of the concepts of relinquishing to authority in the study and the literature), according to Vande-Vusse (1999b) this gives her a more positive view of her birth, as opposed to women who contest decisions made for them. Several times during her interview, Faith mentions that

she would have liked to move around during the labour instead of labouring on the bed. Despite this desire, she does not ask. This is a reflection of the fact, according to Harrison, Kushner, Benzies, Rempei and Kimak (2003), that when women perceive complications in their birth, they feel it limits their opportunity to be involved in decision making and they have to trust the health professionals. The differences in views of progress in labour reflect the different paradigms at work in the practice of midwifery and obstetrics and the influence of technocracy on midwives and obstetricians.

Faith's assessment of her ability to cope without Epidural is an example of the lack of alternatives to technology presented to women as described in Kornelsen (2005). It is also an example of the lack of information given that equates Epidurals with increased length of labour, increased malpositions in labour and increased Instrumental births (Howell, Kidd et al. 2001) and CS (Lieberman, Cohen et al. 1999; Goetzl 2008; Steer 2009). The way women deal with the pain of childbirth and the way midwives help them through that pain, with a focus on drugs, may be a reflection of the lack of realistic preparation for labour and/or the organisation of midwifery services with their dependence on technology (Kirkham 2007). Midwives should remember that mothers' birth experiences are less positive after using pain relief and satisfaction often includes coping with pain during labour (Cunningham 1993; Waldenstrom, Borg et al. 1996a). As Proctor (1998) states a holistic approach to care is needed to help women achieve "delight" (satisfaction) in childbirth.

The results in the study show that premature birth is clinically relevant and statistically significant in subject women having their first baby. This agrees with speculation in previous research by Blomfield, Buxton, Dunn and Luesley (1993), Haffenden, Bigrigg, Codling and Read (1993), Braet, Peel and Fenton (1994), Cruikshank (1995), Paraskevaidis, Koliopoulos, Lolis, Papanikou, Malamou-Mitsi and Agnantis (2002) and Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006). That there are differences in premature births answers one of the secondary outcomes in the study design – B). Are there differences in number of premature births? With subject women having their first baby 2.3 times more likely to have a premature birth, and control women 77% less likely.

The only difference in practice seen between subject women having their first baby as a premature birth and other subject women is having LETZ at the first clinic visit (See and Treat). All of the women who have a premature birth have a punch biopsy first to define CIN, including Faith. There is no significant correlation between premature birth and depth of tissue excised. The p-value is significant but the strength of the correlation is very weak. The fact that these women having LETZ also have at least one prior punch biopsy may be an indication that there is a correlation with total area excised, as opposed to depth alone. This point is also made by Leiman, Harrison and Rubin (1980), Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) and (Bruinsma, Lumley, Tan and Quinn (2007). Although there is no correlation between grade of CIN and premature birth in the study, 3 (50%) out of the 6 premature births in subject women having their first baby have LETZ for CIN 3.

The increased numbers of low birthweight babies born to women having their first baby after LETZ, is a reflection of the increased premature births. It is clinically relevant in that babies with weights below 2500g normally need more intensive observation, feeding, heating and possibly respiratory support. It is also statistically significant. This agrees with the previous meta -analyses by Crane (2003) and Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006). It also answers another secondary outcome in the study – C. Are there differences in birth weight of the babies? However, the birthweight is a reflection of the prematurity and is no significant differences are found when the premature births are removed.

Although type of birth is not clinically relevant nor statistically significant for women having their first baby, the percentages of Instrumental births is of concern as these births increase the risk of vaginal or perineal trauma, damage to the anal sphincter (3rd degree tears) with associated bowel problems and sexual problems (Thompson, Roberts et al. 2002). These results answer the secondary outcome – B). Are there differences in type of birth? The answer is that there are no differences.

Although all subject women are 1.8 times more likely to go into labour spontaneously, 65% of women having their first baby are still deemed unable to give birth without medical intervention. These figures are worrying from an anthropological point of view because if all those interventions **are** necessary in

order for these women to give birth, this means that our species is incapable of birthing 2 out of 3 pregnancies. These figures tend to reflect the medical management of birth that sets strict timescales for theoretical concepts of the different stages in labour and steps in with interventions if women's labours do not conform to them (Labour Suite Guidelines: Section 5.4; (NICE 2007)).

The times for women having their first baby reaching full dilatation from 4cm are neither clinically relevant nor statistically significant. The increased use of ARM in control women having their first baby (see Chp. 5, Part One; Section 5.1.3.3.7, p.121), is both clinically relevant and statistically significant, with control women 1.4 times more likely to have ARM and subject women 43% less likely. This intervention confounds the results of time taken to reach full dilatation, as it decreases artificially the time in labour and accelerates the contractions and cervical dilatation.

The length of time women are in the 'passive' phase of the 1st stage of labour, defined in the study as before 4cm dilated (see Chp. 3; Section 3.4.2, p.71), is both clinically relevant and statistically significant ($p=0.005$) in women having their first baby. This is due to greater numbers of the subject women admitted when they are already 4cm or more dilated. Although this is not the case for Faith who is admitted already 3cm dilated. She is typical of the subject women having their first baby who are admitted before 4cm as 11 (69%) of those subject women take 250 minutes or less to reach 4cm dilated.

Given the propensity in the study hospital to send all women home until they are 3-5cm dilated; the numbers admitted should have been similar for both subject and control women. Why this does not happen is speculative. It may be that the appearance of the cervix is the sole measure for women who are sent home as not in labour and therefore women after LETZ treatment are not admitted until further in their labour, as the appearance of their cervix is not typical. Forty-one (72%) of the subject women having their first baby and 45 (51%) of the control women are more than 4cm when admitted. Unfortunately, documentary evidence of any pre-admission assessments is rarely found in the participants' notes and so further analysis of this is not possible. However, a check on the data that is available for some women, of the time they are in pain before admission, reveals no significant correlations with admission greater than 4cm dilated.

The results on time in the 'passive' phase of the 1st stage of labour answers the research question asked in the study – 2). Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour. The study makes it clear that LETZ affects progress in some ways, as discussed more fully in Chapter 6. These results also answer the research questions – 3). Are the differences clinically relevant? and question – 4). Are the differences statistically significant? The results for time to 4cm dilated and use of ARM are both clinically relevant and statistically significant.

Faith did not reflect on the affect LETZ would have on her labour. This is a reflection of the colposcopy guidelines (Colposcopy.org 2005) current at the time she had LETZ, that it had no effect on labour, despite previous research to the contrary. Therefore, there is no counselling of women when they have LETZ. Faith's ambivalence to knowing in advance that it has an affect is understandable, and is an important point to remember in the study. That not all women want to know in advance that their labour will not follow the 'normal' pattern. As women have no knowledge prior to the study that LETZ has an affect on their labour, the study failed to answer one of the research questions – 1). Do women feel that LETZ makes a difference to their labours? This is discussed more fully in Chapter 7.

6.3 Case Study 02: Keyra, second baby but first after LETZ

The second study examines the case of Keyra (not her real name). A synopsis of her birth story is detailed below and the results for subject women having their second baby, but their first after LETZ, are examined in the light of Keyra's journey when she gives birth.

Keyra is a homemaker with a professional partner. This is her second pregnancy and she has two previous miscarriages. She is a self-reported smoker who gave up at the confirmation of pregnancy. Keyra has her first baby at age 26 years and then has LETZ at age 27 years, after 3 previous punch biopsies. Human Papilloma Virus is found as well as CIN 3. There is only 1 year, 7 months between Keyra having LETZ and giving birth to her second baby. The excision depth is 8mm and the margins are clear. Keyra goes into labour at 39 weeks +3 days. Her labour starts with Spontaneous Rupture of Membranes (SRM).

She telephones the hospital to inform them of her SRM and the staff ask her to come in to be examined. At this stage, she reports that she has some painful contractions. In the hospital, Keyra has a VE and she is defined as not in established labour, as her cervix is only 1-2 cm dilated. It is documented that her cervix has started to efface by softening, but has not yet started to thin. The position of the baby's head is defined as still high.

The midwife suggests that Keyra go home and await events. Despite the assessment, Keyra feels intuitively that she is in labour and wishes to stay in the hospital and walk around. The midwife involved with her care decides that, as she is disinclined to go home, she can stay in the assessment unit and be re-examined later.

Keyra is in the bath using gas and air for pain relief, 120 minutes after her assessment on admission. Gas and air is the only pain relief she uses during the birth, despite describing her pain as agonising. She has no further VE at this point but the midwife who observes her remarks that she will have her baby within 2

hours. Keyra feels very positive about the care she is given and the midwife who gives it.

When Keyra has a VE 117 minutes later, her cervix has reached full dilatation (10cm) with the baby's head low in the vagina. She has taken 237 minutes to get to full dilatation from admission. Five minutes after being diagnosed as fully dilated, Keyra has a Normal birth. The baby is in good condition at delivery, requires no resuscitation and weighs 3670g. Her previous birth had been an Instrumental delivery by Ventouse (vacuum extraction).

The study presented shows no correlation between miscarriages or terminations and premature birth, contradicting the findings by Bruinsma, Lumley, Tan and Quinn (2007) that the number of miscarriages or terminations of pregnancy significantly increase the incidence of premature births. The birth of Keyra's second baby is not premature; despite the fact she has two previous miscarriages.

Keyra's higher socio-economic status is classed as a protective factor against CIN (Bristow and Karlan 1999; Nguyen, Montz et al. 2000). In the study (as reported in Chp. 5, Part One; Section 5.1.3.2.2, p.112) she is typical of the subject women having their second baby, as all socio-economic groups are represented in the study. The study does show a negative correlation between socio-economic status and age at LETZ, with women in lower socio-economic groups needing LETZ earlier in their lives for abnormal smears (Chp. 5, Part One; Section 5.1.3.4.8, p.133). This may be why Bristow and Karlan (1999) and Nguyen, Montz and Bristow (2000) find socio-economic status a risk factor for CIN and cervical cancer.

However, her smoking is a high risk factor for CIN, the precise aetiology of which has not been discovered (Bristow and Karlan 1999; Nguyen, Montz et al. 2000; Villa, Costa et al. 2005). She is typical of the subject women having their second baby 19 (51%), being either smokers or who have given up less than one year, compared to 20 (32%) of control women. There are clinically relevant differences in smoking status with subject women having their second baby being 1.6 times more likely to be smokers. This agrees with previous research by Bristow and Karlan (1999), Nguyen, Montz and Bristow (2000) and Villa, Costa, et al. (2005) that cigarette smoking is a risk factor, but in the study presented it is not statistically significant. As

smoking increases the risk of premature birth, previous research has tried to separate the risk of premature birth from smoking, from the risk of premature birth from CIN (Bristow and Karlan 1999; Nguyen, Montz et al. 2000; Villa, Costa et al. 2005), not always successfully.

Keyra has her first baby at age 26 years, has LETZ at 27 years and gives birth to her second baby aged 28 years. She is in the second most common age group for women giving birth, 25-29, according to recent birth statistics (ONS 2007a) and below the mean age in the study for subject women having their second baby, which is 30 years (range 24-38), but within the 50th percentile range. As the subject women are matched to the control women and one of the matches is age, the age at birth is similar. There is only 1 year, 7 months between the LETZ and when Keyra gives birth to her second baby, this puts her in the 25th percentile range for time from LETZ to birth of second baby, with most women giving birth within 3 years, 2 months of treatment.

Keyra has 3 previous punch biopsies. In this, she is typical of subject women having their second baby in the study with 21 of 37 (57%) who have a previous punch biopsy. Human Papilloma Virus is found as well as CIN 3. This is typical of subject women having their second baby, in that the majority 26 (70%) have CIN 3. She is atypical of women with CIN 3 in the study, as treatment at first visit without punch biopsy is statistically significant, with 15 of 25 (58%) CIN 3 women who have LETZ at first visit ($p=0.012$ Fisher's Exact). Human Papilloma Virus is present in all of the 33 subject women for whom HPV status is recorded, which confirms research by Villa, Costa et al. (2005) that it is present in the vast majority of cases.

Keyra has LETZ at the age of 27 years. This puts her in the most common age range, 20-29, for CIN as per National Statistics (Patnick 2007) and the mean age for LETZ in the study (range 19-35). The excision depth is 8mm and margins are clear. In the study a depth of 12mm is most common in subject women having their second baby, with a mean of 11mm, and only 8 (22%) who have depths of 8mm or less. Evidence for the effect of depths less than 10mm is inconsistent, but several researchers claim increased premature births with depths of 10mm or greater as discussed in the meta-analysis by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006). Depth is not found to be a significant predictor

of premature birth in the study, more important may be total area excised (see Chp. 5, Part One; Section 5.1.4, p.142). Keyra is typical of subject women having their second baby in the study, as the margins of the tissue removed during LETZ are clear, with clear margins in 20 (54%) of subject women. There is no previous research with which to compare these figures. Keyra is included in the 36 of 37 subject women having their second baby who have no complications from their treatment, either immediately or later. Immediate complications after treatment occur in only one woman after her second LETZ treatment.

Keyra's labour starts at 39 weeks + 3 days with SROM. In this she is in the minority of subject women having their second baby, as only 12 of 37 (32%) have SROM on admission, compared to 26 (43%) of the control women. This number of subject women having SROM includes 5 of the 9 women who have a premature birth. Keyra is typical of the subject women having their second baby, in that she has a full term birth (37 weeks or more gestation), with 28 of the 37 subject women having a term birth. However, premature birth is both clinically relevant and statistically significant in women having their second baby. There is a small but clinically relevant group of 9 (24%) subject women, compared to 3 (5%) control women who have a premature birth. Subject women having their second baby are 2.3 times more likely to have a premature birth, with control women 63% less likely (RR=2.33, 95% CI 1.49-3.64). Seven of the 9 subject women having their second baby who have a premature birth have LETZ for CIN 3.

After Keyra telephones the hospital, the staff request that she come in to be examined. At this stage, she has some painful contractions –

"I did feel some contractions... But at the time I thought, ooh, this is this is quite painful. Though but of course it wasn't, it was just, it was nothing compared to later".
(Interview Notes Keyra, Lines 19-23)

At the hospital, she has a VE to determine if she is in established labour. This is according to the criteria for admission in the Labour Suite Guidelines; Section 2.1 and 3.1. As seen in Chapter 5: Part Two; Section 5.2.3.2.3, p.162, assessment is heavily influenced by the midwife's philosophy of normal labour. In this case, Keyra is defined as not in established labour, as on VE her cervix is 1-2 cm dilated, soft, and not effaced as it is still 1-2cm long, and the baby's head is high. There are no clinically relevant or statistically significant differences in women having their second

baby admitted before 4cm dilated. Keyra is atypical of subject women having their second baby, with only 15 (40%) being less than 4cm dilated on admission.

The negative response from caregivers after an assessment provokes negative reactions from women who intuitively feel they are in labour, and makes them feel they are not being listened to –

"I said don't tell me I'm only 2 cm, I'll cry. And she said, "Actually, you're only 1."

(Interview Notes Keyra, Lines 129-130)

"she said, "In fact you know, it's classed as not being in labour". But I said I feel like I'm in labour, you know."

(Interview Notes Keyra, Lines 135-136)

Negative language used, together with negative attitudes, is a common theme from the women's interviews in the study. Waldenstrom (2003) finds that the negative events around birth increase in significance over time, whereas positive aspects stay the same, confirming the research by Simkin (1996). Prince and Adams (1987) claim that dissatisfaction with care during labour increases the likelihood of Postnatal Depression.

The midwife suggests that Keyra go home to await events and she feels helpless to contradict the professionals' opinion –

"Which I couldn't believe, cause I mean, I'd been contracting like, I was gutted. She said you can go home if you want. I'd rather not you know"

(Interview Notes Keyra, Lines 31-33)

This theme of helplessness, which includes concepts such as uncertainty and fear, is in the interviews of women having their second baby, but is more prevalent in the women having their first baby. These findings confirm Fowles (1998), who reports that many women feel helpless in their lack of knowledge during and after childbirth. Despite this assessment from the midwife, Keyra feels intuitively that she is in labour–

"And I just thought, once I'm here, I'll just go for a little walk around."

(Interview Notes Keyra, Lines 33-34)

Kornelsen (2005), describes women feeling that intuition and inner knowledge is authoritative, confirming research by Davis-Floyd (1994). This is not a concept discussed by the midwives in their interviews, nor indeed mentioned in the Labour

Suite Guidelines or national guidelines (NICE 2007). Happily, the midwife who examines Keyra decides that as she is disinclined to go home, she can stay in the assessment unit and be re-examined later. This midwife uses her clinical judgement against the proscriptive guidelines. Perhaps if the situation in the maternity unit had not been so unusually quiet that night (as reported in Keyra's interview) she would not have felt able to do so. Some midwives, who wish to provide care from a holistic midwifery model, feel constrained by the guidelines to practice in an obstetric, technological model –

“Depends on the other findings. If her contractions have got stronger and more frequent, if her cervix is more effaced, if the foetal head is descending, then she's in labour and progressing. I'd re-examine in 2 hrs. But I know it would be a struggle to convince anyone higher up that she should be kept (in hospital).”
(Interview Notes Focus Group; Midwife 14, Lines 71-75)

Keyra is later in the bath using gas and air for pain relief. This is despite describing the pain she is in as –

“it was agonising. You feel like you were going to die, but...”
(Interview Notes Keyra, Lines 44-45)

This is the only pain relief she uses during the birth. In this she is atypical of subject women having their second baby as 20 (54%) have Diamorphine versus 25 (40%) of the control women. This is clinically relevant with subject women 1.4 times more likely to have Diamorphine, but is not statistically significant. Epidural use is also clinically relevant with 17 (19%) of the subject women versus 19 (31%) of the control women who have Epidurals. Subject women are 34% less likely to have an Epidural, but this is not statistically significant. Four (11%) of the subject women and 10 (16%) of the control women use both Diamorphine and Epidural for pain relief. This is neither clinically relevant nor statistically significant. There is a good correlation between women who have CIN 3 and who use Diamorphine earlier in their labour, as defined by dilatation of the cervix, $p=0.006$ (Spearman's rho), correlation coefficient -0.591 .

As in Keyra's case, this description of the pain as severe does not always equate to the need for stronger pain relief. Waldenstrom, Borg, Olsson, Skold and Wall (1996a) state that women usually experience severe pain, but that despite this most are satisfied with their own achievement and think they have coped better than expected, whereas Cunningham (1993) finds that women who use pain relief

express considerably fewer positive feelings about their birth experience than their peers. Their findings show that a positive birth experience does not necessarily preclude pain and distress, as in Keyra's case, and should cause midwives to reassess their attitude to pain in labour. Birth is a multidimensional experience and needs a holistic approach to care.

When the midwife observes Keyra while she is in the bath, 120 minutes after admission, she does not examine Keyra but remarks that she will have her baby within 2 hours -

*"And by midnight she looked at me and said "Oh, you'll have this baby in 2 hours", and sure enough we really did."
(Interview Notes Keyra, Lines 35-36)*

Both the decision to keep Keyra in the Labour Suite when she is not in 'established' labour and encouraging her by making an estimate of the progress of labour from Keyra's behaviour and sounds, show that this midwife is confident in using her clinical judgement. It also shows she is confident in using a holistic midwifery approach to care that takes cognisance of other signs of progress and is not solely dependant on dilatation of cervix on VE, as discussed in Chapter 2; Section 2.3.2, p.51.

This positive attitude and language is vital to women's self-image and results in a more positive self-image after the birth (Simkin 1996). Keyra feels very positive about her care from then –

*"I saw one midwife from the moment I walked through into the labour rooms until the moment the baby was born and like nobody else, you know. Which was very personal and very private, really it's lovely"
(Interview Notes Keyra, Line 126-128)*

*"I was in the bath with water and it was lovely"
(Interview Notes Keyra, Line 44)*

She feels very positive about the care she is given and the midwife who gave it –

*"I felt very safe because I knew; I knew she was competent in what she was doing"
(Interview Notes Keyra, Line 142)*

Keyra's comments confirm McCrea and Wright (1999) findings that women find reassurance in being told what to do by midwives if they are working in a partnership

approach. However, obstetric technological management of birth decreases the control experienced by birthing women. This creates a power imbalance between the woman and the midwives/obstetricians that deprive women from a potentially empowering experience.

Keyra is examined 117 minutes after the midwife observes her in the bath, and her cervix has reached full dilatation with the baby's head low in the vagina. She has taken 237 minutes to get to full dilatation from being 1-2 cm dilated on admission. The time taken to get from 4cm or more dilated to full dilatation for women having their second baby in the study, is clinically relevant, with 34 (92%) of the subject women and 54 (87%) of the control women taking less than 6 hours. Subject women are 1.4 times more likely to take less than 6 hours to get to full dilatation, but this is not statistically significant. However, Keyra's labour is a good example of the negative correlation between women who have CIN 3 and time to get to fully dilated, as these women take less time ($p=0.002$ correlation coefficient -0.493 Spearman's rho).

Five minutes after being diagnosed as fully dilated, Keyra has a Normal birth (as defined by (WHO 1985a)) (see Chp. 3; Section 3.5.1, p.75). The baby is in good condition at birth, requires no resuscitation and weighs 3670g. Her previous birth was an Instrumental birth by Vacuum extraction. Keyra is typical of subject women having their second baby 25 (68%) of whom have a Normal birth, compared to 32 (52%) control women. Subject women are 1.5 times more likely to have a Normal birth, but this is not statistically significant. Spontaneous Vaginal births are neither clinically relevant nor statistically significant between the two groups of women. Instrumental births (Forceps or Vacuum extraction) are clinically relevant with 11 (18%) of the control women versus 2 (5%) of the subject women. Control women are 1.4 times more likely to have an Instrumental birth, with subject women 62% less likely, this is also statistically significant (RR=1.43, 95% CI 1.07-1.91). The increased Instrumental births in the control women having their second baby may be a reflection of the increased use of interventions, such as ARM and Syntocinon, in the control women. Control women are 1.3 times more likely to have ARM and 1.5 times more likely to have Syntocinon. Only the use of Syntocinon is also statistically significant (see Chp. 5, Part One; Section 5.1.3.4.7, p.132). Instrumental births are associated with increased suturing and associated healing times and risk of third

degree tears, as well as more perineal pain and sexual problems (Thompson, Roberts et al. 2002). Additionally Creedy, Shochet and Horsfall (2000) ascertain that Forceps extractions are as traumatic as Caesarean Section for women.

