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# **Approaching Labour:**

**The ‘events’ that women experience in the last two  
weeks of pregnancy**

**A thesis presented in partial fulfilment of the requirements for the degree of**

**Master of Arts in Midwifery**

**at Massey University, New Zealand**

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## Abstract

The 'everyday' events that women experience in the final fortnight of pregnancy as their bodies prepare for labour, is not well reported in the research. This preliminary descriptive study was designed to answer the question: are there specific events in late pregnancy that are associated with the onset of labour?

One hundred and nineteen women used the daily diary that was specifically developed for the study. They recorded the events they experienced between 38 weeks gestation and the onset of their labour. Women were eligible to participate if they had an uncomplicated singleton pregnancy, and were cared for by an independent midwife. Fifteen events were identified that women either commonly experienced or that were important for individual women. These were: cervical 'needling' sensations, fluctuation in fetal movements, uterine activity, mood and energy fluctuations, broken sleep, disturbed bowel and bladder patterns, alterations to vaginal secretions, appetite and mood, nesting/deadline urges, raised libido and enhanced sense of smell and hearing acuity.

The study results do not demonstrate any statistically significant relationships between any of the variables with the onset of labour. However, clinically significant frequencies and patterns have been identified for cervical needling sensations, fluctuations in fetal movements, uterine activity, a 'show', disturbances to bowel activity, mood lability and broken sleep. The study findings provide evidence for the patterns of occurrence of these events that, apart from uterine activity and broken sleep, have hitherto rested on anecdotal, traditional information rather than research.

Specific findings from the study indicate that in the final two weeks of pregnancy, cervical needling sensations were experienced by 74% of the study sample that may mirror the physiological process of cervical softening or effacement. A 'normal' range of fetal movement variation that is not associated with fetal compromise was experienced by 79% of the study participants. Half of the study population experienced mood fluctuations in the fifteen days preceding the onset of labour, whilst two thirds of the sample did not experience a 'show' before the onset of

labour. Several events such as broken sleep and disturbances of bowel activity occur in more complex patterns and over a longer period than is commonly reported in the literature examined for this study.

Midwives help women to stay calm and confident about childbirth by sharing information that can enable each woman to anticipate the normal experiences of childbirth. Providing such '*anticipatory information*' is a key midwifery activity. The results of this study provide evidence for the '*anticipatory information*' related to the final weeks of pregnancy that midwives share with women.

Multiple questions for further research have been generated by the study. In particular, seven events occurred in a synchronous pattern six days prior to the onset of labour, and three of the four post-dates multigravidae whose babies were in an occipito-posterior position at the onset of labour had an operative outcome. These interesting findings need further study to determine whether the findings have significance.



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# Chapter One: Orientation to the Study

## Introduction

Women vividly remember what happens to them during the intensity of labour and birth (Rothman, 1989). However, once labour begins, the 'everyday' events that occurred in the last weeks of pregnancy become unimportant. They are left on the other side of birth, lost to memory, except in a general way. This study identifies and illuminates the 'everyday' events that occur during the final fortnight of pregnancy, when each woman's body is readying for labour. The events that occur, and the frequency with which they happen were examined. The possible association with the onset of labour of one or more of the identified events was also investigated. The use of a data collection instrument that was specifically developed for this study was trialled and evaluated during the current study. The study was undertaken between May 1999 and November 2000.

In this chapter the research question, the aims and the method are overviewed. A description of the process whereby reflection on the collected data was undertaken, and the necessity for such a process, is followed by justification for the study, background literature and the study context. The background information that prompted the research is provided within the section related to the researcher background and rationale for the study. An overview of the following chapters precedes a description of the operational definitions used in this study.

## Research Question and Aims of the Research

The research question was:

Are there specific late pregnancy events that are associated with the onset of labour in pregnant women who are 38 weeks or more gestation when labour begins?

The aims of the study were:

- To identify the 'events' that women experience in the final weeks of their pregnancies.

- To identify whether a single event or a cluster of events is common to all or most women's experiences.
- To determine if any of the identified events appear associated with the onset of labour.
- To highlight events which have potential for further investigation.
- To trial the use of a recording diary for data collection in the late stages of pregnancy.

## **Research Design**

Only two studies were located that addressed the nature of events women experience in late pregnancy. They are, Evans, Dick and Clark's (1995) study of sleep in the week prior to labour, and Nageotte, Dorchester, Porto, Keegan and Freeman's (1988) study of uterine contractions during the latter weeks of pregnancy.

The preliminary review of the literature revealed that little information is reported about the events that women experience as labour approaches. This information appears to be 'received wisdom' rather than evidenced based research. Events such as taking up of the cervix, changes in uterine contractions, gastrointestinal disturbance and surges of energy, are referred to as occurring quite commonly prior to the onset of labour, (Balaskas & Gordon, 1987; Bennett & Brown, 1999; Enkin, Kierse, Renfrew & Neilson, 1995; Olds, London & Ladewig, 1995; Oxorn, 1986; Rosevear & Stirrat, 1996; Sweet & Tiran, 1997). Whilst it is important to value the birthing and practice wisdom of women and midwives, oral tradition tends to highlight the individual, rather than the collective experience. Given the unknown occurrence of most late pregnancy events, the first step towards understanding the events women experience during the final weeks of pregnancy was to undertake a preliminary study in order to identify the events that did occur, and to determine how consistently they occurred.

In this study women kept a daily diary of the events they experienced from 38 weeks gestation, or from the date of recruitment if this was after 38 weeks of pregnancy, until the onset of labour. Descriptive statistical measures such as frequencies were used to describe the findings. As association of any event with the onset of labour



could only be analysed if promising results were evident in the descriptive data, it was intended to undertake more sophisticated statistical analysis only if there were promising results from the data. Correlation and/or regression analysis was planned should data suitable for these types of statistical analysis be generated from the study.

The lack of research in the area under scrutiny meant that no validated data collection instrument was available to gather information about all the events examined in this study. Therefore an original data collection instrument was developed. Thus, a further aim of the study was to trial the use of the daily recording diary (see Chapter Four).

Preliminary studies are designed to identify 'what exists' (Baumgartner & Strong, 1994; Portney & Watkins, 2000). Unlike other quantitative research designs, researchers undertaking this type of study are less able to anticipate or estimate the likely results. Analysis of descriptive data such as that generated by the current study seems to be located at the junction of quantitative and qualitative research techniques. Reflection on, or 'dwelling with' the data is a technique employed in qualitative research studies (Lamb & Huttlinger, 1989). The data from this quantitative study required the employment of a reflective technique to consider other possible explanations and/or to challenge the patterns emerging from the initial data, in order to gain insight into the meaning of the results (Appleton, 1995). Le Fort (1993) says that the meaningfulness of results of descriptive research is of the utmost importance and should be specifically addressed in the research report. The process of reflection was used in this study in order to decide upon the ways to examine the patterns resulting from the initial data displays; which data to submit to more complex statistical testing; and to decide upon the meaningfulness of the results.

## **Justification and Background Literature for the Study**

While the research proposal was being prepared, relevant literature was explored to compile background information and to discover if such a study had been previously undertaken. Justification for the current study included the fact that few studies were identified relating to women's experiences of events in the final weeks of pregnancy.

In the last few weeks of pregnancy women's bodies prepare for labour. Events that are thought to signal that labour is imminent are described as lightening, increasing uterine contractions, a blood and mucus 'show' and cervical effacement. These events are so well known that they are almost universally cited in books written for pregnant women, and in midwifery and obstetric texts as signs of the onset of labour (Appendices I-IV). Women and midwives know that there are also other events that are experienced in the latter weeks of pregnancy that can sometimes be uncomfortable or worrisome. Some of these events are increased vaginal secretions, disturbances to elimination patterns and variability in sleep and energy patterns. These events are reported in some publications (Balaskas & Gordon, 1987; Cassidy, 1993 & 1999; Evans, Dick & Clark, 1995; Jamieson, 1993; Johnson & Johnson, 1980; Olds, London & Ladewig, 1995; Varney, 1997).

If women's experiences of the events in the last weeks of pregnancy are as universal as the literature implies, then there should be some predictability about the onset of labour. This is patently not the case. The same literature that confidently cites the above signs as signalling the onset of labour also states how difficult it is to know when labour begins (Bennett & Brown, 1999; Enkin, Keirse, Renfrew & Neilson, 1995; Pullon, 1991; Rosevear & Stirrat, 1996).

This difficulty has resulted in health professionals coining the term 'false labour' (Bennett & Brown, 1993 & 1999; Enkin, Keirse, Renfrew et al., 1995; Olds, et al., 1995, Silverton, 1993). False labour is "recognised as the failure of the cervix to efface and dilate in the presence of regular, painful, uterine contractions" (Sweet & Tiran, 1997, p.362). Late pregnancy contractions can be quite intense and occur frequently in the last two weeks of pregnancy. Pain may be experienced and lead the woman to think she is in labour. Women are admitted to delivery units because they

believe labour has begun, and are then sent home because they are not in labour (Morrin, 1997; Rothman, 1989; Thompson, 1993 & 1999; Varney, 1997). Raised expectations such as these can be distressing when found to be premature (Sellars, 1993).

Women's confidence in their bodies and in the processes of normal childbirth affects their experience of labour and birth (Crowe & von Bayer, 1989; Green, 1993; Lowe, 1991; Wuitchik, Bakal & Lipshitz, 1994). Knowing the normal experience of the latter weeks of pregnancy and the transition from pregnancy to labour, is an important part of building and maintaining women's confidence in childbirth and preventing or reducing anxiety about the normal processes of labour.

A central aim of current midwifery practice is to guard normal childbirth by preventing the incidence of unnecessary intervention (Page, 2000). Using evidence to support practice is one way of achieving this aim (Enkin et al., 1995; HFA Obstetric Referral Guidelines, 1997). Any study that contributes to the evidence base for midwifery practice and toward each woman's knowledge of her body's progress from pregnancy to labour must contribute to meeting this aim.

Minor health events or wellness experiences are most reliably captured if they are recorded as they occur. A daily diary was considered a suitable tool for collecting data about the type of events examined in this study (Minichiello, Sullivan, Greenwood, & Axford, 1999).

## **Study Context**

This study was conducted in the greater Auckland region of New Zealand. Sixty-four independent midwives from urban, small town and rural midwifery practices recruited women in their care who had an uncomplicated pregnancy into the study. One hundred and nineteen women kept a daily diary about the events they experienced from 38 (or later) weeks gestation until they went into labour.

## **Researcher Interest and Rationale for the Study**

During the course of my practice as an independent midwife, I noticed that many women appeared to experience similar events in the weeks immediately preceding labour. I wondered if there was a common pattern to some of these events, despite the assertions of some women that they had had no warning of the onset of labour. If there was a common pattern to the events in late pregnancy, then one or more events may have an association with the onset of labour. If there was such an association, I believed that women and their caregivers in childbirth would have increased confidence in the identified late pregnancy event(s) as a reliable marker that the onset of labour was imminent. They could also be able to confidently differentiate between late pregnancy activity and the onset of labour. This in turn may lead to fewer unnecessary admissions to hospital, fewer unnecessary interventions in the labour and birth process and possibly fewer inductions of labour.

If there was not a such association, and the late pregnancy events were random, the knowledge that such events are part of a normal pregnancy experience may enhance confidence in the normal process and women's confidence in their own decisions about contacting their midwife or doctor. The number of contacts and/or admissions related to needing reassurance that everything was proceeding normally may be reduced.

## **Structure of Thesis**

Chapter Two provides a critical overview of the literature in order to place the research study in the context of existing written knowledge. The rationale for a quantitative approach to the study and for the research design is presented and discussed in Chapter Three. The details of the method used for data collection are explained. Issues related to selection of participants, information provision, ethical considerations and data analysis are presented and discussed.

In Chapter Four the daily recording diary that was developed and used for data collection in this study is discussed and evaluated. There are two chapters devoted to presentation of the study results. Firstly, in Chapter Five the categories used, the

process of organising the data for analysis and issues of sample size are discussed. The demographic data from the sample are also presented. Secondly, in Chapter Six, an analysis of the data relating to the daily recordings from the 15 days prior to labour is presented. Results from daily samples and the 72-hours prior to the onset of labour are also presented in this chapter. A discussion about how the research question and its aims were addressed, and the results of the study are presented. Implications for practice, education and research are also highlighted in Chapter Seven. The concluding remarks draw this preliminary study to a close.

## Operational Definitions

The following meanings have been attributed to the terms used in this study.

### Late pregnancy event

Any occurrence or change in any of the items listed in Table A during the final fifteen days of pregnancy.

**Table A. Late Pregnancy Events**

<ul style="list-style-type: none"> <li>• mood/feelings</li> <li>• energy levels</li> <li>• food intake and / or type of food</li> <li>• uterine contractions - painful / painless</li> <li>• baby movements</li> </ul>	<ul style="list-style-type: none"> <li>• vaginal secretions</li> <li>• bowel and bladder function</li> <li>• 'needling' pains in cervix</li> <li>• sleep patterns/dreams</li> <li>• senses of taste, hearing &amp; smell</li> <li>• other</li> </ul>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### Change in event

Any alteration in strength, frequency, usual pattern, size and type related to any of the events listed above.

### Occurrence of event

The event has occurred on any day in the recording period.

### The Recording Period

The final fifteen days of pregnancy.

### Daily Recording Diary

The data collection instrument designed for this study that women filled in daily.

### Total sample

All participants in the study, i.e. 119 women.

### **Daily sample**

The number of women recording the occurrence of, or change in, a late pregnancy event on each of the final fifteen days of pregnancy.

### **Recording day**

Any day on which women recorded the occurrence of, or change in, a late pregnancy event during the final fifteen days of pregnancy.

### **Onset of labour**

The onset of regular uterine contractions that increase in frequency, intensity and duration and which result in progressive cervical dilatation and the birth of the baby.

### **Summary**

Orientation to the study has introduced the research question, the aims and the research method. The study was designed to identify the events and the occurrence of the events that women experience in the final two weeks of pregnancy as their bodies prepared for labour. It was also designed to discover whether there is an association between any of the identified events and the onset of labour. The data collection diary was trialled in this study.

The potential to reduce unnecessary visits to hospital delivery units as well as the lack of research in the area were described as part of the justification for the study. My interest and background experience was discussed, as were pertinent research studies that may assist the reader to become orientated to this study. The challenge in current midwifery practice to protect the normal processes of pregnancy and childbirth in order to assist women to be confident in the childbirth experience was also discussed. Finally an overview of the thesis and a description of the operational definitions used in this study was provided.

A review of the literature that places the study in the context of existing knowledge about pre-labour events is presented in Chapter Two.

## Chapter Two: Literature Review

### Introduction

The purpose of the literature review is to site the research study within the context of relevant existing knowledge (Rountree & Laing, 1996). The literature reviewed in this chapter relates to the research question, in that late pregnancy events, theories and research concerning physiological processes involved in the initiation of labour and the traditional signs of the onset of labour are examined.

In addition, the study undertook to trial a late pregnancy diary as an instrument for data collection. Texts and articles that support the research method were also explored. The review is presented as an addendum at the end of this chapter.

The material located for this study resulted from a search of current and historical midwifery and obstetric texts and from reference lists. Databases were accessed through the Cochrane Collection electronic library, CINAHL, Medline, Proquest Medical Library, Webspirs and Wilson Social Sciences. Standard searches were made through the Midwifery Information and Research Service (MIDIRS, 2000).

The following review of the literature addresses texts and articles related to the late pregnancy events examined in this study. Whilst some events, such as cervical effacement and fetal movements have been the subject of substantial research, many of the references located for other events appear to place more reliance upon 'common sense' or 'received wisdom' than upon research studies. There is a paucity of research specifically related to the late pregnancy events experienced by women that are examined in this study. In particular, journal articles are sparse. The gaps in published work in relation to many of the events are identified in this review.

However, there is an abundance of research related to the physiology of the initiation of labour. From this body of research, articles that relate to the physiological changes that occur in preparation for labour are reviewed. Following this section, a review of material from historical and current texts and articles relating to the notion of pre-



labour and the traditional signs of labour, including the concept of false labour, is undertaken. Literature that addresses identification of the onset of labour and the clinical consequences of failure to do so is then examined, followed by review of a study that used an educational technique to assist women to develop confidence in identifying the onset of labour.

## **Late Pregnancy Events.**

In the following section literature reviewed in relation to the specific late pregnancy events examined in this study is outlined. Each event is discussed separately, and are in no particular order. Where sources related to a specific item are excessive the references have been appended, e.g. cervical effacement as a sign of impending labour (17 references, Appendix 4).

### **Needling Sensation in the Uterine Cervix**

Almost all of the texts and articles examined for this study state that cervical effacement or 'taking up' of the cervix is a sign that the onset of labour is near (17 references, Appendix 4). Indeed, substantial research has been undertaken in relation to the physiological changes that occur in the cervix during the final weeks of pregnancy.

Cervical tissue remodelling, is a sequential process which occurs throughout pregnancy and culminates in final softening phases in the last three to four weeks of pregnancy (Leppert, 1998). The cervix is composed of smooth muscle, a collagen framework and a ground substance of fibrous connective tissue (Ruiz, 1998). In early pregnancy the cervix is firm and unyielding as, under the influence of progesterone, the collagen fibres are held tightly together in a triple helix structure with cross-links (Leppert, 1998; Penny, 1999). At about 34 weeks gestation the structure of the cervix begins to alter to become less firm and unyielding (Ruiz, 1998). The changes are triggered by locally produced prostaglandins (Penny, 1999). The softening of the tissue is due to the break down of the collagen helices by an enzyme, tissue collagenase, and an increase in the water content of the cervical tissue (Leppert, 1998; Penny, 1999). Decorin, a proteoglycan secreted by the cervical cells,

disorganises and disperses the collagen fibrils through the cervix (Leppert, 1998). These processes contribute to the cervix becoming swollen, softer and more flexible (Ruiz, 1998) and therefore capable of effacement and dilatation.

In the articles and texts located for the current study the only mention of women experiencing sensations in the cervix at any time during pregnancy is by Anne Frye (1998), an experienced home-birth midwife from the United States. Her description is not referenced to any other source. Rather, she describes the event from her experience of caring for many women in childbirth. The author describes the sensations in the cervix during the weeks prior to labour as intermittent, not co-ordinated with contractions and as shooting up from the cervix. She does not mention whether the sensations can be associated with pain or discomfort.

### **Frequency of fetal movements**

Balaskas and Gordon (1987) state that, "In the days before labour begins your baby may have less frequent movements, although some babies move more" (p140-141). Varney (1997) discusses variability in the total number of fetal movements and agrees with Balaskas and Gordon (1987) that a decrease in the number of fetal movements may be experienced near term. Silverton (1993) discusses fetal activity in more general terms. She states that fetal movement throughout pregnancy peaks at 28-32 weeks gestation, decreasing gradually thereafter until the end of pregnancy. Thomson (1993) however, disagrees. She states that:

*Many women believe that it is normal for the fetus to become less active before labour. The midwife can point out that although the type of movements change because of reduced space, fetal activity should continue throughout pregnancy* (p.145)

Although Thomson does not agree that the fetus becomes less active before labour, she is making the point that the baby should move regularly until he or she is born. A marked reduction in the number of fetal movements is known to be associated with serious fetal compromise (Enkin, Keirse, Renfrew & Neilson, 1996; Enkin, Keirse, Neilson, Crowther, Duley, Hodnett & Hofmeyr, 2000; Olds, London & Ladewig,

1995; Telfer, 1997; Thomson, 1999). It is well established midwifery practice to instruct women to contact their midwife if, for example, they experience less than ten fetal movements within twelve hours (Enkin Keirse, Renfrew et al., 1996; Enkin, Keirse, Neilson et al., 2000; Telfer, 1997; Thomson, 1999; Varney, 1997).

Daily fetal movement counting has been widely used as a means of assessing fetal well being in the third trimester of pregnancy. Enkin, Keirse, Neilson et al., (2000); have concluded, from their meta-analysis of the available randomised controlled trials, that formal daily fetal movement counting has not prevented late fetal deaths and therefore cannot be regarded as a useful preventive procedure. This evidence suggests that distinguishing between benign fluctuations in fetal movement patterns, and reduction in movements that may herald a significant fetal indisposition, may not be as easy or as useful as previously thought. However, Enkin, Keirse, Neilson et al. (2000) do not recommend that women altogether abandon noticing their babies' movement patterns. The discussion by Enkin, Keirse, Neilson et al. (2000) relates to an abnormally low number of daily fetal movements.

Regular cycles of fetal movement frequency (designated 'active' and 'resting' periods) are known to occur but are neither well researched nor widely published (Telfer, 1997). The only reference located in relation to cyclical variation in movement frequency was in Telfer (1997). However, apart from Varney (1997), who notes that fetal movements are widely variable in number and pattern, the normal daily variation in the number of fetal movements in late pregnancy is not widely discussed. There is a gap in the literature related to this normal feature of pregnancy.

Thomson (1993), Varney (1997) and Balaskas and Gordon (1987) also note that in some cases fetal movements become more frequent before labour. Olds et al. (1995) contradict this view. They state that the number of fetal movements does not usually increase before labour. The comments by these authors appear to rest on clinical observations. They do not cite any research to support their statements.

## **Magnitude of Fetal Movements**

It seems that in the final weeks of pregnancy alterations in the magnitude of fetal movements is a known event. Olds et al. (1995) state that women report a decrease in the magnitude of the baby's movements as a normal feature of the last 2-3 weeks of pregnancy. In the quotation from Thomson (1993), produced on page 14, the point is made that the type of fetal movement can alter as labour approaches. Again, no research is cited to support these assertions.

## **Uterine Activity**

Increasing uterine contraction activity reported by women and described in almost all the texts and articles examined for this study (22 references, Appendix 3), is underpinned by the research related to the physiology of myometrial development and activity in the final weeks of pregnancy. In the final few weeks of pregnancy, the myometrium develops gap junctions to allow the uterine muscle to act as a syncytium (a group of cells in which the cellular cytoplasm is continuous with adjacent cells so that all the cells act as one unit). The effect of this development is to co-ordinate myometrial activity to change from intermittent contractions of varying intensity, to regular, co-ordinated labour contractions of increasing intensity (McNabb, 1997b; Nathanielsz, 1994; Norwitz, Robinson & Challis, 1999; Penny, 1999). The uterus and cervix also synthesise and release prostaglandins (Norwitz et al., 1999). The structure of the uterine muscle fibres includes a protein, troponin, that in the presence of an influx of calcium ions into the myometrial cells, triggers uterine muscle contraction (Norwitz et al.; 1999; Penny, 1999). Simultaneously, the myometrial cells upregulate their number of oxytocin receptors thereby making the cell more sensitive to serum oxytocin, so that a larger contraction response to maternal serum oxytocin levels is produced (Carson, 1997, Penny, 1999).

There is a nocturnal surge in uterine activity associated with a rise in serum oxytocin concentration that increases progressively in late pregnancy (McNabb, 1997c). In his study of monkeys, Nathanielsz (1994), found that while uterine activity is a constant event during pregnancy, there is a change in the patterns of contractility for several days prior to the onset of labour. He also found that, at night, the contractions and patterns developed to become fully co-ordinated contractions that precipitated labour

after a few nights. He notes that a similar pattern has often been observed in pregnant women.

Nageotte, Dorchester, Porto, Keegan, and Freeman (1988), undertook a longitudinal cohort study, the aim of which was to quantify uterine activity before labour, in women giving birth preterm, at term and post term. After exclusion of women with multiple pregnancy, third trimester bleeding, polyhydramnios, pre term rupture of membranes and diagnosed preterm labour, a final sample of 2446 women participated in the study. Uterine activity was measured as the maximum number of spontaneous uterine contractions per 10 minutes, on the first part of a tocograph recording. Women were assessed on several occasions at different stages of pregnancy between 30 and 42 weeks of pregnancy. The number of assessments per woman was dictated by the gestation that each woman gave birth. Women who gave birth at earlier gestations had fewer assessments. The researchers found a statistically significant increase in maximum uterine activity per 10 minute window ( $p. <0.0001$ ) as pregnancy progressed. Compared with women who spontaneously gave birth at term, most uterine activity in the 10 minute window was seen in women who gave birth pre-term ( $p. <0.05$ ), and least uterine activity per 10 minute window was seen in women who gave birth post term ( $p. <0.05$ ). The differences seen were present for several weeks prior to the onset of labour. A side result of the study was that a surge in uterine activity was consistently found during the three days prior to the spontaneous onset of labour for all of the women, whether their labour was term, pre-term or post-term.

### **Sleep Patterns**

Pregnant women report that they have increasing difficulty sleeping as their abdominal size increases (Silverton, 1993). Jamieson (1993) refers to general insomnia throughout pregnancy in a non-specific fashion, and Varney (1997) makes passing reference to not sleeping well as part of what she refers to as the “general miseries of the end of pregnancy” (p.391).

Evans, Dick and Clark, (1995), used a descriptive correlational design to investigate whether there were relationships between the quality of sleep in the week prior to

labour with length of labour, type of delivery, and the mother's perception of her labour and birth. Existing data collection tools were employed, i.e the Verran, Snyder-Halpern Sleep Scale and the Manut-Mercer Perception of Labor Scale. A power analysis showed that a sample of 100 was required for the study. Data was collected prospectively from a self-selected sample. There were usable returns from 99 women, (a 57% response rate). Results showed that women's sleep was disturbed and of poor quality during the week prior to the onset of their labour. The reports of sleep disturbance were higher the night before labour commenced, indicating that sleep quality decreased as labour neared. The findings are consistent with earlier studies of sleep in late pregnancy. The most important of these studies were by Karacan, Heine, Agnew, Williams, Webb and Ross (1968) who studied five women who had uncomplicated pregnancies with electroencephalographs, and Driver and Shapiro (1992), who replicated Karacan et al.'s study. The results of both of these studies demonstrated that the pregnant women showed the sleep patterns similar to people who suffer from insomnia, i.e. taking a long time to fall asleep, more wakeful episodes and shorter overall sleep time than non-insomniacs. Evans et al. (1995) concluded that sleep problems are common in the last days of pregnancy.

### **Dreaming**

It is possible that there may be an increase in dreaming toward the end of pregnancy. Schroeder-Zwelling (1988) alludes to vivid dreams throughout pregnancy, while Olds, London, and Ladewig (1995) state that women have reported vivid dreams in the third trimester of pregnancy. No studies have been located that relate to dreaming in pregnancy. The incidence and intensity of dreaming in late pregnancy and whether it differs from the incidence and intensity of dreaming in early pregnancy and in non pregnant women, appears poorly researched.

### **Vaginal Secretions**

Reference to a 'show' as a sign of the onset of labour was found in most material scrutinised for this study (20 references, Appendix 2). The references appear to be traditional information rather than based upon research studies (see p 23).



Women report that increasing vaginal secretion is a constant feature in the last two weeks of pregnancy (Cassidy, 1993, 1999; Gaskin, 1990; Johnson & Johnson, 1980; Llewellyn-Jones, 1986, 1999; Myles, 1971; Oxorn, 1986). Occasionally, the secretions are so fluid they are mistaken for liquor amnii from ruptured membranes (Cassidy, 1993, 1999; Enkin, Keirse, Neilson et al., 2000).

### **Changes in Patterns of Elimination**

In the final weeks of pregnancy, women may report a return of the urinary frequency that they experienced early in their pregnancies. The symptoms appear to be related to the descent of the presenting part into the pelvis. Ten authors state that women experience frequency of micturition in the last four weeks of pregnancy (Balaskas & Gordon, 1987; Bennett & Brown, 1999; Corkhill, 1948; Frye, 1998; Gaskin, 1990; Green, 1976; Llewellyn-Jones, 1986, 1999; Myles, 1971; Pullon, 1991; Sellars, 1993). The authors cite no research.

The occurrence of loose and/or copious stools 12-24 hours prior to the onset of labour is reported in some midwifery texts (Olds et al., 1995; Varney, 1997). Older texts report that intestinal disturbance is not uncommon and that many women experience a 'natural' diarrhoea in the 24 hours prior to the onset of labour (Corkhill, 1948; Myles, 1971). Balaskas and Gordon (1987) describe emptying of the bowel frequently and loose stools as a sign that labour is imminent. However, Llewellyn-Jones (1986, 1999) states that constipation is common in the last weeks of pregnancy. The material cited that relates to bowel activity appears to be an everyday understanding. No evidence-based research has been located for this study.

### **Energy Levels**

Literature found on the topic of energy levels in the final weeks of pregnancy is contradictory. Most of the authors describe a surge of energy or vigour in the 24-48 hours prior to labour (Balaskas & Gordon, 1987; Cassidy, 1993, 1999; Johnson & Johnson, 1980; Olds et al., 1995; Silverton, 1993). However, Varney (1997) describes lower energy as another of the "general miseries of the end of pregnancy" (p. 361). The occurrence of a surge of energy 24 -48 hours prior to the onset of labour is a frequently reported, but poorly understood phenomenon (Olds et al.;

1995; Silvertown, 1993; Morrish, 1997). Midwifery texts report this phenomenon as received wisdom rather than research based knowledge.

### **Fluctuations in Mood**

Several authors variously allude to mood fluctuation as labile self confidence and mood swings (Cassidy, 1999), anticipation with a mixture of fear and excitement (Morrish, 1997), nervousness and apprehension (Green, 1975) and lowered mood (Varney, 1997). These were the only references to mood quality located in the literature examined for this study.

### **Nesting/meeting deadlines**

The two references located relating to a 'nesting' feeling or meeting deadlines before labour were Johnson and Johnson (1980) and Olds, et al. (1995). They both make statements that these feelings are common in the days before labour and are often manifested as an urge to finish the baby's room or to clean the cupboards; and that these urges are frequently accompanied with feelings of raised energy or well being.

### **Raised libido**

Bing (1988) and Olds et al. (1995) state that raised libido is experienced by a small number of women in the final weeks of pregnancy. Balaskas and Gordon (1987, p.142) agree. They explain that women may feel "more sensual and intuitive" as labour draws near.

### **Appetite**

Varney (1997) says that some women experience reduced appetite as labour approaches. Heston and Simpkin, (1991), in their article on carbohydrate loading postulate that there are similarities between endurance sports and childbirth. They suggest that a moderate increase in dietary carbohydrates in the last weeks of pregnancy may reduce the incidence of muscle fatigue and ketoacidosis in labour. No studies have been located that support this theory.



## **Senses of smell, taste, and hearing.**

It is stated in some midwifery texts that the senses of smell and taste are altered in early pregnancy (Thomson, 1993; Olds et al.; 1995; Sellars, 1993). Midwives report individual instances of women having a significantly heightened sense of smell during labour. The sense of hearing is known to be more acute in times of stress (Porth, 1998). Labour and birth is a time of heightened anticipation that resembles the stress response. There is no research reported in the material examined for this study related to a heightened sense of smell or to alterations in acuity of hearing prior to the onset of labour.

## **The Physiological Processes Related to the Onset of Labour.**

The following section reviews articles from the significant body of literature that reports research into the physiology related to the transition from pregnancy to labour. Over the past twenty years there has been an intensive search for the physiological triggers for human labour, primarily to find a way of preventing the onset of pre term labour (Grammatopoulos & Hillhouse; 1999; Kelly, 1996; Lopez et al., 1987; Luton et al., 1997; Majzoub et al., 1999; Nathanielsz, 1994; Neulen & Breckwolt, 1994; Norwitz, Robinson & Challis, 1999; Olah, 1994; Osmers, Adelman-Grill, Rath, Stulsatz, Tschesche & Kuhn, 1995; Osmers, Blaser, Kuhn, & Tschesche, 1995; Smith, 1999; Steinborn, Kuhnert & Halberstadt, 1996). Much of this work is already incorporated into midwifery and obstetric texts (Bennett & Brown; 1993, 1999; Chalmers & Hamilton-Fairley, 1999; Cunningham et al., 1997; Gaskin, 1990; Henderson & Jones, 1997; Llewellyn-Jones, 1999; McNabb, 1997a, c; Olds et al., 1995; Sellars, 1993; Silverton, 1993; Stables, 1999; Rosevear & Stirrat, 1996).

## **Endocrine System Theories**

Studies of the human placenta and uterine tissue have established that the decidua, placenta and the fetal membranes produce prostaglandins. Stables (1999), says that the role of prostaglandins is central to the physiological processes related to the onset of labour. Furthermore, it has been shown that an inflammatory response is

associated with the preparation of the uterus and cervix for labour (Penny, 1999). The placenta produces cytokines (Osmers, Adelman-Grill, et al., 1995) and Interleukin-8, (Osmers, Blaser et al., 1995). These mediating substances appear to allow cells to communicate with each other and to promote tissue breakdown. Along with the prostaglandins  $E_2$  and  $F_{2\alpha}$ , cytokines and Interleukin-8 appear to be significant in the initiation of labour (Carson, 1997). It is known that the fetus has a central role in both the timing and the initiation of labour (Norwitz et al., 1996; Penny, 1999; Stables, 1999). However, the exact role of the fetal hypothalamic-hypophyseal-adrenal axis remains unclear (Norwitz et al., 1996; Stables, 1999).

### **The role of corticotropin-releasing hormone in the onset of labour**

Recently, a number of studies have examined the role of corticotropin-releasing hormone (CRH), which is produced by both the maternal and fetal hypothalamus and by the placenta. (Grammatopoulos & Hillhouse, 1999; Kelly, 1996; Majzoub et al., 1999; Norowitz, et al., 1999; Smith, 1999). According to Smith (1999) birth in humans seems to be determined by the rate of release of placental CRH. The maternal serum levels of CRH rise dramatically in the latter weeks of pregnancy (Grammatopoulos & Hillhouse, 1999). Smith (1999) states that there is collective evidence to suggest that CRH, most of which comes from the placenta, triggers fetal cortisol production (required to mature fetal lungs) and oestrogen manufacture by the placenta. Majzoub et al. (1999), state that corticotropin-releasing hormone (CRH) stimulates the release of adrenocorticotrophic hormone (ACTH) from the fetal pituitary gland. They propose that cortisol further stimulates placental release of CRH, thus creating a positive feedback system that develops the levels of CRH production required for labour. Grammatopoulos and Hillhouse (1999) postulate that CRH has a central role in co-ordinating the smooth transition from uterine relaxation to uterine contractions. Other work indicates that CRH acts directly on the uterus and cervix, possibly by potentiating the effect of other hormones such as oxytocin (Smith, 1999). Grammatopoulos and Hillhouse (1999) report the presence of CRH receptors in the uterine muscle cells and, that the mix of receptors changes during parturition.

Majzoub et al., (1999) and Grammatopoulos and Hillhouse (1999) posit a central co-ordinating role for corticotropin-releasing factor in the onset of labour, however, Penny, (1999), states that current theories about the role of corticotropin-releasing hormone have been challenged. Norwitz et al. (1999), Penny (1999) and Stables (1999) suggest that the fetus may co-ordinate the changes to uterine activity. Stables (1999), suggests that the production of dehydroepiandrosterone (DHAS) by the fetal zone of the fetal adrenal may be implicated in the fetal control of labour. Stables (1999) also posits that fetal oxytocin may also be involved in the onset of labour. Current thought from researchers into the physiological triggers for the onset of labour appears to be that “labour is a complex physiological process involving fetal and placental, as well as maternal signals. Considerable evidence suggests that the fetus controls the timing of labour ... but exactly how is unknown” (Norwitz, et al., 1999, p.663).