Keyra is typical of the subject women having their second baby, in that the baby is not low birth weight (less than 2500g). However, clinically there are relevant differences in birth weight with 5 (14%) babies in the subject women versus 4 (7%) babies in the control women whose babies weigh less than 2500g. Subject women are 1.6 times more likely to have a low birthweight baby. This is clinically relevant, as these babies require more support and observation that is more intensive, feeding, heating and possibly respiratory support. However, it is not statistically significant. It is a reflection of the increased number of premature births in the subject women. This birth Keyra finds to be very different to her first Ventouse birth and she feels she recovers from the birth more quickly -

*“just a completely different experience, you know.”
(Interview Notes Keyra, Line 49)*

*“as soon I was back out I was 100 percent”
(Interview Notes Keyra, Line 167)*

She refers back to her first birth several times in her interview and that birth was an example of relinquishing to authority, one of the themes in women's interviews in the study. This she now regrets –

*“you're in another's hands totally and you accept that when they say you're baby could become distressed, you just, I'll do anything you tell me, of course I will...but in retrospect,”
(Interview Notes Keyra, Lines 116-118)*

*“In retrospect I would have asked, you know, if it happened again, I would say you know, am I going to cause any damage to my child if I wait and...just see if I can do this naturally. Cause the difference is extraordinary isn't it, so...”
(Interview Notes Keyra, Lines 154-155)*

According to Kornelsen (2005) relinquishing to authority puts a woman in a situation where she does not question the use of obstetric technological interventions in the birth. The readiness to surrender any independence or control to authority figures is a common theme in the interviews with women in the study, regardless of their parity. It includes concepts such as dependence on others and acquiescence. In the research by Vande-Vusse (1999b), women who are more involved with the decision making process in their labours, or acquiesce to caregivers views, are more positive

about the birth. Women, who do not agree with medical decisions but have to adapt to them, or contest them, are more negative about the birth. It has definitely coloured Keyra's memories of her first birth –

"I would say my first birth was a rotten experience the birth, and it's been wonderful since, my second birth was wonderful from the start."

(Interview Notes Keyra, Lines 170-171)

Keyra is one of the women who in Proctor's (1998) study may have used the word "devastated" for a negative response to her first birth and "delighted" for a positive response to her second birth.

During the study it is apparent that women have never been counselled about the potential affects of LETZ on their labours, consequently the women do not express any views of how they feel LETZ affected their labours. Therefore, a question is asked, "Would it have been useful for you to know that your labour progress was altered after LETZ?" Keyra is inclined to believe that it may have been useful –

"Yes, right. I don't ... I think so...yes. Ah. Yes... perhaps they would not have been so keen to send me home".

(Interview Notes Keyra, Lines 173 176)

6.3.1 Summary

Although Keyra is admitted to the hospital she does not fulfil the 'normal' criteria required for established labour according to the guidelines at the time, and fell far short of the national guidelines in use at present (NICE 2007). As discussed in Chapter 5: Part Two; Section 5.2.3.2.3, p.162, assessment is heavily influenced by the midwife's philosophy of normal labour. The affects of negative and positive responses and attitudes when women are in labour are long lasting (Waldenstrom, 2003). In her labour Keyra has both, but the significance of the negative may well overshadow the positive in time. Keyra's feeling of helplessness, when the midwife suggests she go home to await events, is a theme which includes concepts of uncertainty and fear and is found more often in the women having their first birth in the interviews. Keyra's reliance on her intuition that she is in labour reflects the research by Davis-Floyd (1994) and Kornelsen (2005) which describes women who feel that intuition and inner knowledge is authoritative. This is not a concept discussed by the midwives in their interviews in the study, nor indeed mentioned in the Labour Suite Guidelines or national guidelines (NICE 2007).

Keyra's description of the pain as "agonising" is an example that sensations of pain do not always equate to the need for stronger pain relief, and that women feel satisfaction and achievement when they think they have coped better than they expected (Waldenstrom, Borg et al. 1996a).

This is confirmed by Cunningham (1993) research which claims that use of pain relief reduces the positive feelings about the birth experience. When women are interviewed in person about the terms in use to describe satisfaction with birth (often via questionnaires), they feel the usual terms of satisfied and dissatisfied are major understatements. They use the terminology delighted and devastated instead (Proctor 1998). Keyra is devastated by her first birth, and delighted with the outcome of her second birth.

Although Keyra's birth was not premature, in the study subject women having their second baby are 2.3 times more likely to have a premature birth, and control women 63% less likely, it is also statistically significant. This confirms the clinically relevant findings from the Pilot Study. These increased premature births answer the secondary outcome – B). Are there differences in number of premature births? This tendency toward premature births after LETZ has been equivocal in the research literature in the past, none of which has enough data for statistical significance. The study confirms the view of the meta-analysis of previous research by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) that finds statistical significance for premature birth.

Keyra's baby is a good weight but the increased number of premature birth in subject women having their second baby is reflected in birthweight, with 5 (14%) babies versus 4 (7%) babies in the control women weighing less than 2500g. This is clinically relevant, however, it is not statistically significant. These differences in birth weight answer another secondary outcome – C). Are there differences in birth weight of the babies?

Clinically there are relevant differences in type of birth of women having their second baby. As is the case for Keyra, subject women are 1.5 times more likely than control women to have a Normal birth as defined by (WHO 1985a), but this is not statistically significant. Control women having their second baby are 1.4 times more

likely to have an Instrumental birth, and this is statistically significant. The findings of differences in type of birth answer the third secondary outcome – A). Are there differences in type of birth? However, the differences in type of birth may be a reflection of the increased Artificial Rupture of Membranes and Syntocinon use in the control women which leads to more Instrumental births. The increased Instrumental births are concerning due to the extra associated bowel and sexual problems (Thompson, Roberts et al. 2002).

The length of time women are in the 'passive' phase of the 1st stage of labour, defined in the study as before 4cm dilated (see Chp. 2), is neither clinically relevant nor statistically significant in women having their second baby. The results for time from 4cm or more to full dilatation finds clinically relevant differences and confirms the Pilot Study results (see Chp. 3; Section 3.5.3, p.77) that subject women take less time to get to fully dilated. Subject women having their second baby are 1.4 times more likely to reach full dilatation from 4cm in less than 6 hours, but this is not statistically significant.

This is despite more intervention by ARM and Syntocinon in control women having their second baby, compared to the subject women, interventions that are performed to accelerate labour. This answers the research question – 2). Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour? However, it has not been answered definitively due to the lack of statistical significance in the results, which are confounded by the increased use of ARM and Syntocinon in the controls.

The results also answer the research question – 5). Are there differences seen in both women having their first baby after LETZ and women having their second baby, but their first after LETZ? Although effects of LETZ are seen in both women having their first and women having their second baby they are not the same effects, with clinically relevant differences in time from 4cm to full dilatation for women having their second baby, and in time from admission to 4cm dilated for women having their first baby. Women having their first baby and women having their second baby behave fundamentally differently in labour. The Friedman curve reflects two different curves or labour patterns for women having their first and subsequent births (Dudley 1999). The Labour Suite Guidelines; Section 5.4, and Intrapartum Care Guidelines;

Chapter 7 (NICE 2007) have very little differentiation between the two sets of mothers, but historically obstetricians and midwives have always differentiated. This is probably the reason Keyra is allowed to stay in the labour suite although she is not in established labour by the guidelines. It is unlikely that a woman having her first baby would have been accommodated so readily. Indeed the figures from the study show that the majority of subject women having their first baby are more likely to be admitted more than 4cm dilated. This is discussed more fully in Chapter 7.

These results answer the research questions – 3). Are the differences clinically relevant? and 4). Are the differences statistically significant? The results for subject women having their second baby are clinically relevant in time from 4cm to fully dilated, but are not statistically significant. The correlation of CIN 3 and less time taken to get to full dilatation is statistically significant. The correlation between CIN 3 and treated at the first visit, for women having their second baby, may be due to the cervix looking more abnormal once a woman has given birth. This may lead to a larger area of tissue being excised and is one of the possible reasons that LETZ has an affect on labour. As Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) notes there is a need for further research which takes note of the volume of cervical tissue excised. As the birth age is increasing more women are giving birth after LETZ, as the most common age group for women giving birth is now 30-34 years, and the most common age for women having CIN is 20-29 years (Patnick 2007; ONS 2007a). This involves increased numbers of women giving birth after LETZ, a point discussed further in Chapter 7: Discussion.

Keyra has no opinion on LETZ affecting her birth, as it has not been mentioned to her before the birth, therefore the research question – 1). Do women feel that LETZ makes a difference to their labours? is not answered in the study. She is of the opinion that knowing how her second birth may progress may have helped her midwives and herself, in that she would have been unlikely to have been advised to go home if everyone is aware that LETZ affects birth. This needs to be considered in the light of the other results from the study and is discussed more fully in Chapter 7: Discussion.

6.4 Case Study 03: Jill, first baby

The third study examines the case of Jill (not here real name). A synopsis of her birth story is detailed below and the results for control women having their first baby are examined in the light of Jill's journey when she gives birth.

Jill is a professional woman, with a professional partner, and this is her first birth. She is a non-smoker who has never smoked and she has one previous miscarriage. Jill is 37 years old when she gives birth. Her labour starts as SROM at 39 weeks, 2 days (by the hospitals dating scan) while she is at home. This is followed shortly after by the onset of pains. Jill is unconcerned and, as the pains only feel like period pains, is happy to stay at home and does not feel the need to contact the hospital. She is pleased that the baby is going to arrive on her due date, which she has calculated from the dates of her last period, as opposed to the date given by the hospitals dating scan.

After her husband comes home from work, Jill phones a friend and her friend advises her to phone the hospital. The hospital midwife informs her that she should have come in as soon as her membranes had ruptured, but Jill cannot see any reason for that. She arrives at the hospital around 20.00pm. When she is given a Vaginal Examination (VE) on admission, her cervix is 3cm dilated, fully effaced, soft, in a central position and the baby's head is high. The amniotic fluid around the baby, which has been slowly trickling out all day, now starts to come out in large gushes.

Despite the results of the VE and the gushes of fluid with each pain, the midwife tells Jill that she is not in established labour. Although assessed as not in established labour, because they have defined that she has ruptured membranes, she is given the choice of immediate augmentation with the artificial hormone Syntocinon, or to go home to await events. Given that Jill feels she is in labour, she chooses augmentation. Jill starts using gas and air for pain relief, and at this point she is still in the assessment unit.

When Jill is finally moved through to the Labour suite, she has some Pethidine for pain relief, approx 150 minutes after admission. Although she feels that the

Pethidine does not work, she admits that she is in a drugged state. Fifteen minutes after the Pethidine Jill has another VE to reassess her cervix as her contractions have become stronger. This VE determines that she no longer needs augmentation, as her cervix is 8cm dilated, fully effaced, soft, in a central position, but the baby's head is still high. For some reason, unclear in her notes, Jill is examined again 45 minutes later and she has now reached full dilatation, with the presenting part a little lower, with the baby's orientation now defined as anterior, the most normal position for birth, with the baby's back to the front of the mothers abdomen.

Jill uses gas and air on top of the Pethidine injection at this time. As she is now defined as fully dilated, the clock for timing of second stage is started and she is encouraged to push 10 minutes later. After another 188 minutes of pushing, Jill has an Instrumental delivery by Vacuum extraction (Ventouse). During the pushing stage, she is given an Epidural and Syntocinon. The baby is born in good condition, and needs no resuscitation and weighs 3275grams.

In the study, Jill is typical of control women having their first baby as all socio-economic groups are represented, and 60 (68%) are non-smokers – defined in this study as never having smoked or have quit smoking for more than 1 year. Jill is atypical in that the vast majority 68 (77%) have no miscarriages; she is in the 13 (15%) who have one miscarriage.

Jill is 37 years old when she gives birth which puts her in the 4th most common age group, according to national statistics (ONS 2007a), an age group whose births have practically doubled in percentage terms of the total births from 9% in 2001 to 17% in 2006. In the study she is at the extreme end of the age range, which goes from 21 to 40 years in the control women with a mean age of 30 years, age 37 was in the 97th percentile. Jill's labour starts as a SROM at 39 weeks + 2 days at home, followed by the onset of pains –

*“and I woke up in the morning about 8 and then my waters just gradually started breaking.”
(Interview Notes Jill, Lines 16-17)*

Jill is typical of control women having their first baby as 87 of the 88 control women have a term birth (37 weeks gestation or more). Only one has a premature birth. Premature birth is both clinically relevant and statistically significant in the women

having their first baby, with control women 77% less likely to have a premature birth and subject women 2.3 times more likely. Jill is however, typical of the control women in going to hospital with SROM as most 54 (61%) rupture their membranes spontaneously. The remaining 34 (39%) of the control women having their first baby all have Artificial Rupture of Membranes (ARM). This is clinically relevant with control women having their first baby 4 times more likely to have ARM, with subject women 43% less likely, this is also statistically significant. This statistical significance is confirmed by $p=0.029$ (Fisher's Exact).

Jill is unconcerned as the pains only feel like period pains, and is content to stay at home –

“and I stayed here all day...it wasn't, it was uncomfortable, felt like sort of a very strong period pain...and my mum and dad live in Wales and I was just on the phone to my mum a lot”
(Interview Notes Jill, Lines 19-21)

Jill is pleased that the baby is going to arrive on her due date, which she has calculated from the dates of her last period, but by the hospitals dating scan she is 39 weeks + 2 days –

“I don't know why, but I had a feeling that she was going to be bang on the day. Just had this funny feeling...and I had absolutely nothing, no warning, no, and I woke up one morning and I just thought this is the day. And it was the day she was due”
(Interview Notes Jill, Lines 13-16)

The women in the study mention intuition infrequently. This theme of intuition is reflected in previous research by Davis-Floyd (1994) where women who have given birth at home feel intuition and inner knowledge is authoritative, a view endorsed by Kornelsen (2005).

In the evening, Jill phones a friend and her friend advises her to inform the hospital about her SROM. The hospital midwife informs Jill that she should have come in as soon as her membranes had ruptured but she does not see any reason for this-

“So I phoned the hospital and they said “Oh, you should have come in as soon as your waters broke” and I said well, why? ...and I thought well, it, I didn't feel I needed to be in hospital. So we went in and I thought well, they could send me home but I went in.”
(Appendix F: Interview Notes Jill, Lines 24-27)

According to Vande-Vusse (1999b), women who contest medical decisions or adapt to them when they do not agree with them, are more negative about their births. Jill

arrives at the hospital around 20.00pm, and on her admission VE her cervix is 3cm dilated, fully effaced, soft, and the baby's head is high. The orientation of the baby is not defined. The amniotic fluid around the baby that has been slowly trickling out all day now starts to come out in large gushes with the contractions. Despite this, the midwife tells Jill that she is not in established labour -

"...I wasn't really far on"
(Appendix F: Interview Notes Jill, Line33)

"But I mean the, the amniotic fluid was just gushing out of me and it was really, you know, I was pacing, it was very, very painful."
(Appendix F: Interview Notes Jill, Line33)

Definition of established labour varies between midwives dependant on their philosophy of normal labour as is discussed in Chapter 5: Part Two; Section 5.2.3.2.3, p.162. Despite the guidelines at the time stating the definition of established labour as 3cm dilated with painful contractions, and the fact that the VE shows that Jill's cervix is fully effaced, the practice in the study hospital is increasingly to send women home for a further time. The definition of established labour in the new guidelines from NICE (NICE 2007), now state that 4cm is established labour. Is this redefinition of the guidelines and the reinterpretation of the existing Labour Suite Guidelines by midwives in the study hospital, really a new insight, or perhaps a way to decrease the workload in the Labour Suite?

(on being told was not in labour) "But I mean the, the amniotic fluid was just gushing out of me and it was really, you know, I was pacing, it was very, very painful."
(Appendix F: Interview Notes Jill, Lines 47-48)

"...you know, I can't do this."
(Appendix F: Interview Notes Jill, Line 158)

Jill feels helpless to contradict the midwives view that she is not in labour. This theme is more prevalent in the women having their first baby, but women having their second baby have times they feel helpless too. It includes concepts such as uncertainty and fear (see Chp. 5, Part Two; Section 5.2.3.1.2, p.152). The study findings include women feeling helpless in their lack of knowledge about specific problems or procedures during and after childbirth and confirm the research by Fowles (1998). Fowles finds in the research on women's concerns about their labours, that women report feelings of regret, displeasure and anger at the helplessness or lack of control they feel during labour. They also feel frustration at their lack of knowledge. Soet, Brack and Dilorio (2003) claim that feelings of

helplessness or powerlessness are significant contributors to Post Traumatic Stress Disorder (PTSD) symptoms, and Fisher, Hauck and Fenwick (2006) explain that women feel helpless due to 'fear of the unknown', 'horror stories', 'general fear for the well being of the baby', 'fear of pain' and 'losing control and disempowerment'. The women's lack of knowledge of the affect LETZ has on their labours disempowers women and that increases their sense of helplessness.

Negative attitudes, as defined by Green and Baston (2003), or negative language used to women is a common theme in women's interviews, together with helplessness. Waldenstrom (2003) endorses Simkin (1996) findings that negative midwives/obstetricians attitudes result in a more negative self-image for women, which increases in significance over time. Creedy, Shochet and Horsfall (2000) and Soet, Brack and Dilorio (2003) suggest that Jill's high level of obstetric intervention and dissatisfaction with her care may lead her to suffer Post Traumatic Stress Disorder in the future.

Although Jill is assessed as not in established labour, the hospital staff have defined that she has ruptured membranes. Therefore adhering to the Labour Suite Guidelines, she is given the choice of immediate augmentation with the artificial hormone Syntocinon, or to go home to await events. Given that Jill feels she is in labour, she chooses augmentation. She starts using gas and air for pain relief. At this point, she is still in the assessment unit –

“...they were very busy and they were trying to find a free birthing room whatever it is.”
(Appendix F: Interview Notes Jill, Line 61)

Treating women admitted in early labour as not 'in labour' (thereby not giving them the attendant support and observations) until they are admitted to the Labour suite, is a practice found by McCourt, Page, Hewison and Vail (1998), even where admission is delayed due to bed shortages.

When Jill is finally moved through to the Labour suite, she has some Pethidine for pain relief, approx 150 minutes after admission. Although she feels that the Pethidine does not work, she admits that she is in a drugged state –

“Pethidine was hopeless, had no effect at all for me”.
(Appendix F: Interview Notes Jill, Line 94)

"it was all a sort of a drug haze to be honest"
 (Appendix F: Interview Notes Jill, Line 102)

Cunningham (1993) states that mothers who use pain relief express considerably fewer positive feelings about their birth experience than their peers, with McCrea and Wright (1999) and Green and Baston (2003) concluding that the ways in which women are helped to deal with pain affects their perceptions of control. The women in the study talk a lot about pharmacological pain relief in their interviews.

Waldenstrom, Borg, Olsson, Skold and Wall (1996a) claim that a positive birth experience does not necessarily preclude pain and distress (as in Keyra's birth, Case Study 02, p.185). Birth is a multidimensional experience and perhaps midwives, obstetricians and family at a birth should be more aware of the negative aspects of interventions than solely reacting to minimise women's pain

Jill is atypical of the control women having their first baby, 35 (40%) of whom use Diamorphine/Pethidine versus 31 (54%) in the subject women. This is a clinically relevant, with subject women having their first baby 1.4 times more likely to have Diamorphine/Pethidine than control women. However, use of Diamorphine/Pethidine for pain relief between the two groups is not statistically significant, confirmed by $p=0.091$ (Fisher's Exact).

Fifteen minutes after Jill has the Pethidine she has another VE to reassess her cervix, as her contractions have become stronger. On the VE her cervix is 8cm dilated, therefore there is no need for augmentation. Jill is admitted under 4cm dilated, and takes 165 minutes to get to more than 4cm, in actual fact she is 8cm dilated. She is atypical of the control women having their first baby as 45 (51%) are admitted 4cm or more dilated, atypical in taking 165 minutes to get to 4cm or over, as only 7 (16%) of the women who are not 4cm dilated on admission take 165 minutes or less to get to 4cm or over. The difference in women having their first baby admitted already 4cm dilated is clinically relevant, with 45 (51%) of the control women admitted already 4cm dilated compared to 41 (72%) of the subject women. Control women having their first baby are 29% less likely to be admitted already 4cm dilated, with subject women 1.8 times more likely ($RR=1.76$). This is also statistically significant with 95% CI 1.10-2.82, this statistical significance is confirmed by $p=0.005$ (Mann Whitney U test) for time taken to reach 4cm dilatation from admission.

For some reason, unclear in her notes, Jill has another VE forty-five minutes later. This is a prime example of the overuse of VE and verifies the research by Stewart (2005). Jill's cervix has now reached full dilatation, with the presenting part still comparatively high, with the baby's position defined as anterior, the most normal position for birth. She uses gas and air on top of the Pethidine injection at this time. Jill has taken only 45 minutes to get to full dilatation from her first examination at 4cm or greater. She is typical of the control women in that she reaches full dilatation in less than 6 hours. There are no clinically relevant or statistically significant differences between the control and subject women having their first baby in time taken to get to full dilatation from 4cm or more.

The arbitrary division of labour into 3 stages (see Chp. 2; Section 2.3.1.2, p.45) means that by these obstetric technological model definitions Jill is now officially in the 2nd stage, as she has now reached full dilatation. A more holistic definition is waiting until the urge to push is felt or the baby's head (or bottom) is seen at the vagina. The clock for timing of second stage is started and she is encouraged to push 10 minutes later, despite the baby's head being defined as not very low in the birth canal (a need for referral to obstetrician in the Labour Suite Guidelines). Using the Labour Suite Guidelines, she should be left for up to an hour for descent of the baby, before pushing commences. No mention is made in the delivery notes of why pushing is commenced before this time.