## **Approaching Labour**

The differentiation by women and health professionals of early labour from late pregnancy changes is difficult and is often known only in retrospect (Balaskas & Gordon, 1987; Cassidy, 1993, 1999; Chamberlain & Hamilton-Fairley, 1999; Enkin, Keirse, Renfrew, & Neilson, 1995; Enkin, Keirse, Crowther, Duley, Hodnett & Hofmeyr, 2000; Morrin, 1997; Pullon, 1991; Oxorn, 1986; Rosevear & Stirrat, 1996; Silvertown, 1993; Stronge & Johnson, 1997; Varney, 1997). Rothman (1989, 1996) says that for women, the transition from pregnancy to labour is a seamless process rather than the end of pregnancy followed by labour as a new event. Other authors agree (Balaskas & Gordon, 1997; Cassidy, 1993, 1999; Llewellyn-Jones, 1986, 1999; Morrin, 1997). McNabb (1997a) describes the interface between the usual events of the last few weeks of pregnancy and the onset of labour as a process of transition. Research into the physiology of the initiation of labour supports the onset of labour as a process that is seamless with pregnancy (Carson, 1997; Leppert, 1998; McNabb, 1997a; Osmer, Adelman-Grill et al., 1995; Penny, 1999).

## **Traditional Signs of Labour**

In many texts, women's experiences of the last few weeks of pregnancy are discussed only in relation to signs that labour is beginning. The literature refers to very few of the late pregnancy events in a consistent fashion. The signs that labour is beginning that are consistently reported are 'lightening', a blood and mucus 'show', uterine contractions and cervical effacement. Lightening and a show are stated as an everyday 'fact' by the authors scrutinised for this study, whereas uterine activity and cervical effacement are better supported by research (see pp. 13 & 16).

### **Lightening**

Lightening is the term used to describe the sensation of 'more room to breathe' in the area of the diaphragm that women experience in the last weeks of pregnancy. Lightening occurs when the pelvic ligaments relax thereby allowing the fetus to descend into the brim of the pelvis (Balaskas & Gordon, 1987; Cassidy, 1993, 1999; Corkhill, 1948; Cunningham et al. 1997; Frye, 1998; Gaskin, 1990; Green, 1975; Johnson & Johnson, 1980; Morrin, 1997; Myles, 1971; Oxorn, 1986, Olds, Ladewig & London, 1995; Varney, 1997).

### **A 'show' of blood and mucus**

Most texts describe the advent of a 'show' as a sign that labour is imminent or has started (Balaskas & Gordon, 1987; Beischer & McKay, 1976; Carter, 1948; Cassidy, 1993, 1999; Corkhill, 1948; Cunningham et al, 1997; Da Cruz, 1962, 1976; Gaskin, 1990; Green, 1975; Farquhar & Jamieson, 1994; Frye, 1998; Johnson & Johnson, 1980; Morrin, 1997; Myles, 1971; Olds, et al., 1995; Oxorn, 1986; Pullon, 1991; Silverton, 1993; Varney, 1997; Wren, 1985). Cunningham et al. (1997) describe the show as a rather dependable sign of imminent labour, an opinion agreed with by Cassidy (1993, 1999) who states that the show may accompany or precede labour. However, other authors suggest that the show can also precede the onset of labour by as much as a week (Balaskas & Gordon, 1987; Pullon, 1991; Silverton, 1993). Alternatively, some multigravid women report no show at all (Sellars, 1993).

### **Uterine contractions of increasing regularity and intensity**

Uterine activity is discussed in almost all of the texts examined for this study, including those written for pregnant women, midwives and obstetricians (Balaskas & Gordon, 1987; Beischer & McKay, 1976; Carter, 1948; Cassidy, 1993, 1999; Corkhill, 1948; Cunningham et al., 1997; Gaskin, 1990; Green, 1975; Da Cruz, 1962, 1976; Frye, 1998; Henderson & Jones, 1997; Johnson & Johnson, 1980; Kitzinger, 1991; Llewellyn-Jones, 1986, 1999; Morrin, 1997; Myles, 1971; Olds et al., 1995; Oxorn, 1985; Pullon, 1991; Sellars, 1993; Silverton, 1993; Varney, 1997). Fluctuations in occurrence, intensity and patterns of uterine activity in the final weeks of pregnancy are noted and described by several authors as practising for labour (Balaskas & Gordon, 1987; Frye, 1998; Gaskin, 1990; Johnson & Johnson, 1980; Kitzinger, 1991; Silverton, 1993). Other authors describe the uterine activity of late pregnancy as Braxton Hicks contractions that merge into painful contractions, which then become the rhythmic contractions of labour (Henderson & Jones, 1997; Llewellyn-Jones, 1986 & 1999; Morrin, 1997). The physiological literature confirms the occurrence of uterine contractions in the last weeks of pregnancy (McNabb, 1997; Nageotte et al., 1988; Nathanielsz, 1994; Norwitz et al., 1999; Penny, 1999).

### **Effacement ('taking up') of the cervix**

Almost all of the texts and articles located for this study state that cervical effacement or 'taking up' of the cervix is a sign that the onset of labour is near (Balaskas & Gordon, 1987; Carter, 1948; Cassidy, 1993, 1999; Cunningham et al., 1997; Frye, 1998; Gaskin, 1990; Green, 1975; Hamlin, 1965; Henderson & Jones, 1997; Llewellyn-Jones, 1986, 1999; McNabb, 1997; Myles, 1971; Olds et al., 1992; Sellars, 1993; Silverton, 1993; Varney, 1997). The work of Leppert (1998), Olah et al. (1994); Osmer, Adelman et al. (1995), and Osmer, Blaser et al., (1995) have provided the physiological evidence for the development of the capacity for the cervix to efface near to the onset of labour.

## **The Notion of Pre-labour**

Several authors who advance the notion that all of the above events signal that labour is near, variously refer to the period of time in which these events occur. The terms used are: the pre-labour period (Myles, 1971; Bennett & Brown 1993, 1999; Silverton 1993; Llewellyn-Jones, 1986, 1999); prodromal signs (Kitzinger, 1991); premonitory or anticipatory signs (Sellars, 1993; Varney, 1997); preparatory signs (Cunningham et al, 1999; Gaskin, 1990) and approaching labour and birth (Balaskas & Gordon, 1987). Only some authors note other phenomena, such as urinary frequency or disturbance to usual bowel activity. Most authors do not mention any other features related to the final weeks of pregnancy and some are silent in relation to some or all of the traditional signs of labour (Farquhar & Jamieson, 1994; Hickman, 1978; Johnson & Johnson, 1980; Pernoll, 1991; Rosevear & Stirrat, 1996; Wren, 1985).

## **Historical and Current Definitions of Labour**

There is agreement in both the historical and current texts that labour is the term used to describe how women give birth. It begins with the onset of regular, usually painful, uterine contractions and culminates with the birth of the baby (Cassidy, 1993, 1999; Corkhill, 1948; Cunningham et al., 1997; Green, 1975; Hamlin, 1965; Llewellyn-Jones, 1986, 1999, Morrin, 1997; Olds et al., 1995; Silverton, 1993; Varney, 1997; Wren, 1985). The first stage of labour can be further categorised as Early, (also called Pre-labour or Latent Phase labour), and Active labour (Cassidy, 1993, 1999; Cunningham et al., 1997; Llewellyn-Jones, 1986, 1999; Morrin, 1997; Silverton, 1993). Early labour is characterised by cervical effacement in the presence of regular uterine contractions of increasing intensity. Increasing cervical dilatation is the hallmark of the active phase labour (Cassidy, 1993, 1999; Morrin, 1997).

## **Assessing the Onset of Labour**

Fluctuations in occurrence, intensity and patterns of uterine activity that do not progress to the regular, rhythmic contractions of labour are noted and described by several authors as practising for labour (Balaskas & Gordon, 1987; Frye, 1998; Gaskin, 1990; Johnson & Johnson, 1980; Kitzinger, 1991; Silverton, 1993). Llewellyn-Jones (1986, 1999) describes late pregnancy fluctuations as progressively



increasing uterine activity that culminates in labour from 36 weeks of pregnancy onward. Frye (1998) extensively discusses contractions comparing pre labour and labour contractions in detail. Frye (1998), Llewellyn- Jones (1986, 1999), Green (1975), Corkhill (1948), and Cunningham et al. (1997) all describe pre-labour contractions as having different qualities to labour contractions. They all speak of contractions that are irregular, brief, lack intensity, painful, low in the abdomen and which can be troublesome and anxiety provoking for some women. On the other hand, Cassidy (1993, 1995), Morrin (1997), Olds et al. (1995), and Silverton (1993) state that these contractions may often last for more than a minute each.

Cassidy (1993, 1995), Corkhill (1948), Cunningham et al. (1997), Kitzinger (1991), Llewellyn-Jones (1999), Myles (1971), Morrin (1997), Olds et al. (1995), Schauberger (1986), and Silverton (1993) all discuss pre-labour contractions as false labour. Pullon (1991) writes of practice contractions and how hard it is for most women to know when the contractions are no longer practising and that 'this is it'. She uses the term 'false start' in this context.

### **The Clinical Significance of not knowing when labour begins**

In the past, when augmentation of labour and/or caesarean section were not as readily available to treat conditions such as poorly progressing labour or obstructed labour, it was not as clinically important to know with precision when labour commenced. However, current maternity practice enables successful treatment of such conditions. Morrin (1997) states that "appropriate care depends on differentiating spurious [false] labour from early latent phase labour and that there is little research on this topic" (p362). O'Driscoll and Meagher (1986) agree. They say that the diagnosis of labour is the most important in obstetrics as subsequent decisions about management are made on the basis of the finding. Enkin, Keirse, Renfrew et al. (1995) say that early labour is poorly understood. Women who come to the hospital delivery unit prior to the commencement of cervical dilatation, have a significantly increased risk of interventions such as augmentation of labour, and caesarean section (Enkin, Keirse, Neilson et al., 2000). Furthermore, Cartmill and Thornton (1992) found that rates of intervention such as augmentation with syntocinon are increased when early labour is included on the partogram record.

Despite Morrin (1997) and O'Driscoll & Meagher 's (1986) assertions, there is an understanding that pre-labour contractions are different from labour contractions throughout the literature examined for this study, however, only some authors give clinical descriptions that differentiate between pre-labour contractions and labour itself in a practical fashion (Cunningham et al., 1997; Corkhill, 1948; Frye, 1998; Green 1975; Llewellyn- Jones, 1986, 1999).

### **The Language of Falsity**

The difficulty created by needing to know when labour has commenced has resulted in authors and health professionals coining the terms 'true' and 'false' (or spurious) labour (or pains in older texts). These terms have been pervasive in the literature for decades (Cassidy, 1993, 1999; Corkhill, 1948; Da Cruz, 1962, 1976; Enkin, Keirse, Renfrew et al., 1995; Enkin, Keirse, Neilson et al., 2000; Green, 1976; Llewellyn-Jones, 1986, 1999; Morrin, 1997; Myles, 1971; Olds et al., 1995; Oxorn, 1985; Silverton, 1993; Varney, 1997).

Progressive effacement and dilatation of the cervical os in the presence of regular (usually) painful uterine contractions indicate 'true labour'. False labour is a term applied retrospectively to the situation where the woman experiences regular painful uterine contractions, but there is no progressive dilatation of the cervix and the contractions eventually cease (Cassidy, 1993 & 1999; Corkhill, 1948; Da Cruz, 1962, 1976; Enkin, Kierse, Renfrew et al., 1995; Enkin, Kierse, Neilson et al., 2000; Green, 1976; Llewellyn-Jones, 1986, 1999; Morrin, 1997; Myles, 1971; Olds et al., 1995; Oxorn, 1985; Schauburger, 1986; Silverton, 1993; Varney, 1997).

Such is the current discourse about labour and birth that terms such as false labour are applied to events that are part of the normal transition from pregnancy to labour. Health professionals construct current definitions. For example, the definition of 'true labour' is related to the time when dilatation of the cervix is 2-3cm and the woman requires her birth attendant to be continuously present (Olds et al., 1995).



The term false labour has concerned a number of writers who state that the contractions experienced by women are real and therefore cannot be labelled as false (Rothman, 1989). Frye (1998) states that she finds the term false labour dispiriting. These authors are more inclined to call uterine activity in the last weeks of pregnancy pre-labour contractions or practice contractions (Balaskas & Gordon, 1987; Frye, 1998; Gaskin, 1990; Johnson & Johnson, 1980; Kitzinger, 1991; Rothman, 1989, 1996; Silvertown, 1993).

### **Developing Confidence in the Transition from Pregnancy to Labour.**

Better understanding of contractions and contraction patterns in the latter weeks of pregnancy may contribute to more confident diagnoses of the onset of labour by both women and health professionals. Education to help women recognise the onset of labour may have some potential to reduce the number of women presenting at hospital in early labour. Bonovich (1990) undertook a quasi-experimental study to determine whether specific education could reduce the number of visits to the delivery unit before active labour i.e. discharged from hospital undelivered. The study was conducted in a single, urban, community hospital obstetric clinic. Lauzon and Hodnett (1999) note that the method of randomisation to experimental and control groups is unclear. Two hundred and forty-five English speaking primigravidae more than 16 years old and more than 30 weeks gestation participated. Admission to hospital for complications of pregnancy, or incomplete records meant that 15% were lost to follow-up. At 37 weeks gestation women were interviewed about their knowledge about the onset of labour. Correct information was reinforced. Specific teaching addressed any knowledge deficit about Braxton Hicks and labour contractions, timing contractions, recognising ruptured membranes, and pain perception. Teaching was reinforced at subsequent antenatal visits. Bonovich found that the women in the experimental group made significantly fewer visits to the labour ward that resulted in discharge from hospital undelivered than were made by the women in the control group (Students *t*-test,  $p = 0.049$ ).

Bonovich's study has been criticised by Lauzon and Hodnett (1999) for the size of loss of women to follow-up, the study's single centre, and an unrepresentative sample. Lauzon and Hodnett (1999) also noted the single outcome measure for the

study. They concluded that the study did not provide sufficient evidence to evaluate the use of a specific set of criteria for self-diagnosis of active labour.

Nonetheless, Bonovich's study (1990) is the only one of its type. There appears to be sufficient promise in her results to justify giving women information to assist them to effectively recognise the onset of active labour, even if a specific set of criteria are not possible to define for universal use.

## **Summary**

The literature examined supports the quest to identify and illuminate the events experienced by women in the last weeks of pregnancy in order to develop a wider, research-based understanding of the normal processes related to the transition from pregnancy to labour. Research based understandings have the potential to build confidence for women and health professionals in this process. Such understanding has the potential to minimise women's anxieties and reduce the number of occasions that women arrive at hospital delivery units before the onset of active labour.

A review of the literature examined in relation to the research method and to the development of the daily recording diary as a data collection instrument follows as an addendum to this review.

## **Addendum: Literature Related to the Research Method**

### **Introduction**

Bailey (1991) identifies two types of assumptions that need to be considered when designing a research study. Firstly, assumptions related to the principles upon which the study is based, and secondly, assumptions that underlie the procedures used in the study.

The current study was based on the assumptions that there are 'events' that occur in the final weeks of pregnancy and that the frequency of their occurrence can be assessed. It was assumed that one or more events were possibly associated with the time of onset of labour, and therefore could be subjected to statistical testing for strength of association.

Procedurally, the assumption was made in the current study that women would recognise the events when they occurred and that they would accurately and consistently record them in a daily recording diary. The assumption was also made that the daily recording diary would accurately capture the nature and frequency of the events being studied in a way that would generate information suitable for analysis.

### **Research Design**

Descriptive studies have an important role in defining clinical phenomena or behaviour so that such phenomena can be explored in further studies. Portney and Watkins (2000) say that understanding clinical phenomena begins with the event being described, and the factors that influence and interact with it being explored. Descriptive studies aim to identify and describe, organise and summarise data (Bailey, 1991; Norman & Streiner, 1994; Polit & Hungler, 1995; Portney & Watkins, 2000). Baumgartner and Strong (1994) say that descriptive data is based on current information that deals with "what is, not what should be" (p.131). Portney and Watkins (2000) agree. They say that observational or non-experimental research studies collect data "as they naturally exist" (p.226). The value of descriptive preliminary studies, such as this one, lies in the identification of the occurrence of the

‘events’ being studied, and how they change over time. Furthermore, the information thus generated can be used to develop hypotheses for testing in further research (Bailey, 1991; Portney & Watkins, 2000).

Correlational studies aim to look for associations in data from research studies. As the research question for the current study also sought to discover whether there was an association between the events that occurred in the final weeks of pregnancy and the time of onset of labour, a descriptive–correlational design was developed for the study.

### **Prospective Data Collection**

Prospective data collection is the term used when data for a research study is collected at the time the event or the phenomenon occurs. Prospective data collection is a stronger design feature than retrospective data collection where the data is collected at a various time after the event (Polit & Hungler, 1995). Prospective studies are more reliable in that the data is less likely to be forgotten by the participant and therefore less likely to be incomplete or missing (Portney & Watkins, 2000). Retrospective recollection of information can result in under-reporting because of selective memory or memory lapses, or over-reporting because participants have a distorted memory of the time the event occurred and thus include information from outside the time period under examination (Minichiello, Sullivan, Greenwood & Axford, 1999). In the current study data was collected prospectively.

### **Data Collection Instrument.**

The data collection instrument used in this study was a specifically designed daily recording diary. Minichiello et al. (1999) say that despite diaries being self reports, many of the distortions and limitations of retrospective studies can be reduced by using a diary to record daily events. Diaries have been used for this purpose in health research (Boyle, 1985; Heitkemper, Shaver & Mitchell, 1988; Minichiello et al., 1999). According to Minichiello et al. (1999) diaries have been used with success in diverse populations, are relatively easy to develop as an instrument and can usually be administered with few difficulties. People generally find it easy to recall events in

their lives that are unusual or that cause a strong emotional response, but it is less easy to recall 'everyday' events. Minichiello et al. (1999) state:

*In the health fields diaries are particularly well suited to elicit information of episodes that do not cause major life disruptions such as diffuse symptoms and minor health actions.* (p.386).

The events examined in the current study were 'everyday' events experienced by women in the final fortnight of pregnancy.

### **Validity and Reliability**

According to Bailey (1991), in human subject research, conclusively proving validity and reliability is difficult, and questionnaires are notoriously unreliable. However, Minichiello et al. (1999) say that compared with retrospective studies, several studies have demonstrated the reliability and validity of the data generated by diaries. Minichiello et al. (1999) go on to say that this has been interpreted as a sign of more valid data than in retrospective studies. High levels of reporting were seen for most events experienced by the participants in these studies.

Critical issues for reliability and validity of the collected information are a well-designed instrument and well instructed diary keepers (Minichiello et al. 1999). The length of the recording time is inversely related to the reliability of the data. This can be affected if a diary takes more than five to ten minutes a day to complete (Minichiello et al., 1999). Bailey (1991) agrees. He states that response rates are improved by making the instrument attractive and short enough to finish, but long enough to gather the required information.

### **Data Analysis**

Diaries also enable the researcher to alter the level at which the unit of analysis is reported. For example, the 'day' level may be suitable for some events, whereas, a longer period may be more suitable for other events (Minichiello et al., 1999). The current study used several levels of reporting; i.e. daily, the whole recording period and the 72 hours prior to labour. A diary also allows the study of how events cluster over time, e.g days of the week, time of day (Minichiello et al., 1999).

### **Advantages and Disadvantages of Diaries**

Minichiello et al. (1999) state that when diaries are used for data collection missing or unknown data may be impossible to compile or clarify. They assert that evidence suggests that the quality of the data are improved by using diaries that have a prescribed framework, and by training the diary keepers. Minichiello et al. (1999) go on to say that although response rates for diaries are similar to other research methods, the participants who continue past the early days of diary keeping demonstrate high completion rates of 80% or more. Finally, the behaviours of diary keepers may be influenced by the study itself. Initially, there is a risk of over-reporting as participants become more aware of the events under examination, and later, participants can become fatigued with recording and under-report events (Minichiello et al., 1999). Diaries are also not always suitable for data collection (Minichiello et al., 1999), as they presume literacy and a cultural bias toward writing rather than speech.

### **Selecting a Diary for Data Collection**

Minichiello et al. (1999) describe three criteria for selecting a diary instead of a questionnaire for the collection of data. Firstly, "the diary must provide different information to a questionnaire, [secondly], the data must be accurate, [and thirdly], it must provide unique kinds of findings and new theoretical insights" (p.389).

Minichiello et al. (1999) provided an example of the diary used in their study. Like this example, the daily recording diary used for the current study was also developed as an instrument for prospective data collection. This could not have been achieved by using a questionnaire. The daily recording diary was designed to examine, in detail, the occurrence of multiple events in the final weeks of pregnancy. It allowed the researcher to collect data about several unique factors of women's experience during this time; and it permitted multiple collection of data at multiple points as the events actually occurred. Minichiello et al. (1999) conclude that diaries are often forgotten as an option for collecting reliable and appropriate data about the ways complex, contextual and interactive variables may affect each other and health outcomes.

## Summary

It is impossible to ask questions about behaviours or cause and effect relationships without having fundamental knowledge about the existence and nature of the phenomena of clinical interest. Descriptive research provides information about the character of what exists. This information forms the platform upon which can be developed research questions that examine what could happen in a controlled setting (Portney & Watkins, 2000).

Portney and Watkins (2000) say that descriptive studies require rigour in defining and measuring variables even though such studies do not involve the manipulation of variables. They go on to state that they find it unfortunate that there is a “tendency to view conclusions from descriptive studies as weaker than [those] from experimental studies. The latter is true only in respect of cause and effect relationships” (p.281). Descriptive studies that ask an appropriate question and that are well-designed produce strong and useful results (Portney & Watkins, 2000).

The paucity of research studies that directly examines women’s experiences of events in the last weeks of pregnancy has determined that this study is a preliminary one that identifies the events experienced by women in these weeks and from which indications for further research can be determined. The study uses descriptive methods to examine these events. The method used for this study is presented in detail in Chapter Three.



## **Chapter Three: Research Method**

### **Introduction**

This preliminary study used a prospective survey method to gather the data for analysis. Participants kept a daily recording diary of specific events as they experienced them from 38 weeks of pregnancy until the birth of the baby. Descriptive statistical measures were used to analyse the data for frequencies and universality of occurrence. Where individual events suggested a possible association with the onset of labour, the data were analysed using logistic regression. This chapter presents the aims of the study and the research design. The methods used for sample selection, data collection and analysis, issues of validity, reliability, and ethics are also described.

### **Purposes of the Study**

This study had two major purposes. Primarily, it was a preliminary study designed to identify the events that are experienced by women in the final weeks of their pregnancies; and to discover whether all or most women experience an event, or cluster of events. Identification of any events that appeared to be associated with the onset of labour and recognition of events that had potential for further investigation, were also part of the primary investigation. The secondary purpose was to trial an original recording diary that was used as an instrument for data collection in the late stages of pregnancy. The project was undertaken between June 1999 and November 2000.

### **Research Design**

The current study took a longitudinal approach to prospectively seek information about fifteen specific events over a period of time up to the final four weeks of pregnancy, although only data from the final fifteen days of pregnancy was analysed (see p.58). Information was required about the first occurrence of an event, on how many days it occurred, whether the nature of the event altered over time, and upon which day(s) of the pregnancy the events occurred.



### **The Decision to use a Daily Recording Diary**

Such a complex web of current data seemed likely to be more effectively collected by daily diary entries. By asking participants to keep a diary over a specific period, it is possible to generate new data for study (Polit & Hungler, 1995). Initially, an unstructured, written diary was contemplated however, as the number of events to be recorded became apparent it appeared that an unstructured diary was unlikely to reliably capture both the variety and complexity of the events. The large numbers of categories available for analysis also precluded the use of an unstructured diary. Semi-structured diary formats have been used in health research (Boyle, 1985; Heitkemper, Shaver, & Mitchell, 1988) as well as the more usual unstructured form of a personal diary. It seemed that a more structured approach would be able to generate the information being sought without loss of important detail if a space for comments was included in the data collection tool.

### **Design of the Daily Recording Diary**

Although examples of semi-structured and structured diaries were located (Boyle, 1985; Minichiello, Sullivan, Greenwood, & Axford, 1999; Heitkemper, Shaver, & Mitchell, 1988) a data collection instrument suitable for the current study was not found. Therefore, an original instrument was designed.

In order to encourage women to keep recording daily for up to four weeks, the recording diary needed to be easy to fill out and to take no more than ten minutes each day (Bailey, 1991; Minichiello et al., 1999). The instrument designed for this study is a mixture of a daily checklist style and an unstructured 'comments' section (Appendix VIII). A "checklist is basically a very highly structured questionnaire" (Baumgartner & Strong, 1994, p89). Checklists are a reasonably efficient way to ask questions and are usually easy for respondents to understand (Polit & Hungler, 1995; Portney & Watkins, 2000). Structured questions were designed to increase the likelihood of reliability in day to day recording of events by each woman and also between participants. The space for qualifying comments provided a place to record individual responses or perceptions.

### **The Daily Recording Diary**

The recording diary is an A4 size booklet that contains a front-page for demographic and onset of labour data, and a double page for each day of the woman's pregnancy from 38 weeks to 43 weeks gestation. The left-hand page constitutes a checklist of the fifteen events that were examined in the study. The right-hand page contains blank lines numbered for each event so women could individually comment if they chose (Appendix, VIII).

Bailey (1991) notes that response rates are improved when the instrument is attractive, short enough to finish, but long enough to collect the required information. He goes on to say that a covering letter that catches the participants interest and an interesting topic also contribute to participants wanting to complete the record. Participants in this study received a covering letter (Appendix V), and were observing their own pregnancies, an interesting topic. The recording diary was styled as a checklist, and had a bright yellow cover so that it would capture interest, and also so that it would be noticeable in the welter of household circulars.

### **Determining the Pregnancy Events.**

The pregnancy events in the checklist were determined through a variety of sources. An initial list of events that women experience in the last weeks of pregnancy was compiled from personal midwifery practice experience and from an examination of midwifery and obstetric texts. Most of the selected experiences included in the recording diary were arrived at from my own midwifery experience and the following sources (Cunningham et al., 1997; Farquhar & Jamieson, 1997; Sweet & Tiran, 1997; Bennett & Brown, 1995, 1999; Olds, London, & Ladewig, 1995.; Silvertown, 1993.; Oxorn, 1986; Varney, 1997).

Professor Mavis Kirkham, (personal communication, February, 1999), suggested the addition of a sense of smell to the list of events. She also suggested a pre pilot survey to ask a few newly birthed mothers what they had experienced in the last few weeks of their recent pregnancies. First year midwifery students volunteered to recall their own experiences. Associate Professor, Dr. Gillian White, (personal communication, March 1999), suggested adding the meeting of personal deadlines prior to the onset

of labour to the list. The time of onset of labour was noted so that any event(s) occurring at a consistent length of time before the onset of labour could be identified and analysed. The final list of variables included in the recording diary is displayed in (Table 1).

**Table 1: Variables included in the Daily Recording Diary**

<ul style="list-style-type: none"><li>• <b>Late Pregnancy Events</b></li></ul>	
sense of smell/hearing/taste	sleep patterns / dreams
mood/feelings	baby movements
food intake/or type of food	bowel and bladder function
uterine contractions (painless and/or painful)	'needling' pains in the cervix
energy levels	libido
vaginal secretions	urge to finish tasks before labour
<ul style="list-style-type: none"><li>• <b>Position of baby at onset of labour</b></li><li>• <b>Time of onset of labour</b></li><li>• <b>Spontaneous onset of labour</b></li><li>• <b>Time and date of Birth</b></li></ul>	

## **Tools used in the Study**

### **Information Sheet**

The research package that was distributed to women contained an extensive information sheet (Appendix V) which explained the purposes of the study, what the women were required to do and the stages at which the women could withdraw from the study if they chose. Midwives who assisted with recruitment into the study also received an information sheet that was similar to that given to the women (Appendix VI).

### **Consent Form**

Women who decided to participate signed a consent form, (Appendix V), which was returned in a stamped, pre-addressed envelope. Some women put the consent form into the front of the recording diary and returned them together. The consent forms returned this way were separated into another storage holder upon receipt. As the recording diary had no identifying features, it was impossible to identify the participant after the consent form had been removed to the alternative storage. Some women did not bother to return a consent form. In these cases return of the completed recording diary was accepted as giving consent.

### **Daily Recording Diary**

A sample page to demonstrate how to use the recording diary was included in the front of the booklet (Appendix VIII). Recording was on a daily basis from 38 weeks gestation (or later recruitment) until the onset of labour. Women were asked to return the recording diary whether they participated or not. They were also asked to return partially completed recording diaries so that the recording diary itself could be evaluated as a data-collection instrument. Women were asked to record the occurrence of, or any change in, a variety of late pregnancy events, and to briefly describe each new occurrence or change on the recording page for each day until the onset of labour.

## **Pre Pilot Survey**

In order to avoid excluding from the recording diary any commonly occurring, yet unidentified events in late pregnancy, a telephone survey of newly birthed women was undertaken. The women were asked to identify any changes they had noticed in the last three weeks of their pregnancies.

A midwife colleague asked women who had recently given birth if they were willing to be telephoned. Five women gave the midwife their telephone numbers and a convenient time to call. Two women were busy when telephoned, the other three confirmed much of the material in the texts, and no new events were added to the recording diary.

A group of six first year student midwives, who were also parents, informally volunteered information about their own experiences. The discussion was initiated spontaneously by the students after a chance remark. As the students had been enrolled in their three-year programme for only two months, the likelihood of the students' contributions being a reflection of their texts, rather than a reflection of their own experiences appeared remote. The ensuing brainstorming discussion added dreams to the list of events and also confirmed many of the events selected from the texts. Five practising midwives and two midwifery lecturers independently vetted the list of selected events. They confirmed that women they had cared for had reported all of the events on the list and suggested no additions or alterations.

## **Deciding when to start recording**

The aim was to gather data in the last two weeks of pregnancy as studies have found that two weeks is the optimum time that most people will maintain diaries or return questionnaires (Bailey, 1991; Minichiello et al, 2000). Although women at term give birth at any time between thirty-eight and forty-two weeks of pregnancy, most women give birth between thirty-nine and forty one weeks gestation (Sweet & Tiran, 1997). If the diary keeping was commenced at thirty-six weeks, in order to be two weeks before thirty-eight weeks gestation, the women who did not give birth until forty-two weeks would be required to keep the recording diary for six weeks. It did not seem reasonable to ask women to keep a daily recording diary for so long, nor

did it seem likely that the recording over such a period of time would be consistent. Similarly, to start recording at forty weeks, in order to limit the diary keeping to two weeks for the women who carried their pregnancy to forty-two weeks gestation, ran the risk of missing half of the birthing population in the data collection period. Therefore, the recording period commenced at thirty-eight weeks gestation or later. Starting at this time gave the maximum opportunity to have a week or more of recording for the majority of participants, yet the maximum period of recording for any one woman was no more than four weeks. The selected time frame appeared to present the best chance of most women reliably keeping the recording diary each day until the onset of labour.

### **Reliability and Validity of the Recording Instrument**

The recording diary is an original instrument. Following the pre pilot survey, a pilot study was undertaken to test the validity of the instrument. One method of examining validity of content, recording diary construction and diary use is vetting by a jury of experts (Baumgartner & Strong, 1994). Recording diary content was examined by the women in the pre pilot survey, students who were also parents and by midwives. Associate Professor, Dr. Gillian White and two senior midwifery lecturers checked construction of the recording diary. The women who completed the pilot study examined the use of the recording diary. They indicated that the recording diary did not take too long to complete and that there were no ambiguous items (Baumgartner & Strong, 1994). The pilot study also indicated that the women responded consistently. The items in the recording diary were therefore thought to be clearly stated (Bailey, 1991). Reliability was assessed further in the main study and is discussed, along with validity in Chapter Four.

### **Pilot Study**

Six women were asked to pilot the recording diary package for one week. The package contained an information sheet, consent form, recording diary and return envelopes. Four women returned the materials. The only changes required were four minor punctuation errors. There was no written feedback about the appropriateness of the listed events. Although no woman experienced every one of the events, collectively, the women filled out the tick boxes for all the events. Thus, all of the

listed 'events' occurred. The variables were therefore considered suitable for the study (Bailey, 1991; Baumgartner & Strong, 1994). Two of the women in the pilot study provided written feedback that the process was manageable and that they enjoyed the recording process. One of these women requested to continue the recording and become a participant in the study. She duly completed the process and her data has been included in the main study. The women who returned the pilot study diaries had consistently filled out the tick boxes and provided substantial qualifying notes in the written comment section. Their feedback indicated that the task of keeping the diary was not onerous and that, rather than produce anxiety, the process provided a pleasurable reflection on the events of the day.

The midwives who recruited the women into the pilot study, trialled the recruiting process, and putting the 'Reminder to Post the Diary' notice into the woman's clinical notes. The midwives reported no difficulty with either process.

### **Main Study**

Three hundred research packages were originally distributed between twelve midwifery practices incorporating sixty-four midwives. One group of ten packages was lost in the delivery process. I personally spoke with all of the participating midwives. In the first instance, this was a telephone inquiry to enlist their willingness to participate in the recruitment of women. In all but three cases, where follow up was solely by telephone, the initial contact was followed up with a personal visit so that the recording diary and the information sheets could be explained. There was also an opportunity to ask questions about either the study or the process. The packages were distributed on the basis of the number of midwives in each practice and the collective client load for the practice. The distribution basis was approximately ten packages per midwife, however, other factors were taken into consideration, such as the percentage of non-English speaking women booked with the practice and the size of individual midwives' caseloads. Thus, some sole practitioners received ten packages, whereas a loosely knit collective of twenty-four midwives received only seventy packages.



The data collection time was initially estimated to be three months. In the event, data were collected over a period of eight months in order to ensure that all packages were distributed. To encourage the midwives to continue distributing the research packages, I made two rounds of telephone reminders and had several conversations at professional meetings and similar venues. Once each woman had completed her recording diary, it was returned using the stamped, addressed envelope included in the research package.

### **Recruitment into the Study**

Midwives were contacted and an indication of their willingness to assist in recruitment into the study was secured. Prior to the data collection phase of the research, I met with recruiting midwives to discuss the nature of the study and the midwife's role in it. Each midwife was provided with an information sheet about the study, her role in enrolment and data collection. If she agreed to recruit women into the study, the midwife was given a consent form to sign and a sample of the research package that was to be given to the women.