Jill does not have Epidural or Syntocinon in the 1st stage of labour, although she has both in the 2nd stage. Use of Epidural and use of Syntocinon are neither clinically relevant nor statistically significant in the 1st stage of labour. Although she has not originally asked for an epidural, Jill feels it is very effective -

“...and I didn't ask for the epidural. But they said, “Well, we think you'd better”

(Interview Notes Jill, Lines 251-252)

A common theme in the interviews with women, regardless of their parity, is the readiness to give up any independence or control to authority figures. It includes concepts such as dependence on others and acquiescence. Kornelsen (2005) finds that hospital birth women feel they are 'flexible' about obstetric technologies but that flexibility creates an opening for the imperatives of technology. A more extreme form of flexibility is the relinquishing of responsibility and control to medical practitioners.

Vande-Vusse (1999b) reports that many women relinquish to authority, on the assumption that midwives/obstetricians' professional knowledge and technological expertise are superior to their own innate knowledge. Women report numerous instances of control in their birth stories, predominantly exercised by midwives/obstetricians, particularly through the application of various obstetric technologies and procedures.

Jill has an Instrumental delivery by vacuum extraction (Ventouse) after 188 minutes of pushing, during which time she is given an Epidural and Syntocinon. Despite Shoulder Dystocia during the delivery (where the shoulder of the baby is impacted on the maternal pelvis), the baby is born in good condition, needs no resuscitation and weighs 3275g. Type of birth is neither clinically relevant nor statistically significant in women having their first baby. Jill is typical in that 34 (39%) of the control women and 23 (40%) of the subject women having their first baby have an Instrumental birth (Forceps or Ventouse). Thompson, Roberts, Currie and Ellwood (2002) suggest the Instrumental births are associated with increased suturing and associated healing times and risk of 3rd degree tears. Normal births as defined by (WHO 1985a) are 30 (34%) in the control women versus 20 (35%) in the subject women, these figures suggest that 65% of women having their first baby are unable to give birth without medical assistance.

Despite being in the hospital only 7 hours 15 minutes before her first child is born, Jill feels that she has a long labour. She does not count the time at home, as she feels that she was coping at home –

*"No, uh it was, I felt the labour was long.... yes, it was hard labour."
(Appendix F: Interview Notes Jill, Lines 136-137)*

*"It was from, if say I was actively, I'd say it was hard from about, about 7 or 8 in the evening. That until she was born that was, really you know, that was hard.... from start to finish it was hard."
(Appendix F: Interview Notes Jill, Lines 141-143)*

This concentration on the hard labour from admission to hospital is reflected in Cunningham (1993) findings that, although in pain, women have more positive views of the birth when they are encouraged to cope, and more negative views when they are using pain relief.

6.4.1 Summary

This case is an example of the lack of consistency faced by women in labour. If not defined as in 'established' labour, often they are not given the one-to-one support that they need to cope. In fact all targets of staffing levels in the joint RCOG/RCM report (RCOG, RCM et al. 2007), and Labour Suite guidelines, only aim to give women one-to-one care when in 'established' labour.

Jill's acquiescence to the midwife's suggestion of an Epidural that she did not ask for is an example of one of the concepts of relinquishing to authority in the study and the literature. Although Vande-Vusse (1999b) argues that it gives her a more positive view of the birth than women who have to contest medical decisions; Cunningham (1993) and Waldenström, Borg, Olsson, Skold and Wall (1996a) argue that the use of pain relief gives her a more negative view of the birth. Epidurals are also implicated in more Instrumental births (Cunningham, F. G., Levenko, K. J. et al. 2001; Illuzzi, J. L., Magriples, U. et al. 2003). The study by Thompson, Roberts, Currie and Ellwood (2002) finds women with Instrumental births (Forceps or Ventouse extraction) report more perineal pain and sexual problems than those with Spontaneous Vaginal deliveries, which in their study also included Normal births as defined by WHO.

The number of premature births, 1 (5%) of the control women having their first baby as opposed to 6 (24%) subject women, is both clinically relevant and statistically significant. Control women are 77% less likely to have a premature birth and subject women 2.3 times more likely. It is a reflection of the previous results for women who having their first baby in the Pilot Study (Chp. 3; Section 3.5.1, p.74), and agrees with other research in this area (Crane 2003; Kyrgiou, Koliopoulos et al. 2006; Bruinsma, Lumley et al. 2007). This answers the secondary outcome – B). Are there differences in number of premature births?

The low numbers of normal births, as defined by the (WHO 1985a), for women having their first baby in the study (35%) are a replication of the findings in the Pilot Study (see Chp. 3; Section 3.5.1, p.74). For women having their first baby the results also answer the secondary outcome – B). Are there differences in type of birth? The answer is that there are no clinically relevant or statistically significant differences in type of birth in women having their first baby.

As in the Pilot Study (Chp. 3; Section 3.5.1, p.74), the difference between control women having their first baby and subject women in time taken to get to full dilatation from 4cm or more dilated, is neither clinically relevant nor statistically significant. Although not used in Jill's case as her membranes have ruptured spontaneously, the practice of the use of Artificial Rupture of Membranes more often in the control women, suggests that their time from 4cm or more to full dilatation is artificially decreased. This intervention is designed to decrease the time in labour and accelerate contractions and cervical dilatation. These results answer the research question – 2). Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour? The results show that it affects the 'passive' phase of the 1st stage.

The study differs from the Pilot study in that there are clinically relevant differences in the time subject and control having their first baby are in the 'passive' phase of the 1st stage of labour, defined in the study as before 4cm dilated. Jill is an example of the 43 (49%) of control women admitted before 4cm dilated. Control women having their first baby are 29% less likely to be admitted already 4cm dilated, with subject women 1.8 times more likely. This difference is statistically significant by the 95% CI and confirmed by $p=0.005$, Mann Whitney U test, for time taken to reach 4cm dilatation from admission.

This particular hospital's practice of sending women home, especially women having their first baby, until well established in labour should have resulted in equal amounts in each group admitted already 4cm dilated or more. Are subject women having their first baby sent home more often as not being in labour? Are they sent home more than once? Unfortunately, this information is missing from the delivery data of most of the participants. This is discussed further in Chapter 7.

These results also answer the research questions – 3). Are the differences clinically relevant? and question – 4). Are the differences statistically significant? The results for admitted already 4cm dilated are both clinically relevant and statistically significant. The results for time from 4cm to full dilatation, although neither clinically relevant nor statistically significant, are confounded by the increase in use of ARM in the control women. This is discussed further in Chapter 7: Discussion.

6.5 Case Study 04: Lynzi, second baby

The fourth study examines the case of Lynzi (not her real name). A synopsis of her birth story is detailed below and the results for women having their second baby in the control women are examined in the light of Lynzi's journey when she gives birth.

Lynzi is a clerical worker with a partner who works in a factory. This is Lynzi's second birth at 29 years of age and she has one previous miscarriage and one previous Spontaneous Vaginal Delivery (SVD). She is a non-smoker who gave up smoking over one year ago.

Lynzi's labour starts with contractions at home at 37 weeks +4 days gestation. She does not want to come to hospital too early, as she has heard that the staff will send her home again. When the contractions are so bad that she needs pain relief Lynzi goes to hospital. She is not seen immediately, despite needing pain relief, and sits in a waiting room with another three women, as the Labour Suite is busy.

When Lynzi has a Vaginal Examination (VE) her cervix is 4cm dilated. She is upset with the midwife who examines her, as the examination is painful. Lynzi is admitted to the Labour Suite, as she is defined as in established labour. She has gas and air for pain relief, which the midwife gives her, but the midwife is only present in the room with her intermittently.

When Lynzi has her next VE, 180 minutes after her initial examination, her cervix is 8cm dilated. At this point, she is using only gas and air for pain relief. The baby's position is defined as right occipital posterior (ROP), which means that the baby was now in a line with it's back to Lynzi's back at the right hand side. At this stage she wishes to have some Diamorphine for pain relief but this is refused, the reason given that the birth of her baby is imminent. She is offered an Epidural instead.

After a further 75 minutes Lynzi has her next VE (15 minutes after the Epidural is given), and her cervix is now 9cm dilated. The position of the baby is defined as once again with it's back to Lynzi's back at the right hand side, and at this VE her membranes are ruptured artificially.

Lynzi's next VE is 15 minutes later and her cervix has now reached full dilatation (10cm). The position of the baby is not defined at this assessment. She has a Spontaneous Vaginal birth a further 165 minutes later. The baby is born in good condition, needs no resuscitation and weighs 4150grams.

This is Lynzi's second birth; she has one previous miscarriage and one previous Spontaneous Vaginal Delivery (SVD). Lynzi is a clerical worker with a partner who works in a factory. In the study, she is typical as all socio-economic groups are represented and she is atypical in that the majority of control women having their second baby have no miscarriages, only 14 (23%) have one miscarriage.

Lynzi is typical of control women having their second baby in that she no longer smokes. Smoking is not found to be correlated with premature birth in the study. There are however clinically relevant differences between smoking status. Control women who are non-smokers (as defined in this study), numbered 40 (65%) versus 18 (49%) of the subject women. Control women are 26% less likely to be smokers, with subject women 1.6 times more likely, but this is not statistically significant.

Lynzi is 29 years old when she has her second baby at 37 weeks + 4 days gestation. This is the mean age for the control women in the study and puts her in the second most common group in the National Statistics (ONS 2007a). The 25-29 age group used to be the most common age at which women gave birth, but was overtaken by the 30-34 age group in 2002. Her labour starts with contractions at home. Lynzi does not want to come to hospital too early –

"I woke up in the morning with pains, my partner wanted to take me to hospital but I said to wait, 'because I've heard that they send you home if you're not far on.'"

(Appendix G: Interview Notes Lynzi, Lines 7-8)

Women in early labour are often sent home to await further progress and this is the practice in the study hospital. From Lynzi's comments, women in the community have discussed this policy and have tried to accommodate it in their labour plans. Lynzi feels that she is not well treated while she waits to be assessed in the hospital, as she only goes in to have some pain relief and she is not given any while she waits—

“Just the pains but they were bad and I needed something for the pain but they wouldn’t give me anything. I had to wait ages before anyone saw me ‘because it was busy, there was about 4 of us in that tiny waiting room all in pain, it wasn’t fair.”
(Appendix G: Interview Notes Lynzi, Lines 14-16)

Women are treated in early labour as not ‘in labour’. They do not have the attendant support and obstetric checks until they are admitted to the Labour Suite, even where admission is delayed due to bed shortages or staffing levels (McCourt, Page et al. 1998).

Green and Baston (2003) define negative attitudes as staff that are unhelpful, rude, offhand, bossy, insensitive, inconsiderate and condescending or any selection of these. This confirms previous research by Fowles (1998) that defines negative attitudes as perceived rude behaviour, uncaring interactions and undesired actions. Negative attitudes from midwives/obstetricians affect the way women perceive themselves during the birth, and Simkin (1996) and Waldenstrom (2003) claim this has long-term affects on women. Lynzi’s VE is an example of such negative attitudes -

“She (midwife) checked me to see if I was far on or not and it hurt but she kept doing it. Finally she let me have some gas and we went through to a room.”
(Appendix G: Interview Notes Lynzi, Lines 17-18)

When Lynzi is admitted her cervix is 4cm dilated on VE, is not effaced, as it is still more than 2cm long, is firm, the position of the cervix is posterior and the baby’s head is high, with her membranes intact. The position of the baby is defined as at right angles to the mother’s abdomen. This means the baby will need to turn to be with it’s back to Lynzi’s abdomen, to be in the best position for the birth. Lynzi is admitted already 4cm dilated and this is typical of the control women having their second baby in the study, with 39 (63%) already at 4cm dilated on admission. There are no clinically relevant or statistically significant differences between the control women and the subject women, with 22 (60%) of subject women admitted already 4cm or more dilated.

After a couple of hours Lynzi is finally taken to the Labour Suite and given gas and air for pain relief –

*"I wish I'd had my mum with me because the midwife was in and out and it was only me and him. And the pain was getting worse."
(Appendix G: Interview Notes Lynzi, Lines 22-23)*

According to Simkin (1996), the quality of emotional support given by midwives to women, which includes the presence or absence of kindness, respect, and thoughtfulness during the emotional crisis of birth, influences the woman's ability to use her coping skills. Fisher, Hauck and Fenwick (2006) confirm previous research by Simkin (1992), Waldenstrom, Borg, Olsson, Skold and Wall (1996a) and Fowles (1998) that absence instead of presence by a midwife has a negative affect on a woman's perception of her labour, and presence has a positive effect. Despite Lynzi being in 'established' labour', she is not given one-to-one care until later.

Lynzi's next VE is 180 minutes after the previous one and she is using only gas and air for pain relief. At the VE her cervix is 8cm dilated, fully effaced, is soft and in a central position, the baby's head is still high. The baby's position is defined as posterior, which means that the baby's back is to Lynzi's back. At this stage, she wishes to have some Diamorphine for pain relief but this is refused, and she is told that the reason for refusal is that the birth of her baby is imminent, and given an Epidural instead. However, the birth it is not imminent as it takes 60 minutes before she has the Epidural. Use of Epidural for pain relief is not statistically significant between the two groups of women having their second baby. However this is clinically relevant in that 19 (31%) in the control women versus 7 (19%) of the subject women have Epidurals, which often lead to more complications (Illuzzi, Magriples et al. 2003; Walsh 2008). Control women are 1.2 times more likely to have an Epidural and subject women 34% less likely.

Lynzi acquiesces to the midwife's views about her pain relief-

*"I wanted the injection but she said it was too near, the birth, to have it so I got an Epidural. But she stayed with me after that."
(Appendix G: Interview Notes Lynzi, Lines 26-27)*

*"I'd had that (the epidural) the first time but I thought I'd manage with the injection this time."
(Appendix G: Interview Notes Lynzi, Line 31)*

Acquiescence to midwives/obstetricians is one of the concepts of relinquishing to authority in the study and reflects the work done in this area by Vande-Vusse (1999b), who finds that women have more negative views of their birth if they have

to adapt to midwives/obstetricians views when they do not agree with them. Waldenstrom, Borg, Olsson, Skold and Wall (1996a) claim that even when women experience severe pain, most are satisfied with their own achievement if they think they have coped better than expected. Their findings confirm the multidimensional character of the birth experience, and that women's assessment of their childbirth is influenced by both physical and psychosocial factors, which highlights the importance of a holistic approach to care in labour.

When Lynzi has her next VE, seventy-five minutes later and fifteen minutes after having the epidural, her cervix is now 9cm dilated, with the baby's head now slightly lower, with the position of the baby still defined as back to Lynzi's back. At this VE, she has her membranes ruptured artificially. Use of ARM is clinically relevant with 24 (39%) of the control women having their second baby versus 8 (22%) of the subject women. Control women are 1.3 times more likely to have ARM and subject women 42% less likely, but this is not statistically significant.

Lynzi's next VE is fifteen minutes later. At the examination her cervix has now reached full dilatation (10cm) with the presenting part still at the same position in the birth canal, the position of the baby is not defined at this assessment. Despite the hospital policy of VE every 4 hours, the frequency of VE in the study is more frequent, which confirms the findings of Stewart (2005). In Lynzi's case, her VE's are after 3hrs, 1hr 15minutes, and 15 minutes. Frequent VE's have been shown to increase a woman's expectations for progress in labour that may not be realistic; they are also uncomfortable examinations and increase the risk of infections (Farrington and Ward 1999).

The time it takes Lynzi to go from 4cm dilated to full dilatation is 270 minutes. This is longer than is typical of the control women having their second baby, with 31 (50%) who reach full dilatation after 125 minutes, and another 21 (34%) after 270 minutes. There are clinically relevant differences in time taken to reach full dilatation with 54 (87%) of the control women having their second baby and 34 (92%) of the subject women taking less than 6 hours. Control women are 15% less likely to reach fully dilated in less than 6 hours and subject women are 1.4 times more likely, but this is not statistically significant.

Lynzi gives birth vaginally 166 minutes later. The baby is born in good condition, and needs no resuscitation and weighs 4150grams. It is not a Normal birth as defined by WHO (WHO 1985a) (see Chp. 3; Section 3.5.1, p.75), as she has ARM and Epidural. It is described as a Spontaneous Vaginal birth instead. In this, she is atypical in the study as only 19 (31%) of control women having their second baby, have Spontaneous Vaginal birth. There are no differences between the groups in Spontaneous Vaginal births, with 10 (27%) of the subject women also having Spontaneous Vaginal births. Type of birth is clinically relevant between the women having their second baby, but in Normal births and Instrumental births. Control women are 21% less likely to have a Normal birth and subject women 1.5 times more likely, but this is not statistically significant. Control women are 1.4 times more likely to have an instrumental birth and subject women 62% less likely, this is also statistically significant.

6.5.1 Summary

Despite low staffing levels, evidenced in Lynzi's birth story as being left alone, it is important that midwives understand the importance of the positive influence on a woman's labour experience that the supportive presence of the midwife brings (Simkin 1992; Waldenstrom, Borg et al. 1996a; Fowles 1998; Fisher, Hauck et al. 2006). Lynzi did not feel reassured until the midwife stayed with her during her labour. It is also important to understand the long-term effects of a negative birth experience, in terms of Postnatal Depression and symptoms of PTSD, and that negative experiences intensify over time (Prince and Adams 1987; Simkin 1996; Creedy, Shochet et al. 2000; Soet, Brack et al. 2003; Waldenstrom 2003). These are discussed more fully in Chapter 7.

Women in early labour are often sent home to await further progress and this is the practice in the study hospital. Women who are not defined as in 'established' labour are sent home and not offered pain relief or support (Labour Suite Guidelines). From Lynzi's comments, women in the community have discussed this policy and have tried to accommodate it in their labour plans. Interestingly more control participants having their second baby have their labour induced or augmented, 12 control women versus 2 subject women. In the study subject women, whether having their first or second baby, are 1.8 times more likely to go into labour spontaneously, it is

also statistically significant. This answers the secondary outcome D). Are there differences in onset of labour?

As discussed in Chapter 5: Part Two; Section 5.2.3.2.3, p.162, 'established' labour is a concept that depends on the midwife's philosophy of normal labour. In the new guidelines from NICE, the definition is increased from 3cm dilated with contractions to 4cm dilated (NICE 2007). This puts midwives under further pressure to refuse admission to women who require support in labour, as their cervix is not that 4cm dilatation. This again places guidelines against clinical judgement and which will prevail will depend on the real autonomy of midwives and obstetricians. This is discussed further in Chapter 7.

Lynzi's does not have a premature birth. Three (5%) of the control women having their second baby give birth before 37 weeks gestation, compared to 9 (24%) of the subject women. The results for premature birth are both clinically relevant and statistically significant with control women 63% less likely to have a premature birth and subject women 2.3 times more likely. This confirms the findings from the Pilot Study and the meta-analysis by Kyrgiou, Koliopolis, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006).

Control women are 1.4 times more likely to have an Instrumental birth, with subject women 63% less likely. This answers the secondary question A) Are there differences in type of birth? The findings of differences in type of birth, with control women having more Instrumental births and less Normal births as defined by WHO (1985a) does not agree with the Pilot Study or the findings from Tan, Pepra and Haloob (2004).

The length of time women are in the 'passive' phase of the 1st stage of labour, defined in the study as before 4cm dilated, is neither clinically relevant nor statistically significant. The results for time from 4cm or more dilated to full dilatation, finds clinically relevant differences, and confirms the Pilot Study results that LETZ women take less time to get to full dilatation. Control women having their second baby are 15% less likely to take less than 6 hours to reach full dilatation from 4cm dilated and subject women 1.4 times more likely. However, this is not statistically significant. The interventions of ARM and Syntocinon, which are used to accelerate

contractions and progress in labour, are clinically relevant in women having their second baby. Lynzi is typical of control women in having ARM as ARM and Syntocinon are used more often in the controls. This suggests their time from 4cm or more to full dilatation is artificially decreased. This confounds the results. The increased use of ARM and Syntocinon is reflected in the differences in type of birth as these interventions often lead to foetal distress or need for greater pain relief, which leads to an Instrumental birth (Illuzzi, Magriples et al. 2003; Walsh 2008). This is discussed more fully in Chapter 7: Discussion.

Chapter 7

Discussion

7.1 Introduction

Chapter 6 discusses the findings of all elements of the study and examines those findings in the light of the journeys of four women giving birth. That Chapter brings together the strands of the study, the quasi-experimental case control study, the interviews with women and with midwives and the effects of the guidelines used by midwives and obstetricians to make decisions during a birth.

Chapter 7 discusses the points made earlier more fully, incorporating the previous research in these areas and the perspectives that research represents. This Chapter discusses the complex of perspectives that surround assessment and management of labour, which have produced conflicts and tensions within the study and in midwifery practice in general. It discusses the effects of the screening programme for CIN in the UK. Chapter 7 discusses the study results in more depth, including the secondary outcomes. This Chapter concludes by discussion of the limitations of the study.

7.2 Labour, guidelines and perspectives

Birth has remained the same physiological process over the ages. However, it is influenced by the attitudes current in our culture towards women and infants. The ability of our species to push the boundaries in Intensive Care medicine, Neonatal Care medicine, Foetal medicine and In Vitro fertilisation, has influenced cultural attitudes towards life, death and acceptable risk. This change in society's attitudes often alters individual's perceptions of birth (Simkin 1996).

With the movement of birth from the home to hospital, after the Peel Report (Peel 1970), midwives soon emulated the obstetric technological model, written into hospital procedures and guidelines. This led to the adoption of the practice of routine vaginal examination (VE) of the cervix. This practice of *routine* VE has no justification other than as a tool for active management. Prior to this practice of routine VE, midwives would occasionally find indications that would prompt a VE (Stuart 2000). Today it is unusual to find mention of anything but cervical dilatation, as documentation of progress in any midwifery notes. This practice is widespread; despite midwifery texts that state that abdominal palpation before VE is best

practice. Vaginal examination (VE) and measurement of the dilatation of the cervix has proved to be unpleasant for women, used unnecessarily when there are no problems in labour and is an imprecise measurement of progress (Farrington and Ward 1999; Lai and Levy 2002; Stewart 2005; Buchmann and Libhaber 2007). An imprecise measure is the exact flaw obstetricians use to dismiss midwifery methods of assessment. Although the guidelines in the study hospital state 4 hourly VE, in this study, as previously mentioned, they are performed more frequently which confirms the research by (Stuart 2000).