### **Data Collection**

#### **The Midwife's Role in Enrolment and Data Collection**

The midwife's role was kept to a minimum in order to avoid coercion and to maximise recruitment of participants. At the 38-week antenatal visit, midwives from recruiting practices informed women of the existence of the study. If the woman agreed to consider participating in the study, she was provided with a research package. The midwife inserted a 'reminder to post' notice into the woman's clinical notes at the time she gave the woman the study package. At the beginning of labour, the midwife recorded the position of the baby at the first abdominal examination on the front page of the recording diary. This observation was designed to identify babies who were in a posterior position at the onset of labour, in order to exclude any event that might subsequently be found to be solely associated with a foetus in that position. Posterior position at the onset of labour is associated with incoordinate uterine contractions, early rupture of membranes and prolonged labour (Morrin, 1997). Uterine activity was one of the events being recorded by participants. Noting



the position at the onset of labour could isolate any unusual uterine activity that may be associated with posterior position.

### **The Woman's Role in Enrolment and Data Collection**

Women were enrolled into the study at the 38-week antenatal visit. They were asked to keep a daily recording diary of late pregnancy events over the final few weeks of their pregnancies and to note the date and time of the onset of labour and of the birth of their baby (Appendix VIII). When each woman had read the information sheet in the package, and decided to participate, she signed and returned the consent form, (Appendix V), and commenced the recording diary. At the end of the recording period, each woman returned the diary in the second stamped and pre-addressed envelope. There were several points in the process where each woman could choose to opt out of the study. Firstly, she could decline to enter the study, secondly, she could decide not to undertake the recording activities, and thirdly, she could refrain from returning the completed recording diary. Until the completed recording diary was returned, a woman was not counted as a participant. As far as the process of participation and return of the data was concerned, the data collection method was no different to a postal questionnaire. If a woman wished to receive the results of the study, she had the option of filling in a request on the consent form. Return of the recording diaries was expected between one and four weeks after the consent forms and result requests.

The recording diaries remained anonymous to the researcher; that is, they did not carry the woman's name or any other way of identifying the individual. If any woman wished to have her diary returned, she was asked to fill out an extra envelope in the study package so that the recording diary could be photocopied and returned.

### **Storage and Security**

Consent forms were received and stored separately from the recording diaries. As the consent forms and the recording diaries had no correlated numbers, there was no way that the consent form and the recording diary could be matched up. All material was stored in a locked cupboard in the researcher's home.

## **Sample**

The study examined the events that women experienced in the last few weeks of pregnancy. A non-random sample of eligible women was enrolled (N 119). The sample does not match the proportions in the general population, as participation was restricted to women who are able to read English. The likelihood of diversity in the sample was maximised by inviting women to participate from a variety of group midwifery practices offering primary maternity care situated in communities reflecting a range of socio-economic and ethnic characteristics. Women who were booked with independent midwives, in twelve midwifery practices in a large metropolitan area; one provincial town and two rural areas were invited to participate in the study.

There are a number of ways of deciding upon the size of the sample. The study investigated an area that was little researched. It was not known how many of the events that women recorded would generate data suitable for analysis. There were fifteen events on the daily recording diary checklist. The 'number of observations versus the number of variables rule' that suggests 10 participants per variable is the most well known approach for descriptive studies (Knapp, 1999). Application of this rule required the return of 150 diaries. However, Munro and Page (1993) state that 100-200 subjects are sufficient for most purposes. Three hundred was chosen as the number of packages for distribution in order to have a reasonable chance of securing a minimum of 100 returned recording diaries. One hundred is also 33.3% of the distributed packages. A response rate of thirty percent is acceptable for postal surveys (Bailey, 1991).

## **Inclusion Criteria**

Women were eligible to participate in the study if they were able to read and write in English; thirty-eight or more weeks pregnant; had an uncomplicated singleton pregnancy, and were booked with an independent midwife as primary maternity care provider. Whilst there are many women in the population who cannot communicate in English, the complexities of catering for non-English speaking women were beyond the scope of a preliminary investigation such as this study. A primary maternity care provider looks after women experiencing uncomplicated pregnancy.

Although secondary maternity care providers also look after women with uncomplicated pregnancies, in the main, their practice is providing maternity care for women experiencing complications.

It was not known whether focusing on the events in late pregnancy would cause women to experience anxiety. It was therefore undesirable to request women who had a pregnancy complication, which may already be a source of anxiety, to participate in the study. Confining the sample to women who were being cared for by a primary maternity care provider, ensured that only women with uncomplicated pregnancies were enrolled in the study. Women pregnant with twins or triplets may experience different patterns of uterine activity or fetal movements to those carrying only one child, therefore, women with multiple pregnancies were excluded from the sample.

## **Data Analysis**

### **Method of Data Analysis**

The late pregnancy events were analysed using descriptive statistics; e.g. frequencies, clusters (Norman & Streiner, 1994). The events examined were needling pains in the cervix, fetal movements, uterine activity, bowel and bladder function, vaginal secretions, energy levels, mood/feelings, sleep patterns/dreams, appetite, libido, sense of smell, hearing and taste and 'nesting' or urgency to complete tasks.

Once the frequencies were determined, where any association appeared to exist between the occurrence pattern of an event and the onset of labour, co-relational and/or regression analysis tests were planned to test the strength of the association

## **Ethical Issues**

The study proposal was scrutinised and approved by the Massey University, Human Subjects Ethics Committee (Appendix VII). Consent was sought from women and midwives involved in the study. Both groups were given a comprehensive information sheet, (Appendices V and VI), which described the purpose and processes of the study, the roles of each woman and her midwife and a telephone number of an independent person the woman could contact if she had any concerns

about the study. Included in each information sheet were withdrawal/refusal without jeopardy clauses i.e. clauses that stated that women's care would not be affected by refusal to participate or by withdrawal from the study. Information about the safekeeping of the woman's information, and a process for the woman's information to be returned to her if she wished was also included.

The consent forms for the women and for the midwives mirrored the issues described in the information sheet (Appendices V and VI). The most important of these issues were the voluntary nature of participation, the non-jeopardy clauses and confidentiality of individual information clause. The consent forms were designed to be returned to the researcher separately from the recording diary. The consent forms were stored separately from the diaries in a locked cupboard.

Arrangements were made with midwives for individual management should any of the participants experience an unexpected outcome to her pregnancy.

### **Effect of the Recording Activity**

It was believed that the recording activity was unlikely to affect the baby unless labour and birth are adversely affected by maternal thoughts. There is some evidence to support this effect. Wutchik, Bakal, and Lipshitz (1994) found that one of the factors that affected birth outcome was distressful thoughts in latent phase labour. Whether noticing late pregnancy events was likely to generate distressful thoughts was unknown. The likelihood seemed small as the current study was collecting data about existing events that occur naturally. The events were studied at a time when most women focus on their pregnancies and themselves in relation to the baby (Nichols & Humenick, 1988). For the same reason, the research was thought to be unlikely to unduly raise anxiety levels or cause women to unduly focus on the pregnancy events. It seemed that there might be a very small possibility that the research may focus women in such a way that they 'created' events, however, it was just as possible that women would be empowered by the process to have a positive birth experience (Lederman, 1984). In the event, women in the pilot study, and those in the main study gave verbal feedback through their midwives, that the process was enjoyable and relaxing, suggesting that a positive outcome might be found.

## **Summary**

This chapter has described the design and processes used for the current study. The development of the recording diary, including processes to test the construct and content validity of the diary, has been discussed. Sample selection, enrolment of women into the study and data collection processes have been described. Attention has been paid to ethics approval and ethical issues of consent and confidentiality of information. Reference has been made to the data analysis intentions related to the study.

The following chapter evaluates the daily recording diary as a data collection tool. Internal and external validity, and reliability are examined and suggestions for changes to the instrument are offered.

## Chapter Four:

### Evaluation of the Daily Recording Diary

#### Introduction:

The daily recording diary was an original, untested instrument designed specifically for this study. Therefore, assessment of its suitability, validity and reliability as a data collection instrument was one of the aims of the study.

#### Suitability of the Daily Recording Diary for Data Collection.

This study sought to discover the events experienced by women in the final weeks of pregnancy; which, if any, events are common to all or most women; and if any of the identified events are associated with the onset of labour. The study was based on the assumptions that women would both recognise the late pregnancy events when they occurred, and, would accurately fill out the diary. Whilst it is impossible to know exactly how accurate the recordings were in an objective sense, the women have recorded what they perceived that they experienced.

The likelihood is that women did record their experience as they were asked. That is, tick the check-box if there was a change or if the event was new, as there is consistent reporting for events such as vaginal secretions and bowel activity across the whole recording period. There are also reports of events such as uterine activity or broken sleep that were experienced and recorded in isolation after a day of 'no data' or 'no change' that suggest the women were assessing their experiences on a daily basis.

The daily recording diary seems accurate and practical for the following reasons. One hundred and nineteen women consistently filled in the recording diaries. Only one other woman returned a diary but did not complete the record. One hundred and sixteen women wrote substantial qualifying statements to accompany the tick boxes. The diary completion rates in this study are consistent with Minichiello et al. (1999)

who state that participants who continue to record past the early days of diary keeping demonstrate high completion rates of 80% or more. In this study the completion rates for returned diaries was 99.17%.

Overall the responses demonstrated changes to pen and/or pencil and to handwriting tidiness that were consistent with filling in pages on a day to day basis. Five women noted that they had enjoyed filling in the diary as it gave them an opportunity to reflect on themselves for a few minutes each day.

Bailey (1991) states that “recipients rarely return questionnaires after two weeks” (p.93). Minichiello et al. (1999) state that the usual time frame for participants to return diaries is similar to that of questionnaires, therefore, asking women to keep a daily record over two to four weeks carried the risk that they would become too busy or lose interest in completing the record. A reasonable mail response rate is deemed to be 30% (Bailey, 1991). In the light of these constraints, the 42.8% return rate for the daily recording diaries is satisfactory.

**Readability**

The Flesch Reading Ease index rates text out of 100. The higher the score, the easier it is to understand the text. Generally, a score above 60 is satisfactory for standard documents (Microsoft Word, 1997). The information sheet for women and the Daily Recording Diary scored well for readability on the Flesch Reading Ease scale, the Information Sheet, and the elements of the Daily Recording Diary scored between 60 and 80 (Table 2). Due to the formal nature of the document, the consent form scored less than 60 on the reading ease scale. However, the elements of the consent form were fully explained in the Information Sheet (Appendices V & VI), therefore the risk of women not fully understanding the consent form was minimised.

**Table 2. Reading Level for Information Sheet and Recording Diary**

Readability	Information Sheet	Consent Form	Demography Page	Recording Pages
Flesch Reading Ease Score	62.0	50.7	77.6	80.2



## Internal Validity

Competing explanations for the results of a study are referred to as threats to internal validity (Polit & Hungler, 1995). Such threats are always an issue for survey studies because the researcher is unable to ascertain whether the respondent's personal or home situation is affecting the way the diary or questionnaire is completed. The current study is open to this risk in a number of ways. An investigation, such as this study, that uses non-random sampling procedures, an original data collection instrument and has a 42.8% mail return rate cannot make any claims to proving relationships.

The women who chose not to return the recording diaries might have had a different experience to those who did respond. There is a possibility that the experiences of the non-respondent women may represent the 'usual' experience, rather than the respondents representing the 'usual' experience. Whilst the respondents are a non-random sample, the size of the sample (N 119), may have increased the chance that the responses are the 'usual' experience for women in the last few weeks of pregnancy. Similarly, although a 42.8% return rate is less than half the number of distributed research packages, it represents a good return for a study that used a data collection technique that is similar to a postal questionnaire (Bailey, 1991).

In studies investigating health issues, a threat to internal validity is that a concurrent health condition may be the reason for the occurrence of the event being examined (Polit & Hungler, 1995). Many of the variables examined in this study are open to this type of risk, e.g. bowel and bladder function, vaginal secretions and alterations to the senses. However, the space for written qualitative comment in the daily recording diary appears to have somewhat minimised this effect. When other, obvious reasons for changes to the womens' experiences of the event occurred, women qualified their responses in the tick boxes as, for example, lack of smell as due to a head cold, loss of appetite due to reflux, and increased vaginal secretions due to candidaiasis. Events qualified in this way were excluded from the data analysis.



The effect of participants responding differently simply because the question has been asked, is well-documented (Minichiello et al., 1999; Polit & Hungler, 1995; Portney & Watkins, 2000). It is not possible to know if such an effect occurred in this study. Nonetheless, the longitudinal approach to data collection used in this study has the potential to counter such an effect. There is less novelty about recording the events the longer the recording period (Minichiello et al., 1999). However, longer recording periods can increase the risk of loss of detail in the recording (Minichiello et al., 1999). The sample's even distribution of primigravidae and multigravidae may have also countered the effect. It is reasonable to assume that women who have already had a baby (multigravidae) are already knowledgeable about the experience of the last few weeks of pregnancy. The chances of over-reporting events are less likely in this group of women. Recording patterns from both primigravidae and multigravidae in the study are consistent with each other for both quantitative and qualitative data.

Bias can arise from changes in the way the measuring instrument is used. In a study of this nature, there is always a possibility that women may lose interest in the recording process (Minichiello et al., 1999). This does not appear to have occurred as, with very few exceptions, all the women who responded made qualitative entries in the recording diary right up to the day of birth.

Fifty-eight women (48.7% of the *total sample*) recorded an entry every day prior to their birth. Another 45 women (37.8% of the *total sample*) provided reports on all but 1-3 intermittent days prior to their birth. Such consistency suggests that the women kept the diaries fairly carefully (table 3).

**Table 3. Completed Recording Diaries**

Completed recording diaries	Number
Report every day	58
No report 1-3 days	45
No report 4-6 days	9
No report 7-9 days	6
No report 10-12 days	1
Total	119

The recording instructions meant that women did not have to record anything when there were no changes to report, which may have increased the ease of completing the diary. However, these simplified instructions may have obscured events that were occurring in a consistent, non-varying fashion on a day to day basis.

**External Validity**

External validity refers to “the generalisability of the research findings to other settings or samples” (Polit & Hungler, 1995, p.239). This study is a preliminary investigation in an area where there is little previous research. The sample is one of convenience, although an effort was made to recruit a diversified population into the study. Despite this attempt, the resulting sample is not representative of the population of child-birthing women for parity, ethnicity or age.

One of the assumptions underpinning the use of a diary in this study was the presumption of literacy and a cultural bias toward writing rather than speech (Portney & Watkins, 2000). The diary is not a suitable data collection tool for women from cultures in which an oral tradition has precedence over writing, or for women who have literacy difficulties. The parity distribution in the sample provides a point of internal validity, but does not provide support for external validity.

The results for uterine activity in the current study show a similar trend to the large study of uterine contractions (n = 2446), undertaken by Nageotte, Dorchester, Porto,

Keegan and Freeman (1988). Their study results indirectly provide support for the external validity of the daily recording diary on this aspect.

Therefore the study results may not apply to another group that is not subject to the same data collection processes. The results are not generalisable, but rather, point the way to promising areas for further research.

## **Reliability**

### **Reliably Completing the Daily Recording Diary**

Prospective data collection is a stronger design feature than retrospective methods (Polit & Hungler, 1995; Portney & Watkins, 2000). Data was collected prospectively in this study. Forgetfulness or 'creating' detail because of poor memory is less likely when data is collected on the day the event occurred rather than relying upon memory some time after the event (Minichiello et al., 1999; Polit & Hungler, 1995).

One hundred and twenty recording diaries were returned. The occurrence of late pregnancy events was prospectively recorded in these diaries (Tables 3 & 4). One diary was considered an incomplete record because there was nothing recorded in it. It was excluded from the data analysis.

**Table 4. Recording Period Prior to Labour, Number of Days.**

<b>Completed Diaries Days Recording prior to labour</b>	<b>Number</b>
<b>3-6 days</b>	<b>12</b>
<b>7-13 days</b>	<b>17</b>
<b>14-20 days</b>	<b>48</b>
<b>21-26 days</b>	<b>31</b>
<b>27-32 days</b>	<b>11</b>
<b>Total</b>	<b>119</b>

Eighty-six and a half percent of the women in the sample filled out the recording diary on 80% or more of the days available prior to the onset of their labour. Thus, it was demonstrated that women had filled out the checklist as requested. One hundred and sixteen participants (97.5% of the *total sample*) made frequent, substantial entries in the 'comments' section on an intermittent basis. Two women kept comprehensive recordings every day for more than twenty-five days. All women made at least one qualitative entry in the diary during the recording period. Data from the final fifteen days of pregnancy was selected for analysis (see p.58).

All but two participants filled in the demographic data section in the front of the recording diary booklet. The two participants who ignored this section gave no reason for leaving it blank.

## Discussion

### Alterations to increase the future effectiveness of the recording diary

#### Checklist page.

One participant in the main study returned useful comments about the structure of the diary, one of which was that a '*no change*' box be included on each day's recording page. In this way, the researcher could ascertain that there had been *no changes*, rather than not knowing whether there had been *no changes*, or, that the page had not been completed on that day. Three women consistently wrote *no changes* on the pages where this applied. Eleven women wrote *no changes* on intermittent pages. Unfortunately, there was no opportunity to include a *no change* tick-box in the recording diary, as by the time the woman's feedback was received, all the packages had been distributed.

Another woman gave feedback that a *baseline observation* page could be included at the beginning of the booklet so that the researcher would know which events were already occurring at the beginning of the recording period.

In the interest of keeping the daily recording time to a minimum, and to reduce the need for women to tick boxes when an event had not occurred, columns to record a

new event and changes to events were included in the recording diary pages. It transpired that most women did not use these columns. Change to an event or a new occurrence either happened on the day in question or it did not, and so, women just ticked the boxes when the new event occurred/changed and made a qualitative comment about the change or the novelty of the event. While women ticked some boxes on most days, they filled in the check boxes for individual events in an intermittent fashion. This suggests that the checklists were filled out as changes or new events occurred.

Deleting the 'new' and 'change' columns on the checklist page could increase the reliability of any future study using the same, or a similar instrument. The addition of a *no change* category and instructions asking women to record in the tick box every day an event occurs would eliminate some of the uncertainties apparent in the data from this study.