Obstetricians like others in the medical profession, dislike uncertainty. That uncertainty led them to divide labour into discrete parts and define the progressive phase at 3cm dilatation. These definitions and divisions give reassurance that labour can be controlled but these definitions are not evidence based. The best indication for that lack of evidence is the varied definitions of 'normal labour' and 'dystocia' throughout units in the UK and indeed throughout nations of the world (Gould 2000). Fixed parameters potentially lead to inappropriate management of individual women. Therefore, midwives need to consider what can be done to avoid unnecessary intervention, with the associated iatrogenesis, in relation to care in labour (Cluett 2000). As this study shows, there are already iatrogenic affects from LETZ introducing more would be inequitable.

Although medical education and textbooks place a low value on authority and a high value on evidence in decision making, practice is often still based on 'expert opinion', that is - what experts think is right, will be right (Peterson, Meikle et al. 1999). Established labour has now changed definition via the NICE guidelines from 3cm to 4cm of cervical dilatation with regular contractions (NICE 2007), **without any evidence for that re-statement**. That re-statement owes more to workload and CS rate management than definition of labour (NICE 2007). It seems to have not occurred that perhaps their definition of 'normal' time frames against which dystocia is judged needs re-examined. More women excluded from Labour Suites until well established in the progressive stage of labour, decreases the workflow in the Labour Suites throughout the country. It is reminiscent of the practices in the 1960's and 1970's of induction of all women at 38-40 weeks during working hours which reduced staffing commitments. In fact all targets of staffing levels in the joint RCOG/RCM report (RCOG, RCM et al. 2007), and Labour Suite guidelines, only

aim to give women one-to-one care when in 'established' labour. As seen in Chapter 5: Part Two; Section 5.2.3.2.3, p.162, 'established' labour is a concept that depends on the midwives/obstetricians view of normal labour. Different views of progress in labour reflect the different paradigms at work in the practice of midwifery and obstetrics. Definition of regular contractions and assessment of progress in the 1st stage of labour is extremely subjective. Yet these continue to be the criteria for admission in established labour and progress in the 1st stage of labour.

Unfortunately, the hegemony of the medical technological model means the diagnosis of labour and progress in labour is from dilatation of the cervix, often to the exclusion of all other indications.

In management of the 1st stage of labour issues the first baby is labelled as 'problematic', the medical view that a normal labour is only possible in retrospect (Al-Azzawi 1998; Scott, Saia et al. 1999). Therefore, management of women having their first baby are even more proscriptive than for other women. Women having their first baby and women having their second baby behave fundamentally differently in labour, which is reflected in the two different Friedman curves or labour patterns for women having their first or other births (Dudley 1999). Some recent research states that women having their second baby are 5 hours less in the 'progressive' phase of the 1st stage of labour (Vahratian, Hoffman et al. 2006). The Labour Suite Guidelines; Section 5.4, and Intrapartum Care Guidelines; Chapter 7 (NICE 2007) barely differentiate between the two sets of mothers in the 1st stage of labour, but historically and in practice obstetricians and midwives do and always have.

Progress in labour has a serious impact on a woman's birth. If a woman's labour does not conform to the set parameters her labour is augmented, which often leads to compromise of the baby, increased use of pain relief, such as Epidural, and increased Instrumental birth or Caesarean Section (Howell, Kidd et al. 2001; Illuzzi, Magriples et al. 2003; Dudley 2008; Steer 2009). These interventions often have long term effects on the woman (Fowles 1998; Creedy, Shochet et al. 2000; Thompson, Roberts et al. 2002; Soet, Brack et al. 2003). Where is the evidence that 'prolonged' labour without interventions is bad? Lavender, Alfievic and Walkinshaw (1998), whose research concludes that the CS rate is decreased markedly if women's labours are allowed to deviate from the 'normal' time frames by up to 4

hours before any interventions, although well published, did not change obstetric practice. Gaskin (2003) documents the outcomes for 2,000 women and has no more adverse effects than the general population, although the mothers she and her colleagues care for have no arbitrary time limits applied to their labours.

Experienced midwives know that from pregnancy to labour, from passive to progressive stages of labour is a seamless transition and artificial divisions are only used for clinical management purposes and are not physiological markers. If labour onset is a seamless transition from pregnancy, which involves a cascade of events that culminate in birth, there will be multiple control mechanisms and 'fail-safe' pathways as is the case in other complex biological systems (Cluett, E. 2000). Although there is increasing knowledge about uterine function and the processes of labour, precise mechanisms remain obscure and incomplete. Why is there no standard of dystocia/prolonged labour? Linear solutions, such as established labour is 3-4cm and progress is 1cm per hour, are over simplistic for the complexities in childbirth.

The redefinition in the new guidelines from NICE further pressurises midwives not to admit women who are already requiring support in labour, as their cervix has not reached that 4cm dilatation. This again puts guidelines against clinical judgement and which prevails is dependent on the real autonomy of midwives and obstetricians. Unfortunately, the obstetric technological model is pervasive within hospital settings and when combined with a risk averse culture that is dominated by guidelines and protocols in an attempt to avoid litigation and so minimise insurance claims, results in a negation of clinical judgement and experience of practitioners.

Reliance on protocols and guidelines, instead of clinical judgement is the reason most midwives no longer practice as autonomous practitioners. It is important to remember that midwives are working under constraints in the health care system that has evolved risk management into a risk averse community. The difference between guidelines, that allow midwives and obstetricians use of their clinical judgement about a woman's care and protocols, which are defined by the hospital management and have to be adhered to, is not in most midwives conscious thought. Unfortunately, rigid adherence to guidelines treats them as protocols. These guidelines make no mention of the woman's knowledge and are proscriptive even

when stating that clinical judgement can be used. They are heavily biased towards the medical technological model of birth and contain very little from a holistic midwifery model. Reliance on expert opinion is still prevalent in local and national guidelines, but is now hidden in the hundreds of pages of these documents, leaving practitioners no choice but to use them all as if they are from the latest research evidence base. The question must be asked - is this intentional? To remove choices from practitioners, to ensure that the guidelines are applied rigidly, serves a particular set of values.

Why do midwives practise in this way? Why is the technological model prevalent? Midwives and obstetricians are part of society and are therefore not immune from the influences on society. Society uses technology to a greater or lesser extent in all daily activities, and society is used to viewing technology as being 'better' than what went before. Technology comes from science and so must be good, but good science is not the mindless application of technology. Good science is testing technology before it is introduced in an objective manner to see if it improves what it sets out to improve, and obstetric technology has mostly been introduced without this testing. Midwives who promote birth without complications, who rely on an ethos of watchful expectancy and who see themselves as the woman's advocate have their practice constrained by these guidelines. However, as seen in Keyra's birth story, where the midwife makes autonomous decisions, there are still some midwives confident enough to practice in a holistic midwifery manner.

It is within this environment that the study is located, and this environment is reflected in the pragmatic adoption of some of the methods used. The technological and paternalistic 'experts know best' culture impacts on care of women after LETZ, and on the information they are given with respect to the effects LETZ may have on their labour. This rigid application of guidelines, that reflects the obstetric, technological model of care in labour, is not in the best interests of women after LETZ with its concentration on dilatation of the cervix. A more holistic, midwifery approach to their care takes cognisance of other signs of progress apart from cervical dilatation.

7.3 Screening, LETZ and HPV vaccine

Why has the screening process persisted unchallenged? Smears and colposcopy treatments have been around since the start of the 20th Century. In those 80-90 years since no attempt has been made to develop a less invasive way of checking for pre-cancerous cells in the cervix, despite women finding the smear and colposcopy examinations embarrassing and painful. Is the lack of progress in finding a non-invasive way to check for pre-cancerous cells a legacy of the medical profession's historical view of women's genitals as being imperfect (Merchant 1990; Kitzinger 1992) and available for examination and scrutiny, even if it has detrimental effects on the woman?

Screening of the cervix for CIN is seen as the major part of preventing Cervical Cancer, despite the fact it diagnoses only one-third of the cancers of the cervix reported each year (Cervical Cancer Register 2004), implying that two-thirds of the cancers are in women who do not attend the screening programme or whose cancers develop between screening episodes. Since the screening programmes inception, cervical smears have been hailed as the definitive way to screen for cervical cancer and the abnormalities in the cells that may lead to this cancer. This continues to be the case, with Rosie Winterton, Minister of State for Health Services stating in 2007 –

*“Cervical screening is the only proven method of detecting cervical cancer early”
(Patnick 2007)*

This kind of statement further adds to the inertia of research into developing a less invasive way of screening, such as the screening for prostate cancer in men.

Why is the use of 'See and Treat' continuing, why is the good evidence against it not followed? Is this another example of non-evidence based practice? Women finding the process of screening embarrassing and often painful is one of the reasons only 80% of women invited for screening actually attend (Patnick 2007). In the latest figures one million women choose not to attend (ONS 2007b). In the last decade there has been a continuing decline in the numbers of the most at risk group of 24-35 year olds who attend. If women proceed to a visit to the colposcopy clinic for treatment they find a sample biopsy for definition of CIN (punch biopsy) so

embarrassing and painful that they often do not return for further treatment, which has led to the adoption of 'See and Treat' policies (Errington 2003), despite this policy contributing to over-treatment (Martin-Hirsch, Paraskevaidis et al. 2000). Given that the majority of subject women having their second baby after treatment for CIN 3 are treated on a 'See and Treat' basis, adds impetus to the call to restrict this form of treatment, and to develop other ways of screening for CIN. The latest research to emerge on HPV screening alone for the over 35 years age group is a start, but does not mitigate the effects of diagnosis of CIN 3 and LETZ in the most at risk age groups.

Changing demographics of abnormal smears, with the highest number having CIN 3 in the 25-29 age group (ONS 2007b), and changing demographics in the age at which women give birth, with the highest numbers in the 30-34 age group (ONS 2007a), mean that more women will have LETZ before giving birth. This reinforces the importance and timeliness of the study. Apart from the emotional costs to women after LETZ, the study shows there are also other costs to the women, paid during their labours, of changes in the progress of the 1st stage of their labours and an increase in premature births. Changes in the pattern and progress of their labours that women are not counselled about before their treatment, an extension of the 'experts know best'.

Why did colposcopists and obstetricians continue to state in 2005 that labour was not affected? (Colposcopy .org 2005). The research up to that point was ambivalent, but the meta-analysis in 2003 by Cruikshank, Flannelly, Campbell and Kitchener (1995) did claim adverse effects. The ripening of the cervix, the changes in size and consistency during pregnancy that are thought to facilitate a normal birth, is discussed in the literature review in Chapter 1: Section 1.4.3, p.22. As the study shows, excision of tissue during LETZ affects the cervix during labour. Due to the lack of knowledge of the mechanisms involved in the way the cervix functions in labour, the precise reasons why the cervix is affected are unable to be defined.

It is difficult, at first, to see why, in context of anatomy of the cervix, there is a difference after LETZ between women having their first baby, and women having their second babies but first after LETZ. The acknowledgement by obstetricians and midwives that the cervix is changed after a woman gives birth, may be the reason

for the different effects and the different approach to treatment in women who have never had a baby and women who have had a baby. If the cervix never returns to its pre-birth state (always remaining 1-2cm open), then what other changes in the cervix remain? In the women who have a premature birth, women having their first baby have a punch biopsy first and women having their second baby have 'See and Treat', all for CIN 3. Why is there a difference in approach? Is there a difference on the appearance of the cervix through the colposcope? This difference in approach may contribute to the reasons for the differences in effects between women having their second baby and women having their first baby after LETZ.

7.4 Premature birth, type of birth, low birthweight and onset of labour

The differences between the groups in premature birth are clinically relevant and confirm previous research that indicates increased premature births after LETZ. Subject women having their first, or second, baby are 2.3 times more likely to have a premature birth, these results are also statistically significant.

In the premature births of subject women having their first baby, only the practice of 'See and Treat' at the same clinic visit is absent. All of the subject women having their first baby who have a premature birth have a punch biopsy first to define CIN. There is no significant correlation between premature birth and depth of tissue excised. However, the fact that these women who have LETZ also have at least one punch biopsy first, and that 3 of the 6 have LETZ for CIN 3, indicates a possible correlation with total area excised as opposed to depth alone. This is a point also made by Bruinsma, Lumley, Tan and Quinn (2007).

In the premature births of subject women having their second baby, 7 of the 9 premature births have LETZ for CIN 3. Five of that 7 who have CIN 3 have their LETZ performed at first visit ('See and Treat') and therefore have no definition of CIN before LETZ. Subject women having their second baby and have CIN 3 are 3.4.times more likely to have treatment at first visit, than subject women having their second baby who have CIN 2 or CIN 1, although this is not statistically significant. Changes in the cervix after childbirth may alter the appearance of the area of

abnormal cells such that the colposcopist is inclined to remove a larger area. This again points toward a correlation with total area excised.

The findings of premature birth in both women having their first baby, and women having their second baby, is also reflected in the findings of more low birthweight babies in the subject women. For subject women having their first baby Relative Risk cannot be calculated as no control women have a low birthweight baby. The difference is highly statistically significant using Pearson Chi-square ($p=0.005$). Subject women having their second baby are 1.5 times more likely to have a baby below 2500g in weight, but this is not statistically significant. There are no correlations in the study between Socio-economic factors and premature birth.

There are clinically relevant differences in women having their second baby, but not women having their first baby, in type of birth; especially with regard to Normal and Instrumental births. Subject women having their second baby are 1.5 times more likely to have a Normal birth but this is not statistically significant. Control women having their second baby are 1.4 times more likely to have an Instrumental birth and this is statistically significant. The increased use of Syntocinon in control women having their second baby may be the reason for the increase in Instrumental births in this group. Syntocinon accelerates the number and strength of contractions and increases the stress on the foetus (Dudley 2008), it also leads to the need for more pain relief, often an Epidural. Both foetal distress and Epidural lead to more Instrumental births (Howell, Kidd et al. 2001; Dudley 2008).

Type of birth is not clinically relevant nor statistically significant for women having their first baby. Twenty-three of 57 subject women (40%) and 34 of 88 (39%) control women having their first baby, who have Instrumental births is of concern, as these births increase the risk of vaginal or perineal trauma, damage to the anal sphincter (3rd degree tears) with associated bowel problems and sexual problems (Thompson, Roberts et al. 2002). Is this the reason Thompson, Roberts, Currie and Ellwood (2002) study finds that women having their first baby are more likely than other women to report these types of problems. Also of concern is the 65% of first time mothers who are deemed incapable of giving birth without medical intervention. The very low numbers (35%) of women having their first baby who are seen as not needing any kind of intervention to aid them to give birth is very worrying for the

midwifery profession and women in general. What has become of our species that it is now so unsuccessful at reproduction? When did more than 6 out of ten women fail to give birth unaided? If the human species were that unsuccessful at giving birth there would not be so many people on the planet. Is it a reflection of the medical view that birth is only normal in retrospect, and of the arbitrary time limits applied to labour? If labour takes 3 days (as stated in O'Driscoll, Meagher and Boylan, 1995), as long as women have sufficient support, does it really matter?

Onset of labour is calculated for all women in the group before removal of cases with confounding variables and division into parity. It is clinically relevant with subject women 1.8 times more likely to go into labour spontaneously and control women 20% less likely. This is also statistically significant. Eleven of 111 (10%) subject women have their labour induced or augmented compared to 42 of 214 (20%) control women. Why this should happen is unclear, but may be related to the increase in Premature Rupture of Membranes in subject women that is a finding in previous research by Bruinsma, Lumley, Tan and Quinn (2007).

7.5 Time in the 'progressive' phase of the 1st stage of labour

The 'progressive' stage is defined in the study as from 4cm dilated to full dilatation. The subject women having their second baby are 1.4 times more likely to take less than 6 hours to reach full dilatation, a clinically relevant difference. Although clinically relevant, the results are not statistically significant, but these results are confounded by the accelerative interventions of ARM and Syntocinon used more often in control women having their second baby.

Why do subject women having their second baby reach full dilatation from 4cm in less time and why is the time taken related to grade of CIN? All 25 of the 37 subject women, who have LETZ for CIN 3, take less than 6 hours. These subject women take less time to get to fully dilated than women with CIN 1 or CIN 2. This is confirmed by a good, highly significant negative correlation between CIN 3 and time to get from 4cm to fully dilated. Given that it is widely stated that degree of CIN is analogous to severity seen on visualisation by colposcopy, is that severity on visualisation particularly severe in appearance if not only the women have CIN 3 but also have a previous birth? Do colposcopists remove a larger total area of tissue

because of that altered appearance of the cervix? The visual appearance is important for these women as the majority of subject women who have their second baby and were diagnosed as CIN 3 had LETZ before confirmation of CIN ('See and Treat' – see Chp. 1; Section 1.4.1, p.18), therefore, treatment is based on visualisation only.

The interventions of Syntocinon and ARM are used more often in control women having their second baby, to accelerate contractions and accelerate progress in labour. Control women having their second baby are 1.5 times more likely to have Syntocinon and control women are also 1.3 times more likely to have ARM, these are both clinically relevant but only the use of Syntocinon is statistically significant. Although the difference between the groups in time taken for women in the 'progressive' phase is clinically relevant, it may also have been statistically significant if the times for the control women having their second baby were not artificially decreased by the use of Syntocinon and ARM. The increased use of these interventions confounds the results for time in the 'progressive' stage of labour. This increased use of interventions is reflected in the differences in types of birth, as these interventions often lead to foetal distress and need for Instrumental birth (Dudley 2008).

Although the difference between the groups in time women took in the 'progressive' phase is not clinically relevant or statistically significant in women having their first baby, this result is also confounded by the increased use of ARM in the control women. Control women having their first baby, are 1.4 times more likely to have ARM, this is also statistically significant.

As there is no correlation with depth for progress in labour (or premature birth), this author posits that total area of tissue excised may be the key factor. This speculation is also formulated by Leiman, Harrison and Rubin (1980), Raio, Ghezzi, Naro, Gomez and Luscher (1997), Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) and Bruinsma, Lumley, Tan and Quinn (2007). As Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis and Bruinsma, Lumley, Tan and Quinn note, there is a need for further research taking note of the volume of cervical tissue excised. Unfortunately, width of excised tissue

is no longer routinely recorded in the study hospital, and not in many other hospitals according to other research in this subject (Kyrgiou, Koliopoulos et al. 2006)).

7.6 Time in the ‘passive’ phase of the 1st stage of labour

The definition of ‘passive’ phase in the study is from admission until 4cm dilated. The difference between the groups in time women are in the ‘passive’ phase of labour is clinically relevant for women having their first baby. Subject women having their first baby are 1.8 times more likely to be admitted greater than 4cm, it is also statistically significant. Why are subject women having their first baby admitted later in their labours?

The common practice in the study hospital anticipated the new guidelines from (NICE 2007), with women already being sent home until they are 3-5cm dilated. Given this practice, the numbers admitted more than 4cm should have been similar for both groups. As accurate notes of women’s pre-admission examinations, when they are examined and sent home, are not available (see Chp. 5: Part One; Section 5.1.3.3.9, p.122), it is impossible to ascertain why this is so. Women not being admitted until later in their labours, is an important emerging issue in the study.

Ripening and dilatation of the cervix is the sole measure for women being sent home as not in labour and women after LETZ are not admitted until further in their labour. The reasons for this are speculative, but LETZ obviously changes the appearance/function of their cervix, as indicated by the study results for progress in labour and premature birth. This change in appearance may result in vaginal examinations that determine that they are not in established labour. This is compounded by the new guidelines re-stating established labour as 4cm dilated. The difference in times for women having their second baby in the ‘passive’ phase is neither clinically relevant nor statistically significant.

7.7 LETZ and the effect on women’s experiences

If women are defined as not in ‘established’ labour, they are often not given the one-to-one support that they need to cope, as seen in Chp. 6: Case Study 04 Lynzi, p.209. Women are sent home, to await further progress and not offered pain relief or support. From Lynzi’s comments, women in the community have discussed this

policy and tried to accommodate it in their labour plans. The difference in approaches to management of women having their second baby and women having their first baby is most probably the reason that Keyra is allowed to stay in the labour suite, although she is not in established labour by the guidelines. It is unlikely that a woman having her first baby would have been accommodated so readily, indeed the figures from the study show that subject women having their first baby are 1.7 times more likely to be admitted after 4cm.

All targets of staffing levels only aim to give women one-to-one care when in 'established' labour (RCOG, RCM et al. 2007). Under the new NICE guidelines, the definition increases from 3cm to 4cm dilated and will put midwives under further pressure to send home women who are already requiring support in labour (NICE 2007). Yet midwifery artistry (see Chp. 1; Section 1.3.1, p.7), an important component of midwifery practice, educates midwives to appreciate a woman's situation and provide whatever the woman requires to restore or extend her ability to cope with the demands of childbirth (Carper 1978). These differing views of care to be given to women set guidelines against clinical judgement and which prevails will depend on the real autonomy in practice of midwives and obstetricians.

Ignoring women through the vital stage of early labour is often counter-productive. Endogenous forms of pain relief are released during labour which helps a woman to cope, but higher levels of stress inhibits the woman's ability to cope (Cluett 2000). Women turned away from a maternity unit when they come for help and reassurance will logically increase their levels of stress. Adequate support acts as a buffer to stress, however not all women left to labour at home have the quality of support needed to reduce the stress of labour and so will return unable to cope, with the resultant increase in pharmacological forms of pain relief. The language used when their bodies have not conformed to the medical establishment's set parameters of 'normal' affects women negatively (Bastion 1992; Zander 1997; Fowles 1998; Green and Baston 2003; Kitzinger 2004). They are made to feel a failure and powerless. This language of medical labour includes being told they are not in labour when they have not conformed to the definition used in the obstetric, technological model of 'established labour'.

The different themes that emerge from the women and midwives' interviews are not surprising given that their focus on labour is from different perspectives. A woman's assessment of her birth experience concentrates more on the result but also includes the process. A midwife's assessment of a woman's birth concentrates more on the process, and the ability to have eased the woman's pain. It is therefore vital for midwives to see beyond the process of labour and understand the importance of a woman's assessment of her birth experience. The woman's birth experience will be remembered by her for years into the future (Simkin 1992). When women are supported to give birth naturally, a birth that unfolds the way a woman wishes is a profound experience. Women prefer to use the terminology "delighted" and "devastated" instead of the bland "satisfied" and "dissatisfied" terms often used to describe birth in satisfaction surveys (Proctor 1998). Many women find the experience of birth empowering, it increases their self-esteem and confidence and seems to last long term (Davis-Floyd 1990; Edwards 1997b). An increase in confidence and self-esteem provides a good foundation for parenting.

Midwives and managers need to understand the importance of the positive influence on a woman's labour experience that the supportive presence of the midwife brings (Simkin 1992; Waldenstrom, Borg et al. 1996a; Fowles 1998; Fisher, Hauck et al. 2006). Low staffing levels mean that one-to-one care is not always possible (as in Chp. 6: Case Study 04: Lynzi, p.209), but midwives should fight to get this rectified. Midwives need to be equally aware of the link between negativity experienced by women and the helplessness they feel and Postnatal Depression and PTSD symptoms after the birth (Creedy, Shochet et al. 2000; Soet, Brack et al. 2003). This negativity and helplessness experienced by women should be a reminder to the midwifery profession not to treat the process of labour too lightly. The process of labour may be normal or commonplace to midwives, but women do not understand that normality and reassurance is needed, even when not specifically asked for (Proctor 1998).

The focus on pharmacological methods of pain relief by women is a blow to the campaign for 'normality' in maternity units (Fraser 2007), as reliance on Epidurals to 'retain control' seems to be preferable. The way women deal with the pain of labour and the way midwives help them through that pain, with this focus on pharmacological pain relief, may be a reflection of the lack of realistic preparation for

labour and/or the organisation of midwifery services with their dependence on technology. It may be a reflection of the staffing levels in the Labour Suite, or the dependence on technology by society, that looks to it for a quick fix for whatever ails. It may also be a reflection of women being admitted later in their labours and left to cope at home without the right kind of support. Then, when they are eventually admitted, they are not coping. This leaves them more than ready to acquiesce to technology to relieve their pain. Faith's assessment of her ability to cope without Epidural (Chp. 6: Case Study 01: Faith, p.172), is an example of the lack of alternatives to technology presented to women (Kornelsen 2005). It is also an example of the lack of information given regarding Epidurals leading to increased length of labour, increased malpositions in labour, increased Instrumental births and increased CS (Howell, Kidd et al. 2001; Illuzzi, Magriples et al. 2003; Steer 2009).

Midwives need to remember that women's birth experiences are less positive after using pain relief, and satisfaction often includes coping with pain in labour (Cunningham 1993; Waldenstrom, Borg et al. 1996a). Vande-Vusse (1999a) confirms Waldenstrom and Turnbull (1996c) survey of 295 Swedish mothers that concludes that birth is complex, and therefore suggests a comprehensive approach to care during labour; care which enables women to be cared for holistically. A holistic approach to care is needed for the complexity of childbirth and to help women achieve "delight" (satisfaction) in childbirth (Proctor 1998). An understanding of what influences the birth experience of women, both physical and obstetric variables, such as pain, duration of labour, CS and Instrumental births; and psychosocial ones, such as support, experience of involvement, and expectations, may have resulted in more flexible and individualized care (Waldenstrom, Borg et al. 1996a). Such an approach is especially important for women after LETZ because of the different pattern of their labours. Contrary to the expectation at the start of the study, the clinically relevant differences in interventions are more evident in the control women.

The views of the women in the interviews differ in whether it is helpful to know in advance if LETZ has an effect on their labour. Faith's ambivalence to knowing in advance that it may have an affect is understandable, and is an important point to remember in the research. That not all women will want to know in advance that their labour may be more complicated. Keyra's opinion that knowing how her second

birth would progress may have been helpful to her midwives and herself, in that she would have been unlikely to be sent home if everyone is aware how LETZ affects birth, is also important. As is the implication that midwives and obstetricians need to be aware of the findings of the study.

Despite Faith and Keyra (the subject women interviewed) giving birth in 2005, after years of research that LETZ may lead to premature birth, no-one has discussed the possibility with these women (see Chp.6: Section 6.2, p.181, 185 and Section 6.3, p.19, p.198). That non-discussion is an artefact of the over reliance on 'expert opinion' in medicine as opposed to evidence based practice.

Despite the reluctance of the obstetric profession to discuss the effects LETZ has on progress in the 1st stage of labour, one of the advantages of the technocratic society is the free exchange of information via that tool of technology the Internet. This has resulted in discussion boards hosted by midwifery sites that compare techniques to help women in that prolonged 'passive' phase of the 1st stage of labour, and describes the shorter 'progressive' stage in women after LETZ, exactly the findings in the study (see Appendix G; nettalk 2007). To paraphrase the words of a popular song – "women (and midwives) are doing it for themselves" (Stewart and Lennox 1985).

7.8 Study results and recent research

Premature birth is one of the secondary outcomes in the study. The increase in number of premature births in the subject women and the subsequent increase in low birthweight, is a finding consistent with other studies (Blomfield, Buxton et al. 1993; Haffenden, Bigrigg et al. 1993; Braet, Peel et al. 1994; Cruikshank, Flannelly 1995; Paraskevaidis, Koliopoulos et al. 2002; Samson, Bentley et al. 2005). It also confirms the findings from the Pilot Study. The findings of increased premature birth in the subject women are not only clinically relevant in the study but are also statistically significant. This tendency toward premature births after LETZ has been equivocal in the research literature in the past, none of which had enough data for statistical significance. The study confirms the view of the meta-analysis of previous research by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) that finds statistical significance for premature birth. The study

presented is larger in its quantitative arm than all but the one study by Samson, Bentley and Fahey (2005) used in that meta-analysis.

Obstetricians and others are now aware from the meta-analysis by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaïdis (2006) and the Australian study by Bruinsma, Lumley, Tan and Quinn (2007) that LETZ increases premature births but it remains to be seen if this knowledge has filtered through to actual practice. Certainly, in the study hospital it is very rare that women are counselled that LETZ can have an effect on their labour. When an obstetrician does think it can have an effect they tend to concentrate on ultrasound of the cervical length in late pregnancy, even though this has been shown to have no correlation with the affect of premature birth after LETZ (Gentry, Baggish et al. 2000).

The meta-analysis by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaïdis concludes by claiming that evidence clearly indicates that LETZ is associated with a small but real increase in risk of premature birth. This completely disregards one of their computations for publication bias (fill and trim method) that indicates that a very small number, three, of unpublished research will remove all significance for LETZ having a detrimental effect on premature births. It also urges clinicians to consider this new information when women are counselled before consent to treatment, and supports the philosophy of doctors not treating young women with mild abnormalities that often resolve spontaneously. Is the reporting of the computation for publication bias, which reveals a flaw in their analysis, the reason clinicians are not using the results to counsel women?

Bruinsma, Lumley, Tan and Quinn (2007) investigate all women referred to the colposcopy clinic at an Australian tertiary referral centre and who have a subsequent birth recorded in the regional birth database. They use 1682 women of all parities treated for CIN but by a variety of treatments, only 69 (4%) have LETZ as their treatment. The authors claim that LETZ increases the incidence of premature birth, but the OR is 1.91, whereas the power calculations before the study show it is only capable of assessing a 3.5 difference in the LETZ group. After adjusting for confounding factors, the only treatment that still increases the risk of premature birth is ablative diathermy. This Australian study by Bruinsma, Lumley, Tan and Quinn follows the pattern of medical studies previously. It concentrates on the outcomes of

premature birth. Interestingly, it also finds that those referred to a colposcopy clinic but not treated, have higher rates of premature birth. It recommends that 'See and Treat' is not used, which confirms best practice guidelines in this country as research has already proved that it leads to over treatment of low grade neoplasia that will normally resolve spontaneously and deeper incisions than are necessary. Is the lack of power in their study for LETZ the reason their recommendations not being followed?

None of the previous studies on the effects of LETZ in labour had concentrated on progress in the 1st stage of labour and the study presented is one of the few to attempt to analyse by parity. Cruikshank, Flannelly, Campbell and Kitchener (1995) was the only other research to do any sub analysis by parity and length of 1st stage of labour. Their conclusion was that there were no statistically significant differences.

In the study, the analysis by parity is defined at the outset and the results refute the previous research, in that this study does show differences in times in 1st stage of labour. Subject women having their first baby are more likely to be admitted greater than 4cm. Subject women having their second baby take less time to get from 4cm to full dilatation. The conclusion validity for the quantitative part of the study is achieved as the results establish that there is a relationship between LETZ and progress in the 1st stage of labour.

The study presented has a larger number of women after LETZ (94) than the large study by Bruinsma, Lumley, Tan and Quinn (2007), and is more robust in the results being clinically relevant and having sufficient power for Relative Risk calculations. It is not a meta-analysis and has no need of statistical methods to compute publication bias as in Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006). The results from this study that are also not statistically significant tend to be confounded by other factors, such as use of ARM and Syntocinon in the control women. The study is an important addition to the knowledge of the effects of LETZ on progress in the 1st stage of labour, especially of the different effects seen between women who have LETZ before their first or before their second babies. It also confirms the previous speculation of increased premature births after LETZ, by

providing clinically relevant and statistically significant results that are missing from previous research.

7.9 Limitations of study

In all Health Service research, there is the inevitable disadvantage of being unable to randomise participants to having a particular condition or disease. For the study, it is obviously unethical to randomise women to having LETZ if they do not require it for a clinical reason. Therefore, the quantitative data in this study is retrospective and suffers from the limitations of this kind of data.

Evidence shows that retrospective records are limited in that they are partial, and authors select what to report in them (Higgins 1996; Gray 2004). In this case, the partogrammes in the notes stood as a record of the details of the delivery of a woman having a baby. Some authors claim that retrospective research produces less convincing evidence about causal relationships between the variables (Robson 1993). This ignores the problems that can be inherent in experimental studies, particularly the 'Hawthorne effect'. Are the differences seen in experimental studies due to the intervention, or due to the increased attention given to the study participants? It is important to also acknowledge that retrospective notes by medical, nursing and midwifery staff are the normal rather than the exception in health service research

The study suffers from the same restriction as other studies, in that achieving a large number of subjects would have taken a multi centre trial and too many people for the resources of a PhD thesis. Randomly selecting the study subjects would have been too time consuming and involved too many years of data being accessed for labour details for a lone researcher, therefore all suitable study subjects were used. The use of a larger amount of subjects for the secondary outcomes to part-validate the study results, may have been a flaw. It resulted in not quite the number of control women needed for a simple 1:2 power calculation.

Research Question1) Did women feel that LETZ makes a difference to their labours; is based on an incorrect premise that colposcopists at treatment and midwives/obstetricians in labour will discuss the ambivalent research in the area

with women. Due to this lack of discussion the women interviewed have given no thought to how their births will be affected by LETZ (Chp. 6: Case Study 01, p.181 and Case Study 02, p.195). However, the question is still a valid one to ask given the previous findings by other researchers that should have initiated discussion with women undergoing LETZ and having pregnancies after LETZ. Asking this question revealed the lack of discussion with women about the latest evidence to date.

The study has been limited in scope but does have validity and can be generalised to other women who have LETZ. The findings that are statistically confounded by accelerative interventions used more in the control women, need not devalue the results.

7.10 Summary

The obvious differences between the effects on women having their first baby and women having their second baby is justification that all research on the effects of LETZ should be analysed by parity, and that this study is long overdue. The lack of knowledge of the exact mechanisms by which the cervix performs its functions during birth leads to a knowledge of effects only and obfuscation of causes.

Counselling of subject women before LETZ and labour.

The study results can be used to influence the practice of obstetric, midwifery and colposcopy staff. As increasingly women will give birth after LETZ (Patnick, 2007; ONS 2007a), due to the decrease in age at LETZ and increase at age birth of their babies, this reinforces the importance and timeliness of the study. What will happen in the future? The cervical screening programme is still going to continue, because the HPV vaccine will still leave 20-30% of CIN. The number of women treated unnecessarily may increase.

The meta-analysis by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevaidis (2006) has advised more counselling of women in colposcopy clinics and more surveillance of women during pregnancy. The study adds to that impetus and suggests women after LETZ need a redefinition of normality for them. The complexity of childbirth does not lend itself to this linear solution of establishing who

is in labour and who is not. Birth is a complex multidimensional experience; to pretend otherwise only produces simplistic solutions.

Discussion with Nurse Coloscopists reveals that from approximately 2007, since the research by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevidis (2006) and (Bruinsma, Lumley, Tan and Quinn (2007), they have been advising women that there is a very small increase in risk for premature birth after LETZ (Goodfellow 2010). However, this is not evident in the published leaflets given to women, whether the study hospitals own leaflets or national leaflets. It is also not present in the 2004 Colposcopy Guidelines, but is now present in the updated 2010 Colposcopy guidelines (NHSCSP 2010). It is encouraging that this is happening but it may be a recent development in other areas to the study hospital, given that the guidelines are so recent.

No-one is counseling women as to the pattern and progress of their labour after LETZ. Despite the reluctance of the obstetric profession to discuss the effects LETZ has on progress in the 1st stage of labour, midwives and women have used internet discussion boards to discuss changes in the cervix after LETZ. Techniques used to help women in that prolonged 'passive' phase of the 1st stage of labour are compared and the shorter 'progressive' stage in women after LETZ described. Exactly the findings in the study (see Appendix G; nettalk 2007).

Increased premature births in both subject women having their first baby and subject women having their second baby confirm speculation in previous research.

All of these results indicate that the functional/appearance of the cervix changes after LETZ. Despite not understanding exactly how the cervix works in labour, we only know what it does; the long established view is that excision of part of the cervix is unproblematic for pregnancy and labour. Due to the lack of knowledge of the processes involved in the thinning and dilatation of the cervix in labour, it has long seemed to this author to be problematic that such assumptions are made in the first place. The adoption of various forms of colposcopy has always preceded the research on effects in childbirth. Medicine can no longer justify this unscientific approach – often encapsulated by 'experts know best'. The study confirms the

speculation from Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevidis (2006) and Bruinsma, Lumley, Tan and Quinn (2007) that this assumption is false. Labour is affected by excision of tissue during LETZ.

For the meta-analysis by Kyrgiou, Koliopoulos, Martin-Hirsch, Arbyn, Prendiville and Paraskevidis to ascertain LETZ, and all the other colposcopy treatments that excised tissue, are detrimental by resulting in more premature births, is a justification for the study, which was started before that meta-analysis was conceived. For the small study (in numbers who have LETZ) by Bruinsma, Lumley, Tan and Quinn to have achieved validation by the scientific community when they find an OR of 1.9, despite their statement at the outset that they only have the power to detect a difference of 3.5, is a trifle unsettling. The study presented investigates a larger number of women than Bruinsma, Lumley, Tan and Quinn and analyses by parity, giving it a rigor missing in previous studies.

The power calculations before the study show it has an 80% power of detecting a Relative Risk of 1.3.

The study investigates a larger number of women than Bruinsma, Lumley, Tan and Quinn (2007) and has analysed by parity, with power calculations for sample size that will allow the RR of 1.3 to be detected, giving it a rigor missing in the previous studies. The obvious differences between the effects on women having their first baby and women having their second baby is justification that all research on the effects of LETZ should be analysed by parity, and that this study is long overdue.

Subject women having their first baby are admitted later in their labours than control women, this is clinically relevant as well as statistically significant.

This is an important emerging issue in the study and needs to be investigated further. Unfortunately, in order for this to take place Labour Suites need to tighten the documentation of pre-admission visits. Women in early labour are often sent home and not offered pain relief or support, and have to await further progress and this is the practice in the study hospital. Although this is not an issue for medical and midwifery staff, it is an issue for women, as illustrated in the women's interviews. From the women's interview comments, women in the community have discussed

this policy and accommodated it in their labour plans. This becomes more important with the change in definition of established labour to 4cm.

Are women after LETZ denied midwifery care for longer than women without LETZ treatment? Will the change in guidelines exacerbate this? The dissemination of the study results should lead to women having their first baby after LETZ being admitted earlier in their labours. This will hopefully prove to be the case, however the redefinition of established labour in the NICE guidelines may be difficult to overcome. When women have gone through the early stages of labour without the kind of support they need, this primes them to more readily acquiesce to any of the obstetric interventions such as ARM, Epidural, Syntocinon and pharmacological forms of pain relief. This deprives them of any pleasure in their birth, gives them a biased view of the likely event course of their next birth and therefore at the next birth, this reliance on technology is perpetuated.

Subject women having their second baby take less time to get from 4cm to fully dilated. This is clinically relevant.

Would it also have been statistically significant without the increased use of Syntocinon and ARM in the control women? This increased use of accelerative interventions confounds the statistical significance of these results.

Chapter 8

Conclusion and recommendations

8.1 Introduction

Chapter 7 discusses the results of the study, particularly the results from the case studies. The case studies illustrate the impact the qualitative results and the impact the quantitative interview results from the midwives have on the women during their births. That Chapter compares the results to other research in the area of labour after LETZ treatment.

Chapter 8 reviews the main points that emerge throughout the thesis and the impact these have on the study of progress of the 1st stage of labour of women after LETZ. Chapter 8 concludes with recommendations for practice and further research.

8.2 Research aims and questions

The Research Questions for the Main Study are influenced by the findings in the Pilot Study, especially the finding that different results are found for women having their first baby and women having their second baby. This led to a theory generation that the ways in which women having their first and women having their second babies are managed mask the true differences between the subject and control groups. This was translated into Research Question 6, and was used as one of the bases for the case study approach (see Chp. 4; Section 4.4, p.89). These differences persist in the Main Study results.

The overall aim of the study investigates whether LETZ treatment for abnormal smears of the cervix has an effect on progress in the 1st stage of labour. That has been answered by the study, there are effects and they are different effects, dependant on whether a woman is having her first or second baby. In the study, the analysis by parity is defined at the outset and the results refute the previous research, in that the study does show differences in times in 1st stage of labour. Although clinically relevant, some of the results are not statistically significant due to the increased use of accelerative interventions in the control women, which confounds the results.

The study includes the major constructs identified by other researchers of colposcopy and birth and to compare the study results to their research it answers the following secondary outcomes.

A). Are there differences in type of birth?

There are no clinically relevant differences in type of birth for women having their first baby, but subject women having their second baby are more likely to have a Normal birth and less likely to have an Instrumental birth than the control women. These are not however statistically significant.

B). Are there differences in number of premature births?

The differences in premature birth in both women having their first baby and women having their second baby confirm the speculation from previous research and from the Pilot Study that LETZ women are more at risk of premature birth. Subject women in the study are 2.3 times more likely to have a premature birth irrespective of whether they have given birth previously.

C). Are there differences in birth weight of the babies?

That difference in premature birth is reflected in the low birthweight of the babies, but is only statistically significant in women having their first baby. It is not significant when premature births are removed

D). Are there differences in onset of labour?

The subject women in the study are more likely to go into labour spontaneously. Why is unclear and worthy of further study.

The study answers the following research questions, some only partially

1). Do women feel that LETZ makes a difference to their labours?

This is not answered as the question is based on an incorrect premise, that colposcopists and obstetricians will discuss the ambivalent research with women under their care. That either it is not discussed, or the only investigation is of length

of cervix before labour, that has been described in research as of doubtful use. A hypothetical question put to women elicits different views on whether they want to know in advance of the changes in progress from LETZ.

2). Does previous LETZ treatment for abnormal smears of the cervix affect the progress in the 1st stage of labour?

This question is answered definitively, with valid results for subject women having their first baby being admitted later in their labours and subject women having their second baby taking less time in the 'progressive' phase of the 1st stage, that is from 4cm to full dilatation. Women who have CIN 3 have a valid correlation with taking less time to get to full dilation from 4cm.

3). Are the differences clinically relevant?

This is answered as all the results for 'progressive' and 'passive' labour are clinically relevant (Chp. 5: Part One; Section 5.1.4, p.141).

4). Are the differences statistically significant?

The results for subject women having their first baby being admitted later in their labours is statistically significant, as is the correlation between CIN 3 and taking less time to get to full dilatation from 4cm. It is not statistically significant for subject women having their second baby taking less time than controls to get from 4cm to full dilatation, but the statistical significance of this result is confounded by more accelerative interventions in the control women.

5). Are differences seen in both women having their first baby after LETZ and women having their second baby, but their first baby after LETZ?

Differences are seen in both women having their first baby and women having their second baby, but these are not the same differences. It is postulated that the change in the cervix after birth influences colposcopists to remove a larger area of tissue and that is why the results are different for women having their first baby and women having their second baby.

6). *Can differences in the management of women having their first baby and women having their second baby be identified that may mask true differences?*

The intervention rate in all women having their first baby is 65% and this is related to the stricter management applied to this group of women, with the obstetric view being that birth is only normal in retrospect and for a woman at her first birth her pelvis is 'untried'. Women who have a birth previously are given more leeway. This use of accelerative interventions in women having their first baby may well be masking differences in the 'progressive' phase of the 1st stage of labour.

8.3 Recommendations for Practice

The poor rate of women who gave birth for the first time without interventions (35%) should be addressed by the study hospital. Their figures should differentiate between Spontaneous Vaginal Delivery and Normal birth, in this way all staff will soon realise the vast difference in the figures and being aware is often all that is needed to change practice (Wagner 1999). Midwives need to retake control of normal labour in hospitals and ensure women are not medicalised unnecessarily. Guidelines in use need to be condensed and levels of evidence graded if they are to be used appropriately

The recognised evidence base against 'See and Treat' should be incorporated into all colposcopy clinics; it is no longer valid to ignore that evidence when the detrimental effects of LETZ on birth are now known. Indeed it is now emphasised in the new guidelines for colposcopy (NHSCSP 2010), p.13. The differences in appearance after a birth that occurs in the cervix, that may lead a colposcopist to remove a greater area of tissue, will be tempered if 'See and Treat' is no longer used. Women also need counselled before LETZ that it increases their risk of premature birth more than 2-fold. Hopefully, the new Colposcopy Guidelines (NHSCSP 2010) will change the information given by colposcopists, but that information states "a small but significant increase in the incidence of preterm labour and preterm prelabour rupture of membranes" (NHSCSP 2010), p.20.