#### **Demographic information page.**

In order to reduce the daunting effect that such a large booklet may have on the participants, the demographic information page was kept as simple as possible. Only information that was considered absolutely necessary to the study was requested. However, for completeness, it would have been useful to include a space for birth outcome data. In the event, so many women included birth outcome data that the frequencies were calculated (see p.65).

#### **Conclusions**

The instrument did what it was designed to do, i.e. gather data about the occurrence of, and/or change in, fifteen variables over the final two to four weeks of pregnancy. The instrument provided a straightforward method of collecting the data. The consistency of reports between multigravidae and primigravidae and the number and frequency of qualitative entries indicate that the women filled out the daily recording diary carefully. The consistency of the entries from primigravidae and multigravidae suggest that despite the identified minor structural alterations discussed above, the daily recording diary is a reasonably reliable data collection instrument for multiple

observations in areas that are relatively unstudied. Sufficient data has been collected to identify the occurrence of events, and frequencies and patterns of occurrence for events. There was also sufficient data to examine the frequencies for three events (fetal movements, cervical needling and broken sleep) for promising associations with the onset of labour. Thus, if the suggested alterations are made, the daily recording diary can be further tested for reliability using statistical coefficients and be usefully used to identify areas for future study.

# Chapter Five:

## Results: Sample and Demography.

### Introduction

By their very nature, descriptive studies yield a substantial amount of data (Polit & Hungler, 1995). The purpose of the two data chapters is to display the results of the data analysis. In this chapter descriptions and explanations are given concerning the sample, why the sample size varies across the recording period, how the variable size of the sample has been managed and the way the recording period for analysis was decided upon. The results relating to the demographic characteristics of the sample are also presented in this chapter.

### Distribution and Return of Daily Recording Diaries.

Self-employed midwives distributed two hundred and seventy eight research packages to women who showed interest in the study. One hundred and twenty daily recording diaries were returned, of which one hundred and nineteen were completed in sufficient detail for inclusion in this study (N 119). This number represents a return rate 42.8% (table 5).

Table 5. Distribution and Return of Daily Recording Diaries

Daily Recording Diaries	Number
<i>Distributed to Midwives</i>	300
<i>Not received by midwife</i>	10
<i>Returned undistributed</i>	12
<b>Distributed to women by midwives</b>	<b>278</b>
<b>Returned complete</b>	<b>119</b>
<b>Sample</b>	<b>N = 119</b>
<b>Return Rate</b>	<b>42.8%</b>

## Sample Size

### Total sample and daily sample

The denominator of the *total sample* is 119 women. Where results for the *total sample* are reported, the term *total sample* will be employed. The gestation of each woman’s pregnancy at the time that she gave birth determined the number of days that each woman recorded in the daily recording diary. Thus, the number of women in the sample decreased daily as the women gave birth. Therefore when daily reports are discussed, the denominator alters each day. The term *daily sample(s)* is used to indicate results where the denominator is subject to daily variation.

### Labelling the recording days

Any day in the period of time that each woman recorded events was called a *recording day*. The *recording days* were labelled in reverse order from the day of birth. For all women whatever the gestation of their pregnancy, the day prior to the day of birth was identified as birth day minus 1. Thus, all women in the study (N 119) had recordings for birth day minus 1, i.e. the *daily sample* for birth day minus 1 = 119. Fourteen women had given birth less than seven days after beginning recording, therefore the denominator on birth day minus 7 is 105, i.e. the *daily sample* = 105. Frequency distributions for the events being examined over the whole recording period were calculated using the daily sample size as the denominator. Because of the daily variation in the denominator, all *daily sample* results are reported as a percentage of the daily denominator (table 6).

**Table 6. Daily Sample: Daily Variation in Denominator.**

Birth day	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15
Daily sample	119	119	119	113	108	106	105	104	100	97	96	94	89	85	72



## Recording Days

The range of recording days on which women reported experiencing the events being studied was 3-31 days prior to the onset of labour. Seventy-two women, (60.5% of the *total sample*), had completed recordings for fifteen days prior to the onset of labour. Therefore, fifteen days prior to the onset of labour was chosen as the cut off point for useful analysis of the daily checkbox data from the daily recording diary.

Data from the daily checkboxes were examined in 24-hour time bands. For selected events data was also collapsed into 48 hour and 72 hour time bands. This was done to examine the effect on report patterns of smoothing the variations in the frequency curve(s). Forty-eight-hour clusters emphasised the major pattern variations and eliminated the minor fluctuations. Results from the 48-hour analysis are reported for fetal movement and cervical needling (ch. 6). Seventy-two hour clusters however, resulted in only five data points in each data series. Fewer data points resulted in a substantial loss of variation and no useful patterns were identified given the numbers in the sample. The 72-hour cluster results are of no value, therefore they are not displayed.

The data relating to the 72 hours prior to labour, however, were analysed in order to identify events that may have been experienced close to the onset of labour. The results of this examination are reported with other results that relate to individual events (ch. 6). As all women in the study recorded events for a minimum of three days prior to birth, the denominator for the 72 hour time period is that of the *total sample* (N 119)

## Demographic Information

### Total sample

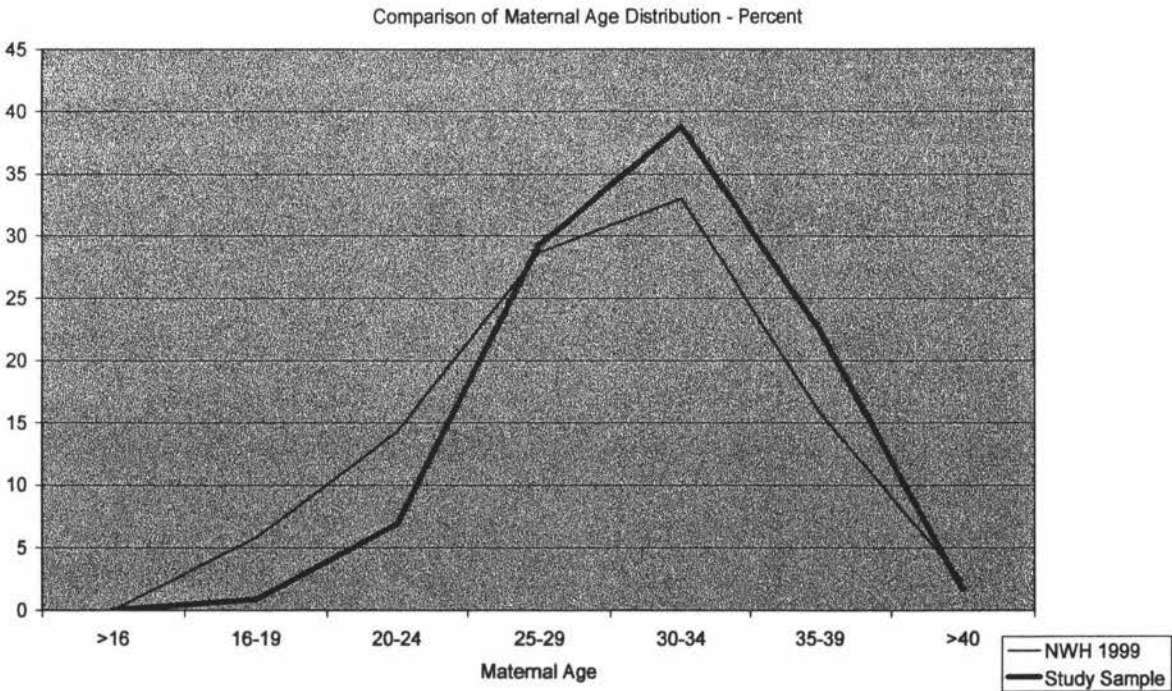
The New Zealand Health Funding Authority report (HFA), published in 1999, uses data collected in 1997. The reference 'HFA, 1999' is therefore used for the 1997 national data set in this report for the current study.

Maternal Age

The age range of the women who participated in the current study was 17-44 years. In this study, women recorded their age as being within a range. The median range for age in this study was 30-34 years. The median age range reflects the national trend for women to give birth at older ages (HFA, 1999). The median age that Pakeha/New Zealand women in New Zealand give birth is 29.7 years (HFA, 1999). At the extremes of distribution of maternal age, nine women under the age of 24 years, and 27 women over the age of 34 years participated in the current study.

As a benchmark for the local region, the age distribution of women who gave birth at >37 weeks gestation at National Women’s Hospital in 1999 was accessed. The distribution of maternal age in the National Women’s Hospital report shows a similar pattern to the study sample (National Women’s Hospital, 2000), (fig. 1).

Figure 1. Maternal Age



**Ethnicity**

The distribution of ethnicity in the sample does not match the national population of birthing women according to the HFA (1999). The respondents in the current study overwhelmingly identify as Pakeha/New Zealanders (84.9%). There were no respondents who identified as being from Pacific Island cultures, and those respondents who identified as Maori or as Asian were small in number, 6.4% and 3.4% respectively. The latter two groups of women were a smaller percentage than is found in either the population of women who gave birth at National Women’s Hospital in 1999, (National Women’s Hospital, 2000), or nationally in 1997 (HFA, 1999), (table 7).

**Table 7. Ethnicity**

Ethnicity	Current Study Percent	Comparison	Comparison
		National Women's 1999 percent*	All NZ Women 1997 percent**
Pakeha/NZ	84.9	52.6	58
Maori	6.4	8.0	19
Pacific	0.0	18.6	9
Asian	3.4	13.6	6
Other	0.8	2.8	8
Not Known	4.2	-	-
Total	99.7	95.6	100

\*(National Women’s Hospital 2000), \*\*(Health Funding Authority, 1999).

**Parity**

The sample is well balanced for parity. An almost equal number of primigravidae and multigravidae participated in the study (table 8). This distribution is however, dissimilar to the 33% primigravida to 66% multigravida distribution in the national population of birthing women (HFA, 1999).

**Table 8. Parity of the Study Participants**

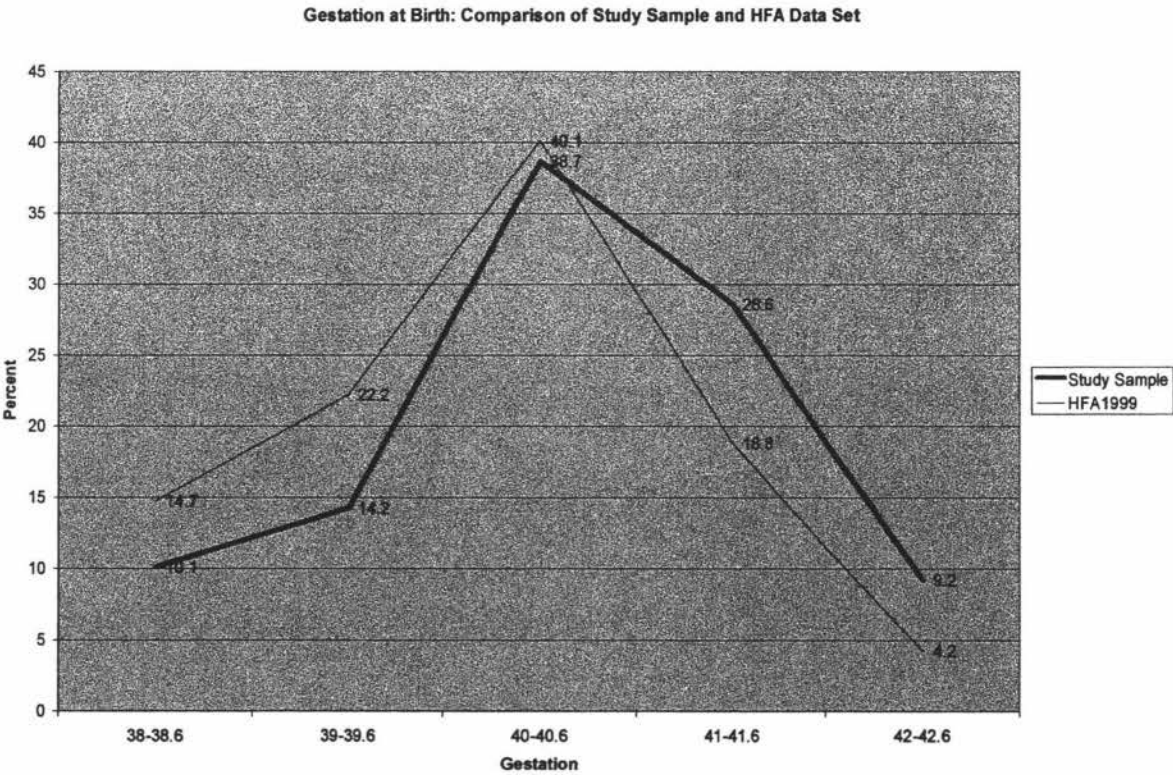
Parity	Number
Primigravida	60
Multigravida	57
Not Known	2
Total	119

Gestation at Birth

The normal gestation period for humans falls within the range 38-42 weeks of pregnancy (Carson, 1997; Sweet & Tiran, 1997). This definition is reflective of current obstetric philosophies that regard more than 42 weeks gestation as cause for induction of labour (HFA, 1999).

National figures show that over one third more babies are born at 38 and 39 weeks gestation (13,898) than are born 41 and 42 weeks gestation (8,666) (HFA, 1999). However, the gestational age at birth in this study is generally later than in the national population of birthing women (HFA, 1999), (fig.2). For example, 28.6% of the study sample compared to 18.8% of the national birthing population gave birth at 41 weeks gestation.

Figure 2. Gestation at Birth: Comparison of Sample with National Data Set



In the study sample, there was a difference in the distribution of gestation at birth for primigravidae and multigravidae (table 9). Generally, multigravidae gave birth at an earlier gestation than primigravidae. Seventy-one and a half percent of primigravidae compared with less than 60 percent of multigravidae gave birth between 40 and 41.6 weeks gestation. The gestation at which multiparous women gave birth in this study was more evenly distributed across the gestational age groups and more closely reflected the HFA national data set (1999). Thirty-nine percent of multigravidae compared with 20% of primigravidae gave birth between 38 and 40 weeks gestation (table 9).

**Table 9. Gestation at the Onset of Labour related to Parity**

Gestation	Primigravidae % n = 60	Multigravidae % n = 57
38-38 <sup>6</sup>	10.0	12.3
39-39 <sup>6</sup>	10.0	26.3
40-40 <sup>6</sup>	41.7	35.1
41-41 <sup>6</sup>	28.3	21.1
42-42 <sup>6</sup>	8.4	3.5
Total	98.4	98.3

NB missing data = 2 women of unknown gestation

The distribution of gestation at onset of labour seen in the study sample is a little dissimilar to the national figures (fig2). While it is not possible to determine the reason for this finding, the distribution curve for gestation seen in this study may reflect a real difference in gestational age at onset of labour or reflect difference in sample size or parity distribution. Another possible reason for the difference is possible sample bias; all women in the sample were in the care of a self-employed midwife.

## Fetal Position at the Onset of Labour

Occipito-posterior position is a mal-position of the fetal head that occurs in approximately 10% of labouring women, and is associated with prolonged labour (Sellars, 1993; Rosevear & Stirrat, 1996; Sweet & Tiran, 1997). In the occipito-posterior position, engagement of the fetal head is impeded because the head is deflexed (Silverton, 1993; Sweet & Tiran, 1997). Non engagement of the fetal head may delay the onset of labour (Sweet & Tiran, 1997).

In the current study the frequency of each position of the fetal head at the onset of labour was slightly higher for posterior position, and more evenly distributed between the lateral and anterior position, than Thompson's published values (1993) (table 10). It is of note that Thompson's figures make no allowance for the percentage of babies with a mal-presentation such as breech.

**Table 10. Fetal position at the onset of labour. Comparison of Sample with Thompson (1993).**

Fetal Position	Current Study %	Thompson(1993) %
Occipito-anterior	33.6	25
Occipito-lateral	34.5	64
Occipito-posterior	13.5	11
Sacro-anterior	0.8	na
Not Known	17.6	-
<b>Total</b>	<b>100.0</b>	<b>100</b>

The differences between Thompson's values and the study results were analysed using the chi-square statistical test with 1 degree of freedom. The results were not significant for occipito-posterior and occipito-anterior position. The occipito-lateral position was significantly less frequent in the study sample ( $p = 0.001$ ), however, the finding is not clinically significant. Occipito-lateral position at the onset of labour



usually converts to the anterior or, less commonly, the posterior position as labour progresses and the fetus rotates to the position required for birth (Morrin, 1993).

Inter-rater reliability cannot be assumed for assessment of fetal position in this study. The woman's midwife voluntarily recorded the position of the fetus at the onset of labour. No attempt was made to standardise the way in which this assessment was done.

In the study sample, three times as many primigravidae (12), as multigravidae (4) reported an occipito-posterior position at the onset of labour. This result is congruent with Rosevear and Stirrat (1996), and Silverton (1993), who report that occipito-posterior position is more commonly found in primigravid women.

### **Birth Outcome**

Birth outcome data was not specifically sought in this study as the research question was focussed toward the final weeks of pregnancy and the onset of labour. However, because 95% of women in the sample ( $n = 113$ ) recorded the type of birth they experienced, the percentages are presented for the interest of readers.

All the women had an independent midwife as their Lead Maternity Carer. The majority of the women in the sample had their babies within a hospital in the Auckland region. For these reasons, the birth outcomes in the study have been compared with published birth outcome data from both a large local tertiary maternity unit and a local independent midwifery group practice. In the current study, of the women who reported their birth outcome, 86.7% gave birth spontaneously, 10.6% had a caesarean section and 2.7% a vacuum extraction (table 11).