Given that the average time from LETZ to birth in the study hospital is 3 years, it remains to be seen if this will translate into new information being given in pregnancy. This information needs to be reiterated to them during their pregnancy in

order that they do not assume that it is “too early” to go into labour (as in Faith’s interview) when it happens to them.

Midwives, obstetricians and colposcopists need to take heed of this research and incorporate it into counselling of women before LETZ and during any pregnancy after LETZ. It needs to be highlighted to women the differences in the ‘passive’ and ‘progressive’ phases of the 1st stage of labour, and women need reassurance that midwives and obstetricians will have these differences in mind when caring for them. All midwives and obstetricians being aware that the pattern and progress of their labours are not linear will lead to care that is more appropriate for these women in labour.

While keeping women in the Labour Suite who have LETZ will stretch resources, it must happen, as these women appear to have a longer ‘passive’ phase in cervical dilatation terms but not necessarily in strength or pain from contractions.

8.4 Recommendations for further research

The cervical screening that is performed at present will not be suitable in future for the smaller number of women who benefit from it, the cost alone will not be able to be justified. This could be beneficial in that this is likely to lead to research on other ways to detect abnormal changes in the cervix, than the fact that the present screening is a painful and embarrassing procedure for women. At present there is new research being conducted on human papillomavirus (HPV) testing as a form of risk assessment; immunoenhanced testing using antibodies to cell cycle proteins and electro-optical technologies. However, only HPV testing is currently being evaluated for implementation in the Cervical Screening Programme (NHSCSP 2010), p.7. But this research does need to be done and the concept of cervical smears being the only proven way of detecting pre-cancerous changes needs to be challenged.

More research needs to be done, to explore the majority of women’s views on advance knowledge, and this needs to be considered in the light of the other results from the study presented

Labour Suites need to be more rigorous in the recording of data on women who are sent home as not in established labour. If this data had been available to the study it might have shed light on the pattern in cervical dilatation in subject women having their first baby, while they are in the 'passive' phase of the 1st stage of labour. Subject women who are admitted later in their labours is an important emerging issue in the study and needs to be investigated further. Will the change in guidelines exacerbate this? What will women's reaction be when the new definition of established labour takes effect? This question will only be answered by further research.

The study has shown that LETZ affects progress in the 1st stage of labour. However, the lack of knowledge of the exact mechanisms by which the cervix performs its functions during birth, leads to a knowledge of affects only and obfuscation of causes.

Looking at future research that delineates the area of tissue excised should be the next step. For this, tissue sent for histology after removal by LETZ needs to be defined as to width as well as to depth in order for total area to be calculated. This information needs to be recorded in colposcopy databases in order for future research to be completed that looks at total area correlated with the differences defined in this study in premature birth and progress in the 1st stage of labour.

Only when these further studies are completed can we be certain that the effects of LETZ on progress in labour are being accounted for in women's care during labour. In the meantime, the differences in progress in labour found in this study must be taken into account when caring for women after LETZ.

References

- Acharya, G., Kjeldberg, I., Hansen, S. M., Sørheim, N., Jacobsen, B. K. and Maltau, J. M. (2005). "Pregnancy outcome after loop electrosurgical excision procedure for the management of cervical intraepithelial neoplasia." Arch Gynecol Obstet **272**: 109-112.
- Al-Azzawi, F. (1998). Childbirth and obstetric techniques. London, Mosby.
- Althuisius, S. M., Schornagel, I. J., Dekker, G. A., Geijn, H. P. v. and Hummel, P. (2001). "Loop electrosurgical excision procedure of the cervix and time of delivery in subsequent pregnancy." International Journal of Gynecology & Obstetrics **72**: 31-34.
- Ashworth, P. D. and Longmate, M. A. (1993). "Theory and Practice: beyond the dichotomy." Nurse Education Today. **13**: 321-327.
- Aslam, R. (1999). "Risk Management in Midwifery Practice." British Journal of Midwifery. **7**(1): 41-44.
- Baggish, M. S., Dorsey, J. H. and Adelson, M. (1989). "A ten-year experience of treating cervical intraepithelial neoplasia with the CO2 laser." American Journal of Obstetrics & Gynecology: 60-68.
- Bastion, H. (1992). "Confined, managed & delivered: the language of obstetrics." British Journal of Obstetrics and Gynaecology. **99**(February.): 92-93.
- Benner, P. (1984). From Novice to Expert. California, Addison-Wesley.
- Bigrigg, A., Haffenden, D. K., Sheehan, A. L., Codling, B. W. and Read, M. D. (1994). "Efficacy and safety of large-loop excision of the transformation zone." The Lancet **343**(8888): 32-34.
- Bigrigg, M. A., Codling, B. W., Pearson, P., Read, M. D. and Swingler, G. R. (1991). "Letters: Pregnancy after cervical loop diathermy." The Lancet **337**: 119.
- Blackwell, D., Elam, S. and Blackwell, J. (2000). "Cancer and Pregnancy: a health care dilemma." Journal of Obstetric, Gynecologic, and Neonatal Nursing **29**(4): 405-412.
- Bland, M. (2000). An introduction to medical statistics. Oxford, Oxford University press.
- Blohmer, J. U., Schmalisch, G., Klette, I., Gruneisen, Y., Kohls, A., Guski, H. and Lichtenegger, W. (1999). "Increased incidence of cervical intraepithelial neoplasia in young women in the Mitte district, Berlin, Germany." Acta Cytol **43**(2): 195-200.

- Blomfield, P. I., Buxton, J., Dunn, J. and D.M.Luesley (1993). "Pregnancy outcome after large loop excision of the cervical transformation zone." American Journal of Obstetrics & Gynecology **169**(3): 620-625.
- Bowling, A. (2009). Research methods in health: Investigating health and health services. Berkshire, Open University Press.
- Braet, P. G., Peel, J. M. and Fenton, D. W. (1994). "A case controlled study of the outcome of pregnancy following loop diathermy excision of the transformation zone." Journal of Obstetrics and Gynaecology **14**: 79-82.
- Bristow, R. E. and Karlan, B. Y. (1999). Chapter 49: Disorders of the Uterine Cervix. Danforth's Obstetrics and Gynecology. Scott, J. R., Saia, P. J. D., Hammond, C. B. and Spellacy, W. N. Philadelphia, Lipincott Williams & Wilkins: 805-836.
- Bruinsma, F., Lumley, J., Tan, J. and Quinn, M. (2007). "Precancerous changes in the cervix and risk of subsequent preterm birth." British Journal of Obstetrics and Gynaecology **114**(1): 70-80.
- Bryman, A. (1988). Contemporary Social Research 18: Quantity and quality in social research. London, Routledge.
- Buchmann, E. J. and Libhaber, E. (2007). "Accuracy of cervical assessment in the active phase of labour." British Journal of Obstetrics and Gynaecology **144**: 833-837.
- Byrne, D. L. and Edmunds, D. K. (1990). "Clinical methods for evaluating progress in the first stage of labour." The Lancet **335**(8681): 122.
- Campbell, M. J. and Machin, D. (1999). Medical Statistics; A Commonsense Approach. Chichester, John Wiley and Son.
- Campbell, R. and Macfarlane, A. (1990). Recent debate on the place of birth. The politics of maternity care. Garcia, J., Kilpatrick, R. and Richards, M. Oxford, Oxford University Press.
- Carper, B. A. (1978). "Fundamental Patterns of Knowing in Nursing." Advances in Nursing Science. **2**(3): 13-23.
- Carroll, S. G. M. (2006). Preterm Prelabour Rupture of Membranes, RCOG. **2007**.
- CEMACH (2005). Why mothers die (2000-2002). DOH, Centre for Maternal and Child Enquiries.
- Churchill, H. (1995). "The conflict between lay and professional views of labour." Nursing Times **91**(42): p.32-33.

- Cluett, E. (2000). "The onset of labour 2: Implications for practice." The Practising Midwife **3**(7): 16-19.
- Coffey, A., Holbrook, B. and Atkinson, P. (1996). Qualitative Data Analysis: Technologies and Representations., Sociological Research Online. **2001**.
- Colposcopy.org (2005). Colposcopy. **2005**.
- Crane, J. M. G. (2003). "Pregnancy outcome after loop electrosurgical excision procedure: a systematic review." Obstetrics & Gynecology **102**(5, part 1): 1058-1062.
- Creedy, D. K., Shochet, I. M. and Horsfall, J. (2000). "Childbirth and the development of acute trauma symptoms: Incidence and contributing factors." Birth **27**(2): 104-111.
- Creswell, J. W. (2003). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. California, Sage Publications Inc.
- Cruikshank, M. E., Flannelly, G., Campbell, D. M. and Kitchener, H. C. (1995). "Fertility and pregnancy outcome following large loop excision of the cervical transformation zone." British Journal of Obstetrics and Gynaecology **102**: 467-70.
- Cunningham, F. G., Levenko, K. J., III, L. C. G., Hauth, J. C., Wenstrom, K. D. and Bloom, S. L. (2001). Chapter 19: Obstetric anesthesia. Williams Obstetrics. New York, McGraw-Hill: 484.
- Cunningham, F. G., Levenko, K. J., III, L. C. G., Hauth, J. C., Wenstrom, K. D. and Bloom, S. L. (2001). Chapter 20: Dystocia. Williams Obstetrics. New York, McGraw-Hill: 496.
- Cunningham, J. D. (1993). "Experiences of Australian mothers who gave birth either at home, at a birth centre, or in hospital labour wards." Social Science and Medicine **36**(4): 475-483.
- Davis-Floyd, R. E. (1990). "The Role of the Obstetric Rituals in the Resolution of Cultural Anomaly." Social Science and Medicine. **31**(2): 175-189.
- Davis-Floyd, R. E. (1994). "The technocratic body: American childbirth as cultural expression." Social Science and Medicine **38**(8): 1125-1140.
- Denzin, N. K. (1989). The Research Act: a theoretical introduction to sociological methods. New Jersey., Prentice-Hall Inc.
- Dept. of Health, G. B. (1998). Cervical Screening Programme, England: 1997-98. London, Department of Health: 10.

- Dudley, D. J. (1999). Chapter 28: Complications of Labor. Danforth's Obstetrics and Gynecology. Scott, J. R., Saia, P. J. D., Hammond, C. B. and Spellacy, W. N. Philadelphia, Lippincott Williams and Wilkins: 437-456.
- Dudley, D. J. (2008). Chapter 24: Complications of labor. Danforth's obstetrics and gynecology. Gibbs, R. S., Danforth, D. N., Karlan, B. Y., Haney, A. F. and Nygaard, I. New York, Lippincott Williams and Wilkins: 1136.
- Dzakpasu, S. and Chalmers, B. (2005). "Canadian maternity experiences survey pilot study." Birth **32**(1): 34-38.
- Edwards, N. (1997a). "New Direction for the Royal College of Midwives? a commentary on the Inaugural Address or the President of the Royal College of Midwives." AIMS Journal. **9**(3): 4-7.
- Edwards, N. (1997b). "What is 'Normal care'?" AIMS Journal. **9**(2): p.8-11.
- Ellman, R. (1991). Chapter 18. Indications for Colposcopy from a UK Viewpoint. Cancer Screening. Miller, A. B. C., J. Day, N.E. Hakama, M. Prorok, P.C.(Eds). Cambridge, Cambridge University Press.: 172-83.
- Enkin, M., Keirse, M. J. N. C., Neilson, J., Crowther, C., Duley, L., Hodnett, E. and Hofmeyr, J. (2000). A guide to effective care in pregnancy and childbirth. Oxford, Oxford University Press.
- Errington, C. (2003). Colposcopy treatments. Colgan, V. Newcastle.
- Farrington, P. F. and Ward, K. (1999). Chapter 7: Normal Labor, Delivery and Puerperium. . Danforth's Obstetrics & Gynecology. Scott, J. R., Saia, P. J. D., Hammond, C. B. and Spellacy, W. N. Philadelphia, Lippincott Williams and Wilkins: 91-1110.
- Favalli, G., Lomini, M., Schreiber, C., Ciravolo, G., Junasevic, J., Pecorelli, S. and Bianchi, U. A. (1999). "The use of carbon-dioxide laser surgery in the treatment of intraepithelial neoplasia of the uterine cervix." Przegląd Lekarski. **56**(1): 58-64.
- Ferenczy, A., Choukroun, D., Falcone, T. and Franco, E. (1995). "The effect of cervical loop electrosurgical excision on subsequent pregnancy outcome: North American experience." American Journal of Obstetrics & Gynecology **172**(4:1): 1246-1250.
- Firestone, W. A. (1990). Chapter 6. Accomodation: Toward a Paradigm-Praxis Dialectic. The Paradigm Dialog. Guba, E. G. California, Sage Publications, Inc.: 105-125.

- Fisher, C., Hauck, Y. and Fenwick, J. (2006). "How social context impacts on women's fears of childbirth: A Western Australia example." Social Science and Medicine **63**: 64-75.
- Fleiss, J. L. (1981). Statistical Methods for Rates and Proportions. Chapter 3., John Wiley & Sons New York. **2009**.
- Forsmo, S., Hansen, M. H., Jacobsen, B. K. and Oian, P. (1996). "Pregnancy outcome after laser surgery for cervical intraepithelial neoplasia." Acta Obstetrica et Gynecologica Scandinavica. **75**(2): 139-143.
- Fowles, E. R. (1998). "Labor concerns of women two months after delivery." Birth **25**(4): 235-240.
- Fraser, D. (2007). "Campaign for Normal Birth: Recording facts." Midwives **10**(9): 1
- Fraser, W. D., Turcot, L., Krauss, I. and Brisson-Carrol, G. (2001). "Amniotomy for shortening spontaneous labour." Cochrane Database of Systematic Reviews(1): 915-925.
- Friedman, E. (1954). "The graphic analysis of labor." American Journal of Obstetrics & Gynecology **68**(6): 1568-75.
- Fusi, L., Steer, P. J., Maresh, M. J. A. and Beard, R. W. (1989). "Maternal pyrexia associated with the use of epidural analgesia in labour. ." Lancet **3**(1(8649)): 1250-1252.
- Garcia, J., Kilpatrick, R. and Richards, M. (1990). The politics of maternity care. Oxford., Oxford University Press.
- Gaskin, I. M. (2003). Ina May's guide to childbirth. London, Vermilion.
- Gentry, D. J., Baggish, M. S., Brady, K., Waish, P. M. and Hungler, M. S. (2000). "The effects of loop excision of the transformation zone on cervical length: Implications for pregnancy." American Journal of Obstetrics & Gynecology **182**(3): 516-520.
- Goetzl, L. (2008). "Should we be concerned about epidural-induced maternal fever?" Contemporary Obstetrics and Gynecology(December): 36-48.
- Goodfellow, J. (2010). Counselling before LETZ. Colgan, V. Newcastle.
- Gould, D. (2000). "Normal labour: a concept analysis." Journal of Advanced Nursing **31**(2): 418-427.
- Granstrom, L., Ekman, G. and Malmstrom, A. (1991). "Insufficient remodelling of the uterine connective tissue in women with protracted labour." British Journal of Obstetrics and Gynaecology **98**: 1212-16.

- Gray, D. E. (2004). Doing Research in the Real World. London, SAGE Publishers Ltd.
- Green, J. M. and Baston, H. A. (2003). "Feeling in control during labor: Concepts, correlates, and consequences." Birth **30**(4): 235-247.
- Guba, E. G., Ed. (1990). The Paradigm Dialog. California, SAGE Publications Inc.
- Haffenden, D. K., Bigrigg, A., Codling, B. W. and Read, M. D. (1993). "Pregnancy following large loop excision of the transformation zone." British Journal of Obstetrics and Gynaecology **169** 620-25.
- Hagen, B. and Skjeldestad, F. E. (1993). "The outcome of pregnancy after CO2 laser conisation of the cervix." British Journal of Obstetrics and Gynaecology **100**(8): 717-720.
- Harrison, M. J., Kushner, K. E., Benzies, K., Rempei, G. and Kimak, C. (2003). "Women's satisfaction with their involvement in health care decisions during a high-risk pregnancy." BIRTH **30**(2): 109-115.
- Herbert, A. and Smith, J. A. (1999). "Cervical intraepithelial neoplasia grade III (CIN 3) and invasive carcinoma: the yawning gap revisited and the treatment of risk." Cytopathology **10**(3): 161-170.
- Higgins, R. (1996). Approaches to Research: a handbook for those writing a dissertation. London, Jessica Kingsley Publishers Ltd.
- Hinchliff, S. and Montague, S., Eds. (1988). Physiology for Nursing Practice. London, Balliere Tindall.
- Hobbs, L. (1998). "Assessing cervical dilatation without VEs; Watching the purple line." The Practising Midwife **1**(11): 34-35.
- Howell, C. J., Kidd, C., Roberts, W., Upton, P., Lucking, L., Jones, P. W. and Johanson, R. B. (2001). "A randomised controlled trial of epidural compared with non-epidural analgesia in labour." British Journal of Obstetrics and Gynaecology **108**: 27-33.
- Illuzzi, J. L., Magriples, U. and Williams, K. P. (2003). "The impact of epidural analgesia on the rotation of the fetal head during labor: A prospective study." Obstetrics & Gynecology **101**(4 (supplement)): 85S-86S.
- Kabakian-Khasholian, T., Campbell, O., Shediak-Rizkallah, M. and Ghorayeb, F. (2000). "Women's experiences of maternity care: satisfaction or passivity?" Social Science and Medicine **51**: 103-113.
- Kirkham, M. (1997). "Reflection in midwifery: processional narcissism or seeing with woman? ." British Journal of Midwifery. **5**: 259-262.

- Kirkham, M. (1999). "The culture of midwifery in the National Health Service in England." Journal of Advanced Nursing **30**(3): 732-739.
- Kirkham, M. (2007). Cutting the cord: A system of freelance midwives could help retain some of the profession's disillusioned staff and improve care for new mothers, argues Mavis Kirkham. The Guardian. London.
- Kitchener, H. C. (1991). "United Kingdom Colposcopy Survey: British Society for Colposcopy and Cervical Pathology." British Journal of Obstetrics and Gynaecology. **98**: 1112-1116.
- Kitzinger, S. (1992). Birth and violence against women. Womens Health Matters. Roberts, H. London., Routledge.
- Kitzinger, S. (2004). The New Experience of Childbirth. London, Orion.
- Kitzinger, S. (2005). The Politics of Birth. London, Elsevier Butterworth-Heinemann.
- Kornelsen, J. (2005). "Essences and imperatives: An investigation of technology in childbirth. ." Social Science and Medicine **61**: 1495-1504.
- Kuklick, B., Ed. (1981). William James: Pragmatism. Indianapolis, Hackett Publishing Company.
- Kyrgiou, M., Koliopoulos, G., Martin-Hirsch, P., Arbyn, M., Prendiville, W. and Paraskevidis, E. (2006). "Obstetric outcomes after conservative treatment for intraepithelial or early invasive cervical lesions: systematic review and meta-analysis." The Lancet **367**(9509): 489-498
- Lai, C. Y. and Levy, V. (2002). "Hong Kong Chinese women's experiences of vaginal examinations in labour." Midwifery **18**: 298-303.
- Lavender, T., Alfievic, Z. and Walkinshaw, S. (1998). "Partogram Action Line study - A Randomised Trial." British Journal of Obstetrics and Gynaecology **105**: 976-980.
- Leiman, G., Harrison, N. A. and Rubin, A. (1980). "Pregnancy following conization of the cervix: complications related to cone size." American Journal of Obstetrics & Gynecology. **136**(1): 14-18.
- Leppart, P. C. (1995). "Anatomy and physiology of cervical ripening." Clin Obstet Gynecol. **38**: 267-79.
- Lewis, J. D. and Smith, R. L. (1980). American Sociology and Pragmatism: Mead, Chicago Sociology, and Symbolic Interaction. Chicago, The University of Chicago Press.

- Lieberman, E., Cohen, A., Lang, J., Frigoletto, F. and Goetzel, L. (1999). "Maternal intrapartum temperature elevation as a risk factor for Cesarean delivery and Assisted Vaginal delivery." American Journal of Public Health **89**(4).
- Lopez-Zeno, J., Jose, A. and Peaceman, A. M. (1992). "A controlled trial of a program for the active management of labour." New England Journal of Medicine. **326**(7): 450-454.
- Lyons, J. (1999). "Reflective education for professional practice: discovering knowledge from experience." Nurse Education Today. **19**: 29-34.
- Martin-Hirsch, P. L., Paraskevaides, E. and Kitchener, H. (2000). "Surgery for cervical intraepithelial neoplasia." The Cochrane Library(4): 9.
- Mathevet, P., Chemali, E., Roy, M. and Dargent, D. (2003). "Long-term outcome of a randomized study comparing three techniques of conization: cold knife, laser, and LEEP." European Journal of Obstetrics and Gynecology and Reproductive Biology. **106**: 214-218.
- McCourt, C., Page, L., Hewison, J. and Vail, A. (1998). "Evaluation of one-one midwifery: Women's responses to care." Birth **25**(2): 73-80.
- McCrea, B. H. and Wright, M. E. (1999). "Satisfaction in childbirth and perceptions of personal control in pain relief during labour." Journal of Advanced Nursing **29**(4): 877-884.
- Merchant, C. (1990). *The death of nature: women, ecology, and the scientific revolution*. New York, Harper and Row.
- Miller, A. B., Chamberlain, J., Day, N. E., Hakama, M. and Prorok, P. C., Eds. (1991). Cancer Screening. Cambridge, Cambridge University Press (on behalf of International Union Against Cancer).
- nettalk (2007). "Scarred cervix." Midwifery Matters **Spring**(112): 25.
- Nguyen, C., Montz, F. J. and Bristow, R. E. (2000). "Management of Stage I cervical cancer in pregnancy." Obstetrical and Gynecological Survey **55**(10): 663-643.
- NHSCSP (2010). *Colposcopy and Programme Management: Guidelines for the NHS Cervical Screening Programme*. , NHS Cervical Screening Programmes: 78.
- NICE (2007). *Intrapartum Care: care of healthy women and their babies during childbirth*. Health, N. C. C. F. W. s. a. C. s., RCOG Press: 332.
- O'Driscoll, K. and Meagher, D. (2003). Active Management of Labour: The Dublin experience. London, Mosby.

- O'Driscoll, K., Meagher, D. and Boylan, P. (1995). Active Management of Labour. London, Mosby, Times Mirror Publishers Ltd.
- O'Herlihy, C. (1993). "Active management: a continuing benefit in nulliparous labour." Birth **20**: 95-97.
- Oakley, A. and Houd, S. (1990). Helpers in childbirth : midwifery today. New York, Hemisphere Pub. Corp.
- Odent, M. (2005). *Birth reborn: what childbirth should be*. London, Souvenir.
- Olah, K. S., Henderson, C. and Birbeck, J. (1993). "Assessment of uterine contractions : midwife or monitor?" British Journal of Midwifery. **1**(3): 111-118.
- ONS (2003). *Cervical Screening Programme, England: 2002-2003*. Statistics, O. o. N., HMSO.
- ONS (2004). *Birth statistics: Review of the Registrar General on births and patterns of family building in England and Wales, 2003*. Statistics, O. f. N., HMSO. **Series FM1 no. 32**: 106.
- ONS (2004). *Cervical Screening Programme, England: 2003-2004*. Statistics, O. o. N., HMSO
- ONS (2007a). *Birth Statistics*. Statistics, O. o. N., HMSO: 108.
- ONS (2007b). *Cervical Bulletin 2006-2007 Tables*. Statistics, O. o. N., HMSO.
- Osmer, R., Rath, W., Adelman-Grill, B. C., Fittkow, C., Kuloczik, M., Szeverenyi, M., Tschesche, H. and Kuhn, W. (1992). "Origin of cervical collagenase during parturition." American Journal of Obstetrics & Gynecology **166**(5): 1455-1460.
- Paraskevaidis, E., Koliopoulos, G., Lolis, E., Papanikou, E., Malamou-Mitsi, V. and Agnantis, N. J. (2002). "Delivery outcomes following loop electrosurgical excision procedure for microinvasive (FIGO stage IA1) cervical cancer." Gynecologic Oncology **86**: 10-13.
- Patnick, J. (2007). *Annual Review 2006: NHS Cervical Screening Programme*. Programme, N. C. S. Sheffield, Trimedia Communications UK Ltd: 24.
- Pearsall, J., Ed. (2001). Concise Oxford Dictionary. Oxford, Oxford University Press.
- Peel, J. M. (1970). *Domiciliary midwifery and availability of hospital beds*. Health, D. o., HMSO.
- Penn, Z. and Ghaem-Maghani, S. (2001). "Indications for caesarean section." Clinical Obstetrics and Gynaecology. **15**(1): 1-15.

- Peterson, H. B., Meikle, S. F. and Holmes, R. B. (1999). Chapter 1: Evidence-based Obstetrics and Gynecology. Danforth's obstetrics and gynecology. Scott, J. R., Saia, P. J. D., Hammond, C. B. and Spellacy, W. N. Philadelphia, Lippincott, Williams and Wilkins: 1-10.
- Prince, J. and Adams, M. E. (1987). The psychology of childbirth : an introduction for mothers and midwives. New York, Churchill Livingstone.
- Proctor, S. (1998). "What determines quality in maternity care? Comparing the perceptions of childbearing women and midwives." Birth **25**(2): 85-93.
- Radwin, L. E. (1998). "Empirically generated attributes of experience in nursing." Journal of Advanced Nursing **27**: 590-595.
- Raffle, A. E., Alden, B., Quinn, M., Babb, P. J. and Brett, M. T. (2003). "Outcomes of screening to prevent cancer: analysis of cumulative incidence of cervical abnormality and modelling of cases and deaths prevented." British Medical Journal **326**: 5.
- Raio, L., Ghezzi, F., Naro, E. d., Gomez, R. and Luscher, K. P. (1997). "Duration of Pregnancy After Carbon Dioxide Laser Conization of the Cervix: influence of cone height." Obstetrics & Gynecology **90**(6): 978-982.
- RCOG, RCM, RCA and RCPCH (2007). Safer Childbirth: Minimum standards for the organisation and delivery of care in labour. London, RCOG; RCM; RCA; RCPCH.
- Read, M. D. and Wellby, D. (1985). A practical guide for the Obstetric Team. London, John Wiley and Sons Ltd.
- Robson, C. (1993). Real World Research: a resource for social scientists and practitioner-researchers. Oxford, Blackwell Publishers Ltd.
- Rolfe, G. (1997). "Beyond expertise: theory, practice and the reflective practitioner." Journal of Clinical Nursing. **6**: 93-97.
- Rooijen, M. v. and Persson, E. (1999). "Pregnancy outcome after laser vaporization of the cervix." Acta Obstetrica et Gynecologica Scandinavica **78**: 346-348.
- Sadler, L. (2004). "Treatment for cervical intraepithelial neoplasia and risk of preterm delivery." JAMA **291**(17): 2100-2106.
- Sadler, L. C., Davison, T. and McCowan, L. M. (2000). "A randomised controlled trial and meta-analysis of active management of labour." British Journal of Obstetrics and Gynaecology **107**(7): 909-915.

- Sagot, P., Caroit, Y., Winer, N., Lopes, P. and Boog, G. (1995). "Obstetrical prognosis for carbon dioxide laser conisation of the uterine cervix." European Journal of Obstetrics Gynecology & Reproductive Biology. **58**(1): 53-58.
- Samson, S.-L. A., Bentley, J. R., Fahey, T. J., McKay, D. J. and Gill, G. H. (2005). "The effect of loop electrosurgical excision procedure on future pregnancy outcome." Obstetrics & Gynecology **105**(2): 325-332.
- Schon, D. A. (1987). Educating the Reflective Practitioner. San Francisco, Jossey Bass
- Scott, J. R., Saia, P. J. D., Hammond, C. B. and Spellacy, W. N., Eds. (1999). Danforth's Obstetrics and Gynecology. Philadelphia, Lippincott Williams and Wilkins.
- Sennstrom, M. B., Ekman, G., Westergren-Thorsson, G., Malmstrom, A., Bystrom, B., Endresen, U., Mlambo, N., Norman, M., Stabi, B. and Brauner, A. (2000). "Human cervical ripening, an inflammatory process mediated by cytokines." Molecular Human Reproduction **6**(4): 375-381.
- Seubert, D. E., Stetzer, B. P., Wolfe, H. M. and Treadwell, M. C. (1999). "Delivery of the marginally preterm infant: What are the minor morbidities?" American Journal of Obstetrics & Gynecology. **181**(5:1): 1087-1091.
- Sharp, F. and Saunders, N. (1986). "Treatment of preinvasive lesions of the cervix." British Journal of Hospital Medicine: 107-110.
- Silverman, D. (2005). Doing Qualitative Research. London, SAGE Publications Ltd.
- Silverton, L. (1993). The Art and Science of Midwifery. London, Prentice Hall.
- Simkin, P. (1992). "Just another day in a woman's life? Part II: Nature and consistency of women's long-term memories of their first birth experience." Birth **19**(2): 64-67.
- Simkin, P. (1996). "The experience of maternity in a woman's life." Journal of Obstetric, Gynecologic, and Neonatal Nursing **25**(3): 247-252.
- Simkin, P. (2007). "Birth plans: After 25 years, women still want to be heard." Birth **34**(1): 49-51.
- Soet, J. E., Brack, G. A. and Dilorio, C. (2003). "Prevalence and predictors of women's experience of psychological trauma during childbirth." Birth **30**(1): 36-46.
- Sookhoo, M. L. and Biott, C. (2002). "Learning at Work: midwives judging progress in labour." Learning in Health and Social Care. **1**(2): 75-78.

- Stake, R. E. (1995). The Art of Case Study Research. California., Sage Publications , Inc.
- Statistics, O. o. N. (2006). The National Statistics Socio-economic Classification, ONS. **2006**.
- Statistics, O. o. N. (2006). Neighbourhood Statistics; Table Indices of Deprivation of Wards, ONS. **2006**.
- Steer, P. (2005). "The epidemiology of preterm labour." British Journal of Obstetrics and Gynaecology. **112**(Supplement 1): 1-3.
- Steer, P. and Flint, C. (1999). "ABC of labour care: Physiology and management of normal labour." British Medical Journal **318**(7186): 793-796.
- Steer, P. J. (1994). Chapter 14: Appropriate use of Technology. The Future of Maternity Services. Chamberlain, G. and Patel, N. London, RCOG Press: 115-118.
- Steer, P. J. (2009). Intrapartum Pyrexia is not the responsibility of the Anaesthetist - or is it? Obstetric Anaesthesia and Intensive Care Annual Meeting, Imperial College London.
- Stewart, D. and Lennox, A. (1985). Sisters are doin' it for themselves. Eurythmics: Be Yourself Tonight, RCA Records Label
- Stewart, M. (2005). "'I'm just going to wash you down': sanitizing the vaginal examination." Journal of Advanced Nursing **51**(6): 587-594.
- Strauss, A. and Corbin, J. (1990). Basics of Qualitative Research: grounded theory procedures and techniques. California., Sage Publication, Inc.
- Stuart, C. C. (2000). "Invasive actions in labour; Where have all the 'old tricks' gone?" The Practising Midwife **3**(8): 30-33.
- Sweet, L. (1997). "Childbirth and the illness focus." Australian College of Midwives Incorporated Journal. **10**(4): p.21-25.
- Szarewski, A. (1994). A woman's guide to: The cervical smear test. London., Little, Brown and Co.(UK) Ltd.
- Tan, L., Pepra, E. and Haloob, R. K. (2004). "The outcome of pregnancy after large loop excision of the transformation zone of the cervix." Journal of Obstetrics and Gynaecology **24**(1): 25-27.
- Teddlie, C. and Tashakkori, A. (2009). Foundations of mixed methods research. California, USA., Sage Publications Inc.

- Thompson, J. F., Roberts, C. L., Currie, M. and Ellwood, D. A. (2002). "Prevalence and persistence of health problems after childbirth: Associations with parity and method of birth." Birth **29**(2): 83-94.
- Tindall, V. R. (1995). Women in normal labour; A report of a CSAG Committee. Group, C. S. A. London, HMSO.
- Trochim, W. M. K. (2006). Research methods database. **2006**.
- Vahratian, A., Hoffman, M. K., Troendle, J. F. and Zhang, J. (2006). "The impact of parity on course of labor in a contemporary population." Birth **33**(1): 12-7
- Vande-Vusse, L. (1999a). "The essential forces of labor revisited: 13 P's reported in women's stories." The American Journal of Maternal/Child Nursing **24**(4): 176-184.
- Vande-Vusse, L. (1999b). "Decision making in analyses of women's birth stories." BIRTH **26**(1): 43-50.
- Viisainen, K. (2001). "Negotiating control and meaning: home birth as a self-constructed choice in Finland." Social Science and Medicine **52**: 1109-121.
- Villa, L. L., Costa, R. L. R., Petta, C. A., Andrade, R. P., Ault, K. A., Guiliano, A. R., Wheeler, C. M., Koutsky, L. A., Malm, C., Lehtinen, M., Skjeldestad, F. E., Olsson, S.-E., Steinwall, M., Brown, D. R., Kurman, R. J., Ronnett, B. M., Stoler, M. H., Ferenczy, A., Harper, D. M., Tamms, G. M., Yu, J., Lupinacci, L., Railkar, R., Taddeo, F. J., Jansen, K. U., Esser, M. T., Sings, H. L., Saah, A. J. and Barr, E. (2005). "Phrophylactic quadrivalent human papillomavirus (types 6, 11, 16, and 18) L1 virus-like particle vaccine in young women: a randomised double-blind placebo-controlled multicentre phas II efficacy trial." Lancet Oncology **6**: 271-278.
- Wagner, M. (1996b). "Pursuing the birth machine: An update by Marsden Wagner,M.D." Midwifery Today **37**: 33,34,51.
- Wagner, M. (1999). The Active Management of Labour., acegraphics.com.au. **1999**.
- Waldenstrom, U. (1996b). "Modern Maternity Care: does safety have to take the meaning out of birth?" Midwifery. **12**(4): 165-73.
- Waldenstrom, U. (2003). "Women's memories of childbirth at two months and one year after the birth." Birth **30**(4): 248-254.
- Waldenstrom, U., Borg, I., Olsson, B., Skold, M. and Wall, S. (1996a). "The childbirth experience: a study of 295 new mothers." Birth **23**(3): 144-153.

- Waldenstrom, U. and Turnbull, D. (1996c). "A systematic review comparing continuity of midwifery care with standard maternity services." British Journal of Obstetrics and Gynaecology. **105**(11): 1160-1170.
- Walsh, D. (2008). "CTG use in intrapartum care; assessing the evidence." British Journal of Midwifery. **16**(6): 367-369.
- Watson, J. E. and Royle, J. A. (1987). WATSON'S Medical-Surgical Nursing and Related Physiology. London., Balliere Tindall.
- Webster, J. (1991). "Politics, Pregnancy and Profitability." Australian College of Midwives Incorporated Journal **June.**: p.14-17.
- White, K., Lyndsay, M., Raynor, D., Graves, W. and Birdsong, G. (2001). Pregnancy outcome after loop electrosurgical excision procedure of the cervix.
- WHO (1985a). "World Health Organisation: appropriate technology for birth." Lancet. **2**(8452): 436-437.
- WHO (1985b). Having a Baby in Europe. Copenhagen, Regional Office for Europe, World Health Organization.
- WHO (1999). Care in Normal Birth: a practical guide. Geneva, World Health Organisation: 55.
- Windridge, K. C. and Berryman, J. C. (1999). "Women's experiences of giving birth after 35." Birth **26**(1): 16-23.
- Wright, T. C. and Richart, R. M. (1995). "Loop excision of the uterine cervix." Current Opinion in Obstetrics & Gynecology. **7**(1): 30-34.
- Yin, R. K. (2009). Case study research: Design and methods. California, USA., Sage Inc. .
- Zander, L. (1997). Women's long -term birth memories. Home Birth: New Evaluations. London., Royal Society of Medicine.

Appendices

Appendix A: Bishop's Score

Bishops Score	0	1	2	3
Cervical dilatation (cm)	0	1-2.	3-4.	5 or >
Cervical length (cm)	2 OR >	1-2.	<1	Fully effaced
Consistency of cervix	Firm	Medium	Soft	N/A
Position of cervix	Posterior	Central	Anterior	N/A
Station relative to Ischial spines	-3	-2	-1/0	+1-2

The different components of the Bishops Score are assessed at vaginal examination and given numerical values, which are then added to get the total score.

Appendix B: Ethical permissions

Initial LREC consent

NHS
Health Authority
JOINT ETHICS COMMITTEE

Your Ref:

21 February 2002

Ms V Colgan

Dear Ms Colgan

Progress During Labour After Treatment For Abnormal Smears Of The
Cervix

(Min Ref: 2002/37)

Your application in respect of this study was considered at the February
meeting of the Joint Ethics Committee.

I am pleased to advise you that ethical approval was granted.

Yours sincerely

Chairman
Joint Ethics Committee

Initial Trust consent

LRF/GW/196
23rd January 2002

Ms V Colgan
Midwife

Dear Ms Colgan

Progress During Labour After Treatment for Abnormal Smears of the Cervix

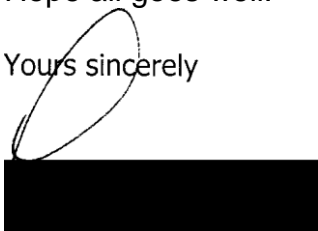
Thank you for sending a completed Project Registration Form to the R&D Department.

We have no objections to the study taking place on Trust premises

I note there are no financial implications to the Trust.

Hope all goes well.

Yours sincerely

A handwritten signature in black ink is written over a solid black rectangular redaction box. The signature appears to be a stylized, cursive name.

Initial Rand D consent

RESEARCH AND DEVELOPMENT
DEPARTMENT ROOM V3 037

Our Ref: CM/PB

Your Ref:

23rd April 2004

Mrs Val Colgan

Dear Val

'Progress during labour after treatment for abnormal smears of the cervix

Thank you very much for your letter about his project.

The additional arm of the study is noted and I do not have any objections to the work that you propose.

Good luck!

Kind regards,

Yours sincerely

Head of Research and Development

Amended LREC consent

Local Research Ethics Committees

Our ref: LK/AT/2002/37 Your ref:

8 July 2004

Ms V Colgan

1

Dear Ms Colgan

Full title of study: Progress During Labour After Treatment For Abnormal Smears Of The Cervix

REC reference number: 2002/37

Protocol number: N/A

Amendment number; 1 Amendment date: 24 June 2004

The above amendment was reviewed by the Sub-Committee of the Research Ethics Committee at the meeting held on 29 June 2004.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Covering letter - 24 June 2004

Notice of Substantial Amendment - 24 June 2004 Sponsor's letter - SM DB - 17 June 2004

Trust letter - CM/PB - 23 April 2004

Staff Information Sheet - 24/06/04

Subject Information Sheet/Additional - 24/06/04 Protocol - 24/06/04

2002-37 040708

An advisory committee to Strategic Health Authority

Management approval

Before implementing the amendment, you should check with the host organisation whether it affects their approval of the research. (noted that you have already received this approval)

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies

fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

REC reference number: 2002137 Please quote this number on all correspondence

Yours sincerely,

Committee Administrator

2002-37 040708

An advisory committee toStrategic Health Authority

Appendix C: Biographical details

Biographical Details

STUDY ID	
HOSPITAL NO.	
DOB	
Para	
Postcode	
Occupation	
(Partner)	
Smoker	
Colposcopy	
Baby DoB	
GP	
Cons	

Appendix D: Colposcopy details

PLACT Study									
COLPOSCOPY									
Study No.		Hospital number:				Date of Birth:			
Date of Tx:				Age at Tx		Parity Tx:			
Previous delivery:		Normal	Vaginal	Forceps	Ventouse	Induction	CS		
No. of Txs:				Previous Punch: <input type="checkbox"/> Yes <input type="checkbox"/> No					
Smoker:	Yes	No			Viral:	YES <input type="checkbox"/>	NO <input type="checkbox"/>		
CIN:	I	II	III	MICRO	CA SITU	GLAND			
Size (mm)		depth:							
Complete	Yes	Ecto	Endo	Both					
Complications									
Immediate	None	Bleeding	Pain	Discharge	Vag. Trauma	Other			
Later	None	Bleeding	Pain	Discharge	Other				
Treatment for bleeding/trauma:			Yes	No					
Type of treatment:									

Appendix E: Delivery details

PLACT Study									
Study No.	Date admitted:				Hospital Number:				
	Gestation:						Age:		
	Onset:						Tx to conception:		
	Pains started:						Tx to birth:		
Time:	Bishops Score	0	1	2	3	Cervix:	Dilatation		
	Dilatation(cm)	0	1-2.	3-4.	5 or >		Position		
	Length(cm)	2 OR >	1-2.	<1	Fully effaced		Station		
	Consistency	Firm	Medium	Soft	N/A		Membranes	Y	
	Position	Posterior	Central	Anterior	N/A		Rupture	N	
Adj time:	Station	-3	-2	-1/0	+1-2				
	Total:					Abdominally	Position		
Prostin: <input type="checkbox"/> Time:		Entonox: <input type="checkbox"/> **Diamorphine: <input type="checkbox"/> Time:		Epidural: <input type="checkbox"/> Time					
Syntocinon: Yes / No		Rate per hour:		Time started:					
Time:	Bishops Score	0	1	2	3	Cervix:	Dilatation		
	Dilatation(cm)	0	1-2.	3-4.	5 or >		Position		
	Length(cm)	2 OR >	1-2.	<1	Fully effaced		Station		
	Consistency	Firm	Medium	Soft	N/A		Membranes	Y	
	Position	Posterior	Central	Anterior	N/A		Rupture	N	
Adj time:	Station	-3	-2	-1/0	+1-2				
	Total:					Abdominally	Position		
Prostin: <input type="checkbox"/> Time:		Entonox: <input type="checkbox"/> **Diamorphine: <input type="checkbox"/> Time:		Epidural: <input type="checkbox"/> Time					
Syntocinon: Yes / No		Rate per hour:		Time started:					
Time:	Bishops Score	0	1	2	3	Cervix:	Dilatation		
	Dilatation(cm)	0	1-2.	3-4.	5 or >		Position		
	Length(cm)	2 OR >	1-2.	<1	Fully effaced		Station		
	Consistency	Firm	Medium	Soft	N/A		Membranes	Y	
	Position	Posterior	Central	Anterior	N/A		Rupture	N	
Adj time:	Station	-3	-2	-1/0	+1-2				
	Total:					Abdominally	Position		
Prostin: <input type="checkbox"/> Time:		Entonox: <input type="checkbox"/> **Diamorphine: <input type="checkbox"/> Time:		Epidural: <input type="checkbox"/> Time					
Syntocinon: Yes / No		Rate per hour:		Time started:					
Time:	Bishops Score	0	1	2	3	Cervix:	Dilatation		
	Dilatation(cm)	0	1-2.	3-4.	5 or >		Position		
	Length(cm)	2 OR >	1-2.	<1	Fully effaced		Station		
	Consistency	Firm	Medium	Soft	N/A		Membranes	Y	
	Position	Posterior	Central	Anterior	N/A		Rupture	N	
Adj time:	Station	-3	-2	-1/0	+1-2				
	Total:					Abdominally	Position		
Prostin: <input type="checkbox"/> Time:		Entonox: <input type="checkbox"/> **Diamorphine: <input type="checkbox"/> Time:		Epidural: <input type="checkbox"/> Time					
Syntocinon: Yes / No		Rate per hour:		Time started:					

Continued

Time:	Bishops Score	0	1	2	3	Cervix: Dilatation Position Station
	Dilatation(cm)	0	1-2.	3-4.	5 or >	
	Length(cm)	2 OR >	1-2.	<1	Fully effaced	
	Consistency	Firm	Medium	Soft	N/A	
	Position	Posterior	Central	Anterior	N/A	
Adj time:	Station	-3	-2	-1/0	+1-2	Membranes Y Rupture N
	Total:					Abdominally Position Palpable
Prostin:	Time:	Entonox:	Diamorphine:	Time:	Epidural:	Time
Syntocinon: Yes / No		Rate per hour:		Time started:		

Time:	Bishops Score	0	1	2	3	Cervix: Dilatation Position Station
	Dilatation(cm)	0	1-2.	3-4.	5 or >	
	Length(cm)	2 OR >	1-2.	<1	Fully effaced	
	Consistency	Firm	Medium	Soft	N/A	
	Position	Posterior	Central	Anterior	N/A	
Adj time:	Station	-3	-2	-1/0	+1-2	Membranes Y Rupture N
	Total:					Abdominally Position Palpable
Prostin:	Time:	Entonox:	Diamorphine:	Time:	Epidural:	Time
Syntocinon: Yes / No		Rate per hour:		Time started:		

Time:	Bishops Score	0	1	2	3	Cervix: Dilatation Position Station
	Dilatation(cm)	0	1-2.	3-4.	5 or >	
	Length(cm)	2 OR >	1-2.	<1	Fully effaced	
	Consistency	Firm	Medium	Soft	N/A	
	Position	Posterior	Central	Anterior	N/A	
Adj time:	Station	-3	-2	-1/0	+1-2	Membranes Y Rupture N
	Total:					Abdominally Position Palpable
Prostin:	Time:	Entonox:	Diamorphine:	Time:	Epidural:	Time
Syntocinon: Yes / No		Rate per hour:		Time started:		

Time:	Bishops Score	0	1	2	3	Cervix: Dilatation Position Station
	Dilatation(cm)	0	1-2.	3-4.	5 or >	
	Length(cm)	2 OR >	1-2.	<1	Fully effaced	
	Consistency	Firm	Medium	Soft	N/A	
	Position	Posterior	Central	Anterior	N/A	
Adj time:	Station	-3	-2	-1/0	+1-2	Membranes Y Rupture N
	Total:					Abdominally Position Palpable
Prostin:	Time:	Entonox:	Diamorphine:	Time:	Epidural:	Time
Syntocinon: Yes / No		Rate per hour:		Time started:		

Time:	Bishops Score	0	1	2	3	Cervix: Dilatation Position Station
	Dilatation(cm)	0	1-2.	3-4.	5 or >	
	Length(cm)	2 OR >	1-2.	<1	Fully effaced	
	Consistency	Firm	Medium	Soft	N/A	
	Position	Posterior	Central	Anterior	N/A	
Adj time:	Station	-3	-2	-1/0	+1-2	Membranes Y Rupture N
	Total:					Abdominally Position Palpable

Appendix F: Example Interview notes (Faith 01)

1 (Interviewer prompts are in red)

2 So... this is your first baby and baby arrived early at 35 weeks and 6 days.

3 So, I just want to know what happened to you.

4 You phoned the hospital 'cause you think you were in labour?

5 Well, I kind of I started...I thought I was wetting myself on Sunday morning, the
6 first thing on Sunday morning. And it starts to dribble and dribble all day and then
7 by...I just thought that maybe it's a change of position you know, causing me to
8 wet myself a little bit. And then by Monday night it started to get heavy, so I
9 phoned the hospital and it they said that needed to be checked.