**Table 11. Comparison of Birth Outcome (Percent)**

Birth Outcome	Current Study	Primigravidae	Multigravidae	'97-'99 Midwives Collective	NWH 1999 Primigravidae	NWH 1999 Multigravidae
	Percent (n = 113)	percent	percent	percent (n = 928)	percent (n = 2847)	Percent (n = 3804)
Spontaneous/ Vaginal	86.7	83.9	91.2	80.4	50.3	74.1
Caesarean Section	10.6	12.5	7.0	11.2	25.6	19.8
Ventouse (incl forceps NWH)	2.7	3.6	1.8	8.4	23.7	5.7
Not Known	(5.0)	-	-	-	-	-
Total	100	100	100	100	99.6	99.6

There is need for caution in making comparisons. The figures from National Women's Hospital are for all women who had completed 37 or more weeks of pregnancy and who gave birth in 1999 at that hospital, therefore they include women with high risk pregnancies who required obstetric team care (National Women's Hospital, 2000). The statistics from the independent midwifery group practice are the total client base for the two-year period, 1997-1999. Primigravidae and multigravidae statistics are not reported separately by the group midwifery practice (Auckland Midwives Collective, 2000) (table 11).

Furthermore, the sample from the current study is small, and all women in the sample had an uncomplicated pregnancy. The study sample is neither randomly selected nor a complete cohort of women. There are also substantial differences in age and ethnicity distribution between the women in the sample and those in the comparison groups. Differences in sample size should also be borne in mind. National Women's Hospital percentages are calculated upon groups of 2847 primigravidae and 3804 multigravidae respectively, the percentage for outcomes from the group midwifery practice are based on a population of 928, whilst the study sample represents 113 women who voluntarily reported their birth outcome.

Therefore, the birth outcome data in the current study can, at best, be regarded as interesting but informal.

## Summary

This chapter has provided details of the sample size and explained the decisions made to manage a sample number that varied on a daily basis. The definitions used to differentiate between the *total sample* (N 119) and the variable *daily samples* were presented. Fifteen days prior to the onset of labour was selected as the maximum period of time for data analysis because the *daily sample* was less than 60% of the *total sample* by birth day minus 16.

The demography of the sample has been discussed. Compared with the HFA data set (1999), the majority of the women in the current study: identified as Pakeha/New Zealanders; were generally older than the national birthing population; and were at a greater gestation at birth. In the current study, fifty percent of the women in the *total sample* were primigravidae as opposed to the 33% seen in the national population.

Occipito-posterior fetal positions at onset of labour were more common and occipito-lateral fetal positions were less common than expected. Birth outcomes were self reported by the women and are presented for interest only. They should be regarded as informal and treated with extreme caution.

The following chapter provides the results from women's reports of selected events experienced in the final weeks of pregnancy. Analysis of the data related to cervical needling, uterine activity and fetal movements, as well as sleep, energy, bowel activity and vaginal secretions is presented.

## Chapter Six: Results - Late Pregnancy Events

### Introduction

This chapter provides the detailed results from the events experienced by women in the fifteen days prior to the onset of labour. Women in the study were asked to record their daily experience of fifteen variables. When each woman perceived an alteration to the pattern of an event, or noticed an event for the first time, it was recorded on the daily checklist.

Results of the record of events are presented in this chapter. Analysis of the data related to cervical needling, uterine activity and fetal movements, followed by elimination patterns, vaginal secretions, energy levels and sleep patterns and dreams is presented. A brief reference is then made to changes in mood reported by women in the study. The presentation of results concludes with analysis of data related to nesting tasks/deadlines, mood type, appetite, libido and alterations to hearing, smell and taste.

### 'Needling' Sensation in the Uterine Cervix

#### Total Sample

Three-quarters of the women in the *total sample* (74.8%,  $n = 89$ ) reported experiencing a needling sensation in the uterine cervix (hereafter referred to as 'needling') at least once during the recording period. During the fifteen days prior to labour 82 women reported needling. Seven women (5.9% of the *total sample*) experienced needling more than two weeks before labour, but did not experience needling within the fifteen days prior to labour.

All but five women reported experiencing needling on more than one day (table 12). Women reported that they usually experienced needling intermittently, however, six women (5% of the *total sample*) reported experiencing needling on 3-4 consecutive days within their total experience of needling that was otherwise on intermittent days.

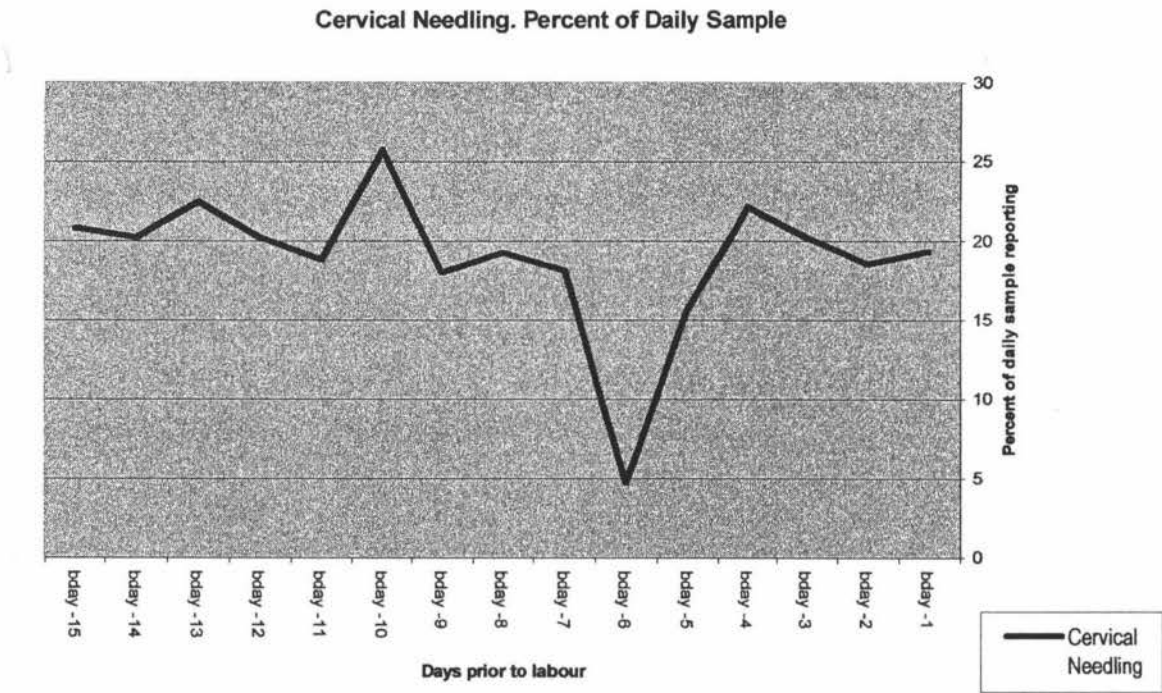
**Table 12. Cervical Needling: - Total Sample (N 119)****Number of Days Needling Experienced within 15 Days of Labour**

<b>Needling experienced within 15 days prior to labour:</b>	<b>On Any Day</b>	<b>On more than 1 Day</b>	<b>On more than 5 Days</b>
<b>Number of women</b>	82	54	30
<b>Percent of total sample</b>	68.9	45.4	25.2
<b>Needling experienced more than 15 days prior to labour</b>			
<b>Number of women</b>	7	7	0
<b>Percent of total sample</b>	5.9	5.9	

Daily Samples data (24-hour clusters)

Up to 25.8% of the *daily samples* reported experiencing cervical needling on any one day between one and fifteen days prior to labour. An exception to these results was on birth day minus 6, when only 4.7% of the *daily sample* reported cervical needling (fig 3). Maximum reports were made on birth day minus 10 when 25.8% of the *daily sample* reported needling (fig 3). The results were examined for ‘Day’ association with the onset of labour using logistic regression analysis. The results were not statistically significant.

Figure 3. Cervical Needling Daily Samples (percent)

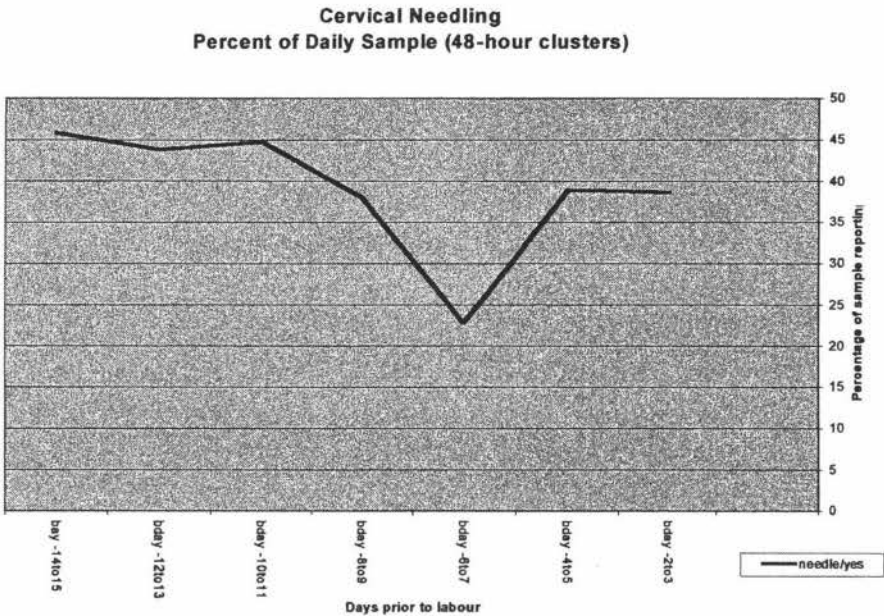


Daily Samples data (48-hour clusters)

When the data for cervical needling was grouped into 48-hour clusters, the peak reports on birth days minus 10 and 11 were smoothed, however, the trough on birth day minus 6-7 remained (fig 4).

The persistence of the trough suggests that it is not an artefact, but represents a real alteration in the occurrence of cervical needling at this time.

Figure 4. Cervical Needling –Daily Samples Percent (48-hour clusters)



During the 72 hours prior to labour 35.3% (n = 41) of the *total sample* reported needling at least once, whilst 14.3% (n = 17) reported needling on more than one day in the 72 hour period.



### **Not Experiencing Cervical Needling**

A quarter (25.2%) of the *total sample* did not report experiencing cervical needling. There is no way to know if any women in this group experienced needling before data collection commenced.

The gestation range for the 'no needling' group of women was 38.2 –42.1 weeks. Therefore, an absence of cervical needling in the two weeks prior to labour does not appear to be associated with the number of weeks gestation at birth.

The pattern of reports of 'not experiencing cervical needling' appeared to be associated with parity. Thirty one point seven percent of primigravidae ( $n = 60$ ), 17.5% of multigravidae ( $n = 57$ ) and one woman of unknown parity experienced no cervical needling during the recording period. Not experiencing cervical needling was examined for association with parity. Analysis was undertaken using the chi-square statistical test with 1 degree of freedom. The results were statistically significant ( $p = 0.001$ ). Women who did not experience needling were almost twice as likely to be primigravidae.

Uterine Activity

Women were asked to report uterine activity as ‘more’ or ‘less’ contractions than the day before, and to discriminate between painful and painless uterine activity. Reports of ‘more’ or ‘less’ contractions had the potential to represent a cumulative effect. However, although there were episodes of ‘more’ or ‘less’ contractions reported on consecutive days, which might have represented a cumulative effect, the likelihood is that it did not, or, that if it did do so, that it is an unimportant effect. Where consecutive reports of ‘more’ contractions were made, they were on no more than three days, followed by a report of ‘less’ contractions or no report for the next day. There were gaps of several days in the reports of contractions at more than one point in the 15-day recording period from all of the women in the study. Only twelve women made consecutive reports at any point in the recording period. This number represents 10.1% of the *total sample*.

Total Uterine Activity

Reports from the *total sample* (N 119)

The various forms of uterine activity that were reported by women in the study are displayed in tables 13 and 14.

Table 13. Total Uterine Activity – Percent of *total sample*

Total Recording Period	All Uterine Activity %	No Uterine activity %	Total	Painful & painless contractions %	Painless contractions only %	Unqualified activity only %	Total
Total sample	92.4	7.6	100	67.2	11.8	13.4	100

All uterine activity: ninety-two and a half percent of the women in the study (n = 110) reported at least one episode of at least one type of uterine activity during the recording period. All but two of this group of women reported uterine activity within 15 days of the beginning of labour. The two women who reported both painless and painful uterine contractions prior to birth day minus 15, did so on birth days minus 23 and minus 27 respectively.

Total combined painful and painless uterine contractions: most women who reported experiencing uterine activity during the recording period experienced both painful and painless contractions. Both painful and painless uterine contractions were reported by 67.2% (n.80) of the *total sample*.

Only painless uterine contractions were reported by 11.8% (n.14) of the women in the sample. During the fortnight before the onset of labour unqualified uterine activity was reported by 13.4% (n.16) of the women in the *total sample*. No uterine activity was reported by 7.6% (n.9) of the *total sample* (table 13).

**Uterine Activity and Parity:**

The frequency and type of uterine activity experienced by women does not appear to be influenced by parity. There were eight primigravidae and six multigravidae (6.8% and 5.0%) in the group of women reporting painless contractions only (table 14). In the group of women who reported no contractions during the recording period, five were primigravida and four were multigravida (4.2% and 3.4%). These numbers are too small for further analysis (table 14).

**Table 14: Total Uterine Activity –Related to Parity**

Total Recording Period	Painless Uterine Activity	No Uterine Activity
Primigravidae		
% total sample	6.8	4.2
Multigravidae		
% total sample	5.0	3.4
Total %	11.8	7.6

### Total Uterine Activity in the 72-hours prior to labour

In the 72 hours before labour commenced 77.3% (n = 87) of the *total sample* reported an increase in all types of uterine activity. No uterine activity was reported by 22.7% (n = 27) of the *total sample* during the 72-hour period. The report frequency for uterine contractions was similar for primigravidae and multigravidae. Reports of uterine activity in the 72-hours prior to labour are displayed in table 15.

**Table 15. Total Uterine Activity: 72 hours prior to labour, *total sample* percent**

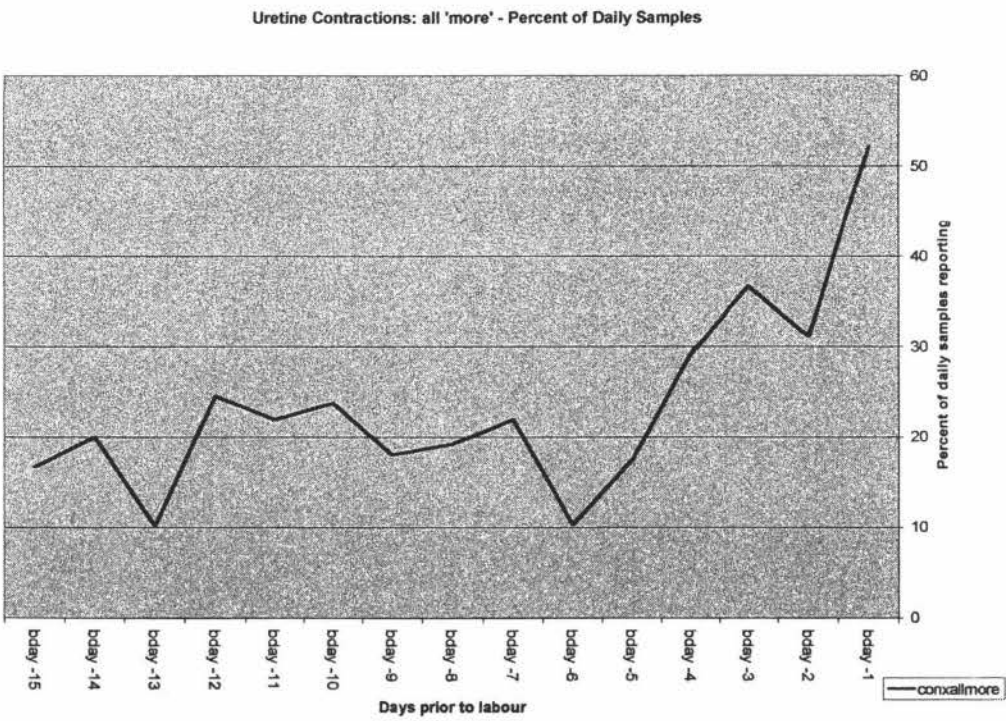
72 Hours Prior to Labour	Painful & Painless Contractions %	Unqualified Uterine Activity %	No Uterine Activity %	Total %
Total Sample (N 119)	73.1 (n = 87)	4.2 (n = 5)	22.7 (n = 27)	100
Primigravidae (n = 60)	70 (n = 42)	3.3 (n = 2)	26.7 (n = 16)	100
Multigravidae (n = 57)	78.9 (n = 45)	1.8 (n = 1)	19.3 (n = 11)	100

UterineActivity: Reports from *Daily Samples*

Combined Painful and Painless Uterine Contractions (Increased Activity).

Not unexpectedly, the greatest percentage of the *daily samples* reporting increased uterine activity (both painful and painless) was seen on birth day minus 1, when there were reports from 52.1% of the *daily sample*. There was a surge in reports shown on birth day minus 3, when 36.9% of the women in the *daily sample* reported increased uterine activity. Note that only 10.1% of the *daily sample* reported ‘more’ contractions on birth day minus 6 (33 women) and birth day minus 13 (9 women) indicating quieter days of uterine activity. These results are displayed in figure 5.