10 I came in on Monday night about 11.00pm or something like, that and they had a
11 little look and decided that the membranes had gone and what they said was
12 to come back the following day or the next clinic. They gave me some oral
13 antibiotics, told me to come back to the next clinic to see the consultant
14 and they'd talk about probably inducing me because of the risk of infection.

15 That's right.

16 I think it was...yes, and then I went home and about 2.30am in the morning
17 started to get stomach pains and back pain. And I thought I'm imagining it
18 because of what's happened, but it just got steadily stronger and I phoned the
19 hospital and they said well you could be in labour and because of what's
20 happened. Just hold on as long as I could and take some pain control at home,
21 which I did, then eventually they I felt like they were getting quite close together
22 although they weren't spaced out. I thought they would be regular they didn't
23 seem to be.

24 They didn't seem as regular as you thought they would be, is that it?

25 No. thought they would be either every 3 mins or every 6 mins, I but they were
26 like sometimes 6 minutes apart sometimes... which kind of made me think well,
27 maybe its not contractions maybe its Braxton Hicks is it?

28 Yes.

29 So, anyway, eventually they got really...I thought they were really close together
30 anyway. And it was becoming very uncomfortable so I came into the hospital and
31 they examined me and I was 3cms dilated, so they decided to put me onto
32 delivery.

33 So were you happy with, or a bit shocked to find you were in labour?

34 Very shocked. Yes, I think...I think probably on the eve of Sunday I thought I
 35 must. I did think about maybe it is and like that and I don't know you just kind of
 36 think it can't be. And you know, which probably with hindsight, I probably should
 37 have phoned (my community midwife) and spoken to her, but I think I was just
 38 completely...I just thought no it can't possibly be!

39 So, when they examined you did they explain what they were doing, and what
 40 they were finding during it?

41 Yes, they explained exactly what they were doing and they were lovely actually.
 42 In fact they were fantastic right the way through, they really were.

43 So, did they explain after they examined you...sort of why they would want you to
 44 go through with the labour so early in your pregnancy?

45 Yes. Because they said the risk of infection and...the membranes going so early.
 46 But I think what they wanted to do was get me to 37 weeks, if they could or as
 47 close to 37 weeks because I think it was they were saying at the end of 36 you've
 48 got more problems. And we got as close to 37 weeks as we could, but it didn't
 49 pan out quite like that.

50 So, you went round to delivery suite after that.

51 Yes.

52 And...were you sort of walking about?

53 No. They put me on a monitor straight away, they put me on a foetal heart
 54 monitor and they put me on...yes, I think it was just a foetal heart monitor and
 55 something to measure my contractions as well.

56 Yes

57and I wasn't sure if I could move around or not. I didn't, that was the only thing,
 58 I didn't know whether I could ask to move around.

59 Yes

60but then it just got, it just got really quite uncomfortable quite quickly. So my
 61 husband asked them if I could have some gas and air, because I'm not very
 62 brave...

Not very brave at asking, or not very brave?

63 Not very brave at either really. I think, you know, you just feel like, I don't know,
 64 you feel like I'm only early on, I should be able to deal with it. And you do kind of
 65 feel like that, and I don't know. And they kind of said; well if you want it you can
 66 have it, and I'm like, right, and they sort of went. And I thought, well I do want it
 67 but you feel sort of embarrassed by having it so early almost, I think. Well, I did, I

68 don't know why really, but I did. But then I had the gas and air which was great
69 for quite a while, and then...it got too much and it was because he was in an
70 awkward position really.

71 So, had they examined you again, during this time you were on the gas and air?

72 Yes, I think they did.

73 And how did they say you were doing at that stage?

74 I can't really remember very clearly about that bit to be honest.

75 Did they say you were doing well or...?

76 Yes, no, they said it was going fine and I think they, yes, I'd got to 7cms I think
77 before I had the...what's the other one?

78 The injection, the epidural?

79 Yes, I had the injection of Diamorphine. Yes, I think I was at 7cms, but I'm not
80 entirely sure about that though to be honest. But she examined me, she told me I
81 was doing well and there was a midwife after about the first hour. There was a
82 midwife with me constantly, so that was quite nice actually. Cause they were very
83 supportive...and then I had the Diamorphine. And then it just it got ridiculous and
84 I just thought, I can't deal with this, so I asked for...an epidural.

85 And did you feel more comfortable after that?

86 It was great. I think it went from being a very, quite a scary situation and quite an
87 overwhelming situation for me, to being very...calm because I had the epidural
88 and that. And when I was having the gas and air and the Diamorphine, I felt
89 completely out of it and I felt completely out of control.

90 And you don't know what is happening and they could do anything to you (on
91 Diamorphine), and you, but I had the epidural and I just felt normal, completely
92 normal. I just feel it was very, very calm and yes; it was much, much nicer.

93 I would do it again.

94 So, you felt more in control with it? Is that what you're saying? (after the epidural)

95 Yes, I did. I think it would have been nice to have walked about, but to be honest
96 because that's the only thing I thought.

97 It would be nice to move about.

98 It would be nice to get in the water, but I don't think they would have let me
99 anyway, with him being so early

100 I don't think they would have let you in the water, no. They might have been
101 able to monitor the baby as you were walking around.

102 Yes, right.

103 I wasn't sure about that.

104 **It's difficult when they are little.**

105 It completely changes things I suppose, doesn't it.

106 I think I would have liked to have been able to walk about, but I think I was in so

107 much pain before I had the epidural, it just wasn't, it wasn't really an option I

108 don't think. And I, so I think, I don't think I could have, I don't think really I could

109 have coped without the epidural, or I would have certainly have had a lot more

110 difficulty without the epidural.

111 Then I slept, I slept for most of the afternoon I think, yes.

112 **And did they examine you again during that time?**

113 Yes.

114 **When you were sleeping, after the epidural....**

115 Yes, they examined me.

116 I think it was every 4 hrs or something like that.

117 **Yes.**

118 ...and I was fully dilated and then she said she wanted to leave it another few

119 hours to let the baby's head descend before she wanted me to start pushing.

120 But for some reason I think then...I think when they examined me again a few

121 hrs later, he still hadn't come down so they gave it a little bit longer.

122 And then it was early in the afternoon, early in the evening when they wanted

123 me to start pushing.

124 And that went on for about an hour and he just couldn't get anywhere really.

125 So they brought the...anaesthetist back to top up my epidural and I'm not sure

126 who else it was actually who came in, that came in to see about a forceps.

127 ...to try to turn him.

128 **So, did they discuss all that with you before they....**

129 Yes.

130 **Yes.**

131 They chatted to me about everything.....

132 **So, you're quite happy with the result then?**

133 Oh, yes, yes, he's pretty good.

134 **Is there anything else you would like to say about your labour? About...whether**

135 **you were kept informed, or if they involved you in the decisions they made?**

136 I felt like they did.

137 I felt they involved me right the way through.

138 The only thing that I, the only time that I thought it could have been different
139 was very at the very beginning. When I didn't, I felt like I was on the bed and I
140 couldn't move and I probably could have but I didn't realise that.

141 Yes.

142 And that would have been better had somebody have said that you can get up
143 and move...but I didn't, I don't think I realised that.

144 And they didn't really discuss the pain control options right at the beginning, but
145 after that they were fantastic and I felt really involved and to be honest they
146 were absolutely brilliant really kind and....

147 Looked after you?

148 Yes, they were they were fantastic, really good.

149 And if anyone had any idea that that was going to happen to you?

150 Yes.

151 Would you have preferred them to warn you it was possibly an early birth, or....

152 I don't know.

153 Or would you rather you know, if, if someone knew in advance.

154 Yes.

155 Would you rather they told you of that, at the beginning of the pregnancy, or
156 would you rather you weren't told.

157 I don't know to be honest.

158 Because you know, if you know you've got that knowledge and then is it that
159 harder to... I don't know, to sort of adjust and....

160 Yes.

161 Thank you very much.

162 You're welcome.

Appendix G: Nettalk

Scarred cervix

A client of mine is five days overdue and went in for a sweep to be told that she has an unusual cervix due to a colposcopy she had many years ago. She was told that the centre of her cervix is rock hard and fibrous - like a polo mint whilst the rest of her cervix is very thin and ready. She has been told that she will need to have her cervix snipped after which she is likely to go into labour straight away. She was told she will have to have the procedure under epidural.

She is really keen to have a natural birth and would like to use hypnosis rather than the epidural so at least she can have let her body kick in with the hormones. She was told that if she does not have the procedure her cervix is likely to rupture and cause major problems. Can any one shed any light on this? Is it really necessary? What would happen if she waited? She is due to go in tomorrow for the procedure so any response will be truly welcome.

Maggie

Archives

Dear Maggie,

Have a look at our list archives on the cervix: www.radmid.demon.co.uk/cervix.htm.

There are several posts on there about scar tissue on the cervix, and I think one about a midwifery technique to break the scar tissue, basically like a long stretch and sweep. This would allow the scar tissue to break at its natural weakest point, rather than a place arbitrarily being chosen for a cut. I'd be worried about having it 'snipped' because this might be more likely to extend to a true cervical tear which can lead to high blood loss. I'm not a professional and it may be that in this case it is necessary - but what's wrong with waiting and seeing how she goes? The progress of her labour might surprise everybody... and if she's only five days past her EDD she's not even technically 'overdue' by anybody's book. Is this her first baby? If so she's not even at the overage gestation for a first baby in the UK yet! How about leaving it until EDD + 10. say, and see how she feels then? She's not too late to postpone the procedure tomorrow.

If it's any consolation... I've had laser surgery too and the middle of my cervix often feels very different to the rest - has often felt like a hard ring. It hasn't been a problem, as four spontaneous, trouble-free homebirths have proven. One anecdote is of course nothing to suggest that she too will have no problems, but over the years we have had many women here and on Homebirth UK who've had cervical surgery, and rarely has it ever been a problem, except for causing a lot of worry before the birth. One member even had a very extensive cone biopsy to remove cervical cancer (true cancer, not precancerous cells) and went on to have a homebirth afterwards - see

<http://www.homebirth.org.uk/jennilydia.htm>

Angela Horn

Mum and owner of www.homebirth.org.uk

Leave well alone

Dear Maggie.

I practise as a midwife in California and see many, many women having had colposcopy or LOOP to their cervix. What I see from taking care of these women during labor is very clear, that if left alone, they will actually have a pretty good labor. What I see happening for many of them is the cervix becomes paper thin before ever dilating. They will usually have a prolonged latent phase, irregular contractions over many hours and in that time the cervix becomes really, really thin, at which time I gently examine the cervix, ease maybe one finger in and then two and before I know it, the cervix literally melts under my fingers to allow dilatation to take place. The active phase thereafter is quite rapid because the cervix is so thin. I agree with Angela. 'snipping' does not sound good practice at all and I think is coming from someone with not much experience. I would go for a second opinion! I usually warn the women beforehand what to expect and although it doesn't occur in all of them, it does happen for many. Hope that helps.

Lin, CNM

Let it be

I agree with Lin. Let it be. Expect long latent phase then roller coaster to fully dilated. Have read in Anne Frye's book about the use of Evening Primrose oil to soften an unripe cervix {not really applicable here}. What do others think?

Liz, midwife and mother

Rupture or cut?

Maggie, this has really been preying on my mind overnight. It sounds like a prime case of using scary language to get consent. What exactly is the difference between scar tissue on the cervix "rupturing", and being cut? "Rupture" is an emotive word - carries associations of a traumatic burst or of it tearing open dangerously - but how exactly could a 'snip' prevent a subsequent tear?

We know from research on episiotomies how much 'better' a "controlled snip" is than a natural tear (rolls eyes.) - a fantastic improvement if you want to create slower healing, more pain, and more extensive tears, and go for the 'gold standard' of a third-degree tear... I suppose one could always talk about the perineum 'rupturing' in labour to scare women into episiotomies! Also I should think she b****y well would want to have an epidural in place if they do this, as a) it could be Incredibly painful, and b) I suppose they want to have quick access to emergency CS or repair if she bleeds very badly afterwards...

Would you be able to let us know how she gets on? It sounds like you are quite worried about this woman - I know you don't post here often...

Angela

Appendix H: Information Sheet – Women

Research Study Information Sheet

Title of Study – Progress of Labour After Cervical Treatment (PLACT Study).

We are undertaking a research project that will examine the pattern and progress of labour of women who have had treatment of the cervix for abnormal smears.

Invitation:

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with friends, relatives and your GP if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Purpose of the study:

The project is necessary, as we do not know if the pattern or progress of labour is different after treatment of the cervix. Increasingly women requiring treatment for abnormal cervical smears are young and have not yet started or completed their families. An important contribution to normal delivery is softening and ripening of the cervix. Treatments lead to changes in composition and could affect this ripening and dilatation. The evidence at present suggests there is no difference in a healthy outcome for mother and baby.

Why you have been chosen:

You have been chosen because you indicated at the booking session with your community midwife that you had previous treatment of the cervix for an abnormal smear.

Or

You have been chosen as you have had no previous treatment of the cervix and we need to compare the women in the study who have had treatment with you.

What will happen if you take part?:

The study will involve participants having their labour details recorded, of the pattern and progress of the labour and interventions used. It will also involve your medical notes being accessed for details of any treatments of the cervix, if applicable. This project will also involve interviewing women and their carers about their labour.

You treatment during pregnancy and labour will be exactly the same as it would be if you were not involved in the study.

Will there be any benefit to taking part in the study?:

There will be no personal benefit to taking part in the study. However, the information we get from this study may help us to plan better care of women who have had treatments of the cervix.

The study is planned to take 2 years to collect enough data to be useful and will take another 1 year before the analysis of the data and recommendations for practice are available. You will be sent a summary of this data when the study is complete.

Confidentiality:

All information, which is collected, about you during the course of the study will be kept strictly confidential. Any information about you that leaves the hospital will not be used in any format that can be identified with yourself. If you have any questions please contact myself or my supervisor on the telephone numbers below or write to us at the addresses below.

This study is being carried out as part of a research thesis in the Faculty of Health, Social Work and Education at the University of Northumbria at Newcastle. The

faculty's Research Degrees Committee, the Research and Development Directorate of the Research Ethics Committee have reviewed the research proposal and granted ethical approval.

If you have any concerns about any aspect of the way you have been approached or treated during the course of this study please contact Dr. Colin Chandler using the contact information below.

It is entirely up to you to decide if you wish to take part in the research. If you decide not to take part, it will not affect the level of care you receive in any way. If you do decide to participate, you can stop taking part in the research at any time, if you wish. This will not affect the level of care you are given in any way.

Val Colgan
Community Midwife

Telephone: 07901 864037

Or

Dr. Colin Chandler
HCES

Telephone: 0191 2156049.

University of Northumbria
Coach Lane Campus
Newcastle upon Tyne, NE7 7XA.

Appendix I: Information Sheet – Staff

Research Study Information Sheet Staff

Title of Study – Progress of Labour After Cervical Treatment (PLACT Study).

We are undertaking a research project that will examine the pattern and progress of labour of women who have had treatment of the cervix for abnormal smears.

Invitation:

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Purpose of the study:

The project is necessary, as we do not know if the pattern or progress of labour is different after treatment of the cervix. Increasingly women requiring treatment for abnormal cervical smears are young and have not yet started or completed their families. An important contribution to normal delivery is softening and ripening of the cervix. Treatments may lead to changes in composition and could effect this ripening and dilatation. The evidence at present suggests there is no difference in a healthy outcome for mother and baby.

Why you have been chosen:

You have been chosen because you have been involved in the care of a woman who is part of the qualitative case studies in the research.

Part of the necessary information for her case study can only be obtained from yourself as one of the staff involved in her care. As the pilot study for this research

suggested that there may be a difference in women having their second baby but not their first this extension of the study was necessary to see if the management of the labour could account for this difference.

OR

You have looked after women with LETZ in the past and are invited to take part in a focus group.

What will happen if you take part?:

I would like to interview you for approximately 20-30 minutes about the process of decision making you used in providing care to this woman. The interview will be recorded for ease of record keeping.

Will there be any benefit to taking part in the study?:

There will be no personal benefit to taking part in the study. However, the information we get from this study may help us to plan better care of women who have had treatments of the cervix.

The study is planned to take 2 years to collect enough data to be useful and will take another 1 year before the analysis of the data and recommendations for practice are available. You will be sent a summary of this data when the study is complete.

Confidentiality:

All information collected about you during the course of the study will be kept strictly confidential. Any information about you that leaves the hospital will not be used in any format that can be identified with yourself. If you have any questions please contact myself or my supervisor on the telephone numbers below or write to us at the addresses below.

This study is being carried out as part of a research thesis in the Faculty of Health, Social Work and Education at the University of Northumbria at Newcastle. The faculty's Research Degrees Committee, the Research and Development Directorate of the Research Ethics Committee have reviewed the research proposal and granted ethical approval.

If you have any concerns about any aspect of the way you have been approached or treated during the course of this study please contact Dr. Colin Chandler using the contact information below.

It is entirely up to you to decide if you wish to take part in the research. If you decide not to take part, it will not affect you in any way. If you do decide to participate, you can stop taking part in the research at any time, if you wish.

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Telephone: 0191 2156049.

Appendix J: Consent Form – Women

Consent Form

PLACT Study

(Progress of Labour After Cervical Treatment)

Researcher: Val Colgan. Midwife.

I(please print)

consent to take part in this research project. I understand that the research is designed to add to midwifery/obstetric knowledge. I have read the information sheet about the study that is attached and I have had time to consider it. I have had the study, its purpose and method, explained to me by the researcher, Val Colgan. It has been explained to me that I can withdraw my consent at any stage without giving a reason and that this will not affect or prejudice my care.

Signed

Date:

Signed (Researcher):

Date:

Name (Capitals):

Post Held:

Appendix K: Consent Form – Staff

Case Study Consent Form

PLACT Study

(Progress of Labour After Cervical Treatment)

Researcher: Val Colgan. Midwife.

I(please print)

consent to take part in this research project. I understand that the research is designed to add to midwifery/obstetric knowledge. I have read the information sheet about the study that is attached and I have had time to consider it. I have had the study, its purpose and method, explained to me by the researcher, Val Colgan. It has been explained to me that I can withdraw my consent at any stage without giving a reason and that this will not affect me in any way.

Signed

Date:

Signed (Researcher):

Date:

Name (Capitals):

Post Held:

Appendix L: Interview Framework

Interview framework for women:

How was your labour?

When did the contractions start?

When did you go to the hospital?

(A) What happened when you were examined?

How did that make you feel?

What did you want to do next?

What happened next?

Why did that happen?

How did that make you feel?

Repeat from (A).

Interview framework for staff:

When did you become involved in this labour?

Why was that?

(A) How did you think the labour was progressing?

What information/knowledge/experience did you base this on?

What decisions were made?

What was the basis of these decisions?

Who was involved in making these decisions?

What happened next?

Repeat from (A).