Figure 5. Total Uterine Activity: Combined Painful and Painless Contractions.  
*daily samples* increased activity (percent)



Painful Contractions

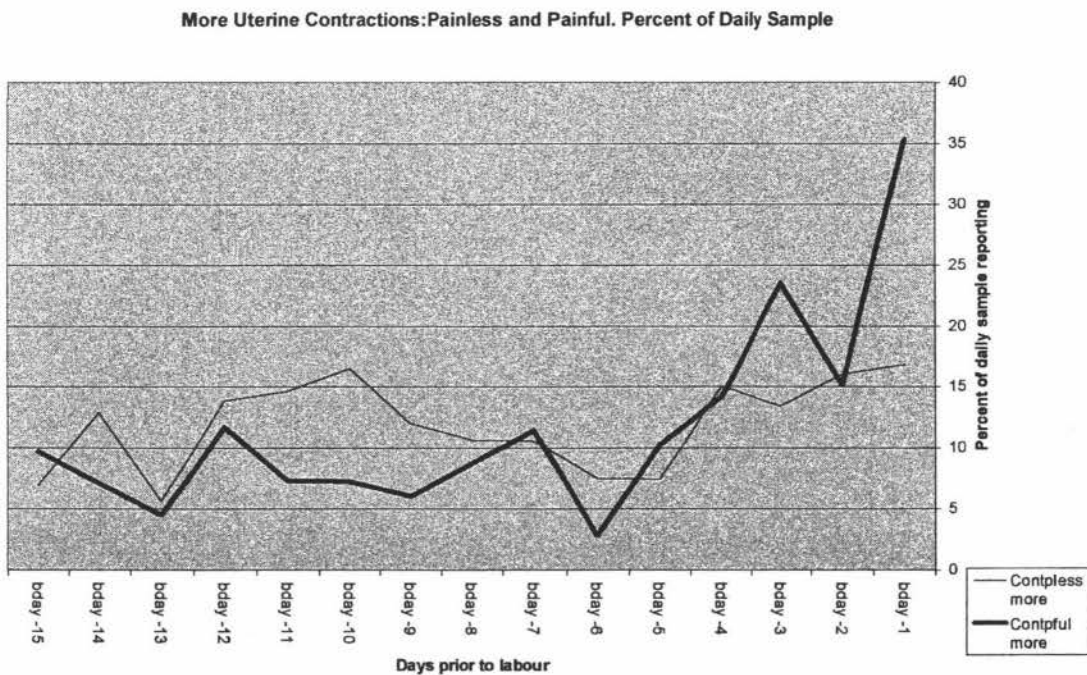
There were more reports of painful contractions as labour approached. Peak reports occurred on birth day minus 1 and birth day minus 3 (35.3% and 23.5% of the *daily samples* respectively). Fewest reports of ‘more’ painful contractions were seen on

birth day minus 6 when reports from only 2.8% of the *daily sample* were seen indicating a quieter day for painful contraction activity (fig.6).

**Painless Contractions**

Compared with reports for painful contractions, the pattern of daily reports of ‘more’ painless contractions was flatter over the 15 days prior to the onset of labour. There is a peak in reports of ‘more’ painless contractions on birth day minus 10 that is not seen again until the day before labour. Daily reports are from small percentages of the *daily samples* (fig 6).

**Figure 6. Uterine Activity: Separate Reports for Increased Painful or Painless Contractions. daily samples (percent)**



**Decreases in Uterine Activity**

A small range of women (1 – 7% of the *daily samples*), reported decreases in uterine activity. Decreased activity may represent an actual decrease in overall activity or may merely indicate a return to normal activity after a period of increased activity. Women were not asked to discriminate to this degree between these two possible changes of events.

**Uterine Activity: - Frequency and Time of Day.**

Whilst some women reported 'runs of contractions' (regular contractions over a short period of time), the reports were intermittent and showed no pattern in terms of either, frequency or length.

Women were also asked to record whether contractions occurred in the day, evening or night. The day prior to labour was the only day that the 'time of day' contractions occurred was recorded by more than one or two women. There were insufficient reports to identify any patterns or clusters. Thirteen point four percent of women in the study reported this type of uterine activity without further qualification on at least one day in the fortnight before the onset of labour.



## Fetal Movements

Women were asked to report changes to both the frequency and type of fetal movement. They were not asked to count the movements, but rather to notice whether there were more or less movements than the day before and to note the size of the movements i.e. bigger or smaller. There was no indication in their qualitative comments that women were reporting abnormal variations in fetal movements. The written entries were much more indicative of a variation in their baby's normal activity, e.g. "baby moving a lot "(respondent 71), "definitely bigger" (respondent 2). There were no written comments indicating that women had concerns about movements, despite the fact that women consistently wrote in the 'comments' section if they had seen their midwife for other reasons. At least one alteration in fetal movement frequency was reported by 79% of the women in the study (n = 94). Most women experienced both 'more' and 'less' movements, however 6.7% of the *total sample* reported only 'more' movements.

### Fetal Movements: Frequency

#### 'Less' Movements

Olds, London and Ladewig (1995) state that some women report a decrease in fetal movements in the last 2-3 weeks of pregnancy. In relation to 'less' fetal movements the study findings support this assertion. Seventy-two point three percent of the *total sample* reported at least one episode of 'less' fetal movements during the recording period. There are two peaks of 'less' movements in the daily reports. They are on birth day minus 12 and birth day minus 1 (30.9% and 22.9% of the *daily sample* respectively). No woman reported 'less' fetal movements on birth day minus 6 (fig.7). The frequencies for 'less' movements were analysed for 'Day' association and 'Parity' association using logistic regression. The results were not statistically significant.

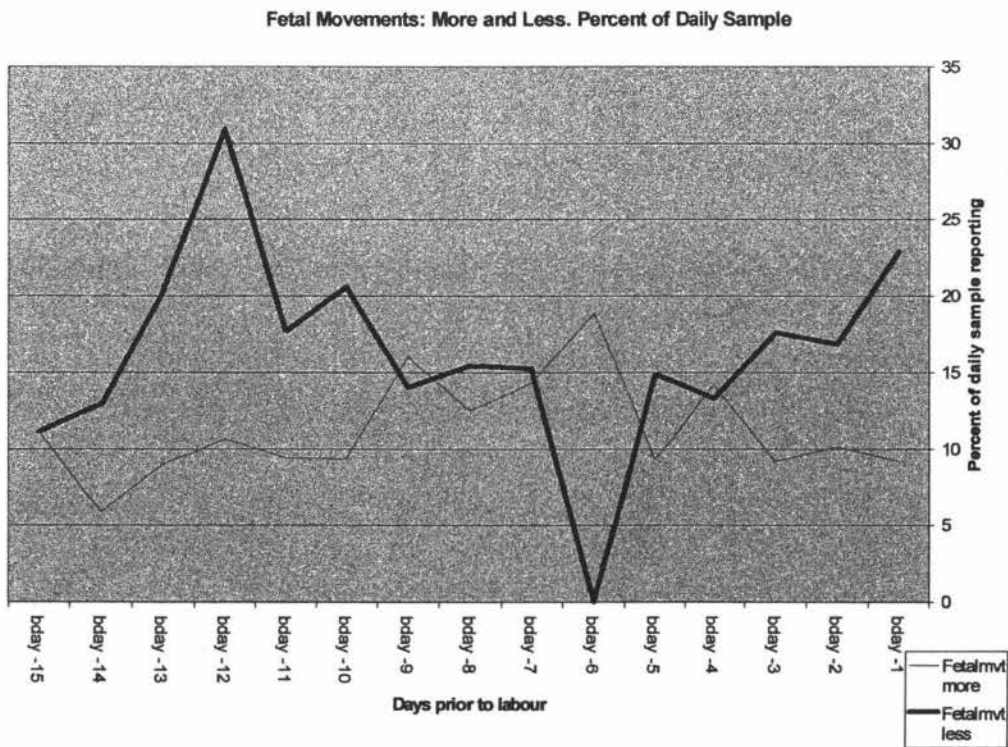
However, women clearly perceived an alteration in their experience of fetal movements to 'less' movements, especially on birth day minus 12. Almost one third of the *daily sample* reported experiencing 'less' fetal movements on birth day minus twelve.

**‘More’ Movements**

The number of women reporting ‘more’ fetal movements is smaller than those reporting ‘less’ movements. Nonetheless at least one episode of ‘more’ movements was reported by 55.5% of the *total sample* (n = 66). Over the recording period from 6% – 18% of the *daily samples* reported experiencing ‘more’ frequent fetal movements (fig. 7).

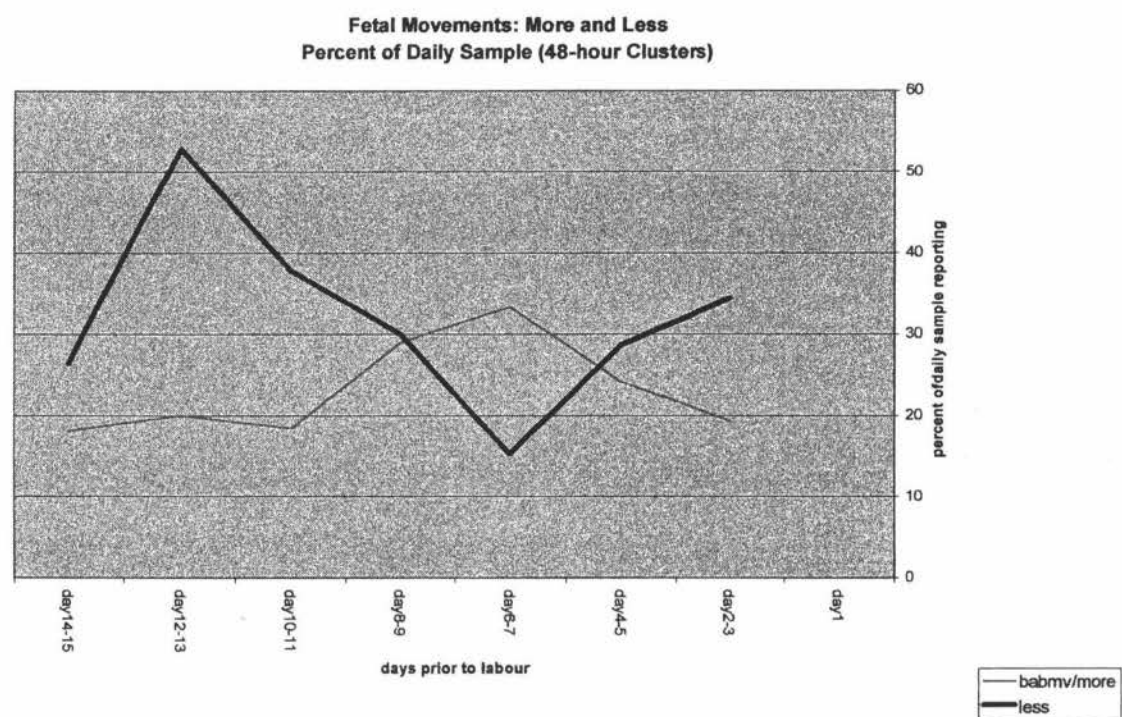
The number of reports of ‘more’ movements peak on birth day minus 6 (18.9% of the *daily sample*). This time band also has the fewest reports of ‘less’ fetal movements. The peak of reports for ‘more’ movements on birth day minus 6 may represent a real increase in the number of movements but it is equally possible that these reports of ‘more’ movements reflect a return to ‘normal’ movement frequency after a period of ‘less’ activity. There were no comments in the qualitative ‘remarks’ column of the recording diary that suggested such a return to normal frequency. There is insufficient data to examine the data from birth day minus 6 for relationships between reports of more and less movements.

**Figure 7. ‘More’ and ‘Less’ Fetal Movements: daily sample reports (percent)**



When the data relating to ‘ more’ and ‘less’ fetal movements is clustered into 48-hour bands the smaller fluctuations are smoothed out. However, the nil report for ‘less’ movement on birth day minus 6 (seen in fig.7) is obscured whilst the peak reports for ‘less’ movements seen on Day 12 (seen in fig. 7) is accentuated in the 12-13 day cluster (fig 8). A similar pattern is seen when the 48-hour clusters include birth day minus 1 and exclude birth day minus 15.

**Figure 8. More or Less Fetal Movements: 48-hour clusters (percent)**



**Fetal Movement Frequency: during the 72 hours prior to labour**

In the 72 hours prior to labour half of the *total sample* experienced changes to fetal movement frequency. Fewer fetal movements were reported by 31.9% of the women in the study on at least one of the three days before labour. More fetal movements were reported by 18.5% of women at least once during this period (table 16).

**Table 16. Fetal Movement Frequency: 72 hours prior to labour. *Total sample* (percent)**

Fetal Movement during 72-hour before labour	Less %	More %	Total %
Frequency	31.9	18.5	50.4

**Fetal Movements: Magnitude**

Women were asked to record size as ‘big’ or ‘small’ fetal movements. There were reports of one or the other alteration to the size of fetal movements each day prior to the onset of labour.

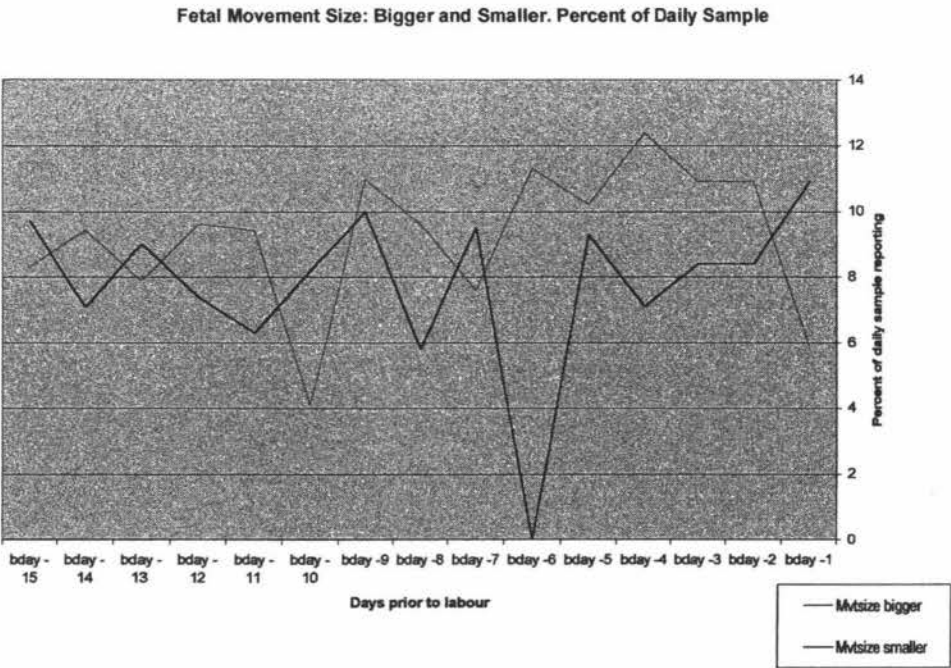
**‘Big’ fetal movements**

A small range of women (5.9% - 12.4% of the *daily samples*) reported ‘big’ fetal movements. Although the percent of the *daily sample* reporting did not exceed 12.4%, there is a discernible rise in the reports of bigger fetal movements from those on birth day minus 7 (7.6%) that peaks on birth day minus 4 (12.4%). The reports of ‘big’ movements then decline to 10.9% of the *daily sample* on birth days minus 3 and 2 and further, to 5.9% of the *daily sample* on birth day minus 1 (fig 9).

**‘Small’ fetal movements**

Small movements were reported by less than 11% of the *daily sample*. The maximum percent of *daily sample* reports of small movements is on birth day minus 1 (10.9%). There were no reports of ‘small’ fetal movements on birth day minus 6 (fig 9).

**Figure 9. Fetal Movements: Magnitude ‘Bigger’ & ‘Smaller’ daily samples (percent )**



**Fetal Movement Magnitude: during the 72 hours prior to labour.**

Over the three days immediately prior to labour, 19.3% of the *total sample* reported larger fetal movements, whilst 21.8% of the women in the *total sample* reported experiencing small magnitude fetal movements (table 17).

**Table 17. Fetal movements: Magnitude 72-hours prior to labour:**  
*daily samples (percent)*

Magnitude of Movement:	Smaller %	Larger %	Total %
	21.8	19.3	41.1

## Elimination

### Bowel Activity

Women were asked to report constipation, loose stools and diarrhoea. At some point in the 15 days prior to labour 97.5% (n.116), of the *total sample*, reported an alteration to their usual elimination patterns. Only three women (2.5%) reported no such alterations.

### Diarrhoea and Loose Stools

Statements that most women experience diarrhoea-like bowel activity within twenty-four hours of the beginning of labour are found in several midwifery and obstetric texts (Bennett & Brown, 1993, 1999; Corkhill, 1948; Rosevear & Stirrat, 1996; Sellars, 1993; Silvertown, 1993; Sweet & Tiran, 1997). The women's experiences in this study show a more complex series of changes in bowel activity. Women reported disturbances to bowel function at any time over the fifteen days prior to labour.

During the 15-day recording period between one and eight women per day reported experiencing diarrhoea. Whilst maximum reports of diarrhoea (5.9%) were on birth day minus 1, there were fewer reports of diarrhoea than expected from the descriptions in the literature. It is not known whether women experienced diarrhoea after labour had commenced.

As expected, some women reported looser bowel motions closer to labour (Bennett & Brown, 1996; Olds et al., 1995; Sellars, 1993; Silvertown, 1993; Sweet & Tiran, 1997). However, women also reported episodes of loose stools across the entire recording period. One or more episodes of loose bowel motions or diarrhoea were experienced by 69.7% of the *total sample* (n = 83) in Days 1-15 prior to labour. Within days 1-5 prior to labour 50.4% of the *total sample* (n = 60) reported loose stools or diarrhoea. Five women reported loose stools on almost every day of the recording period i.e. on 9-15 days in the fortnight before the onset of labour.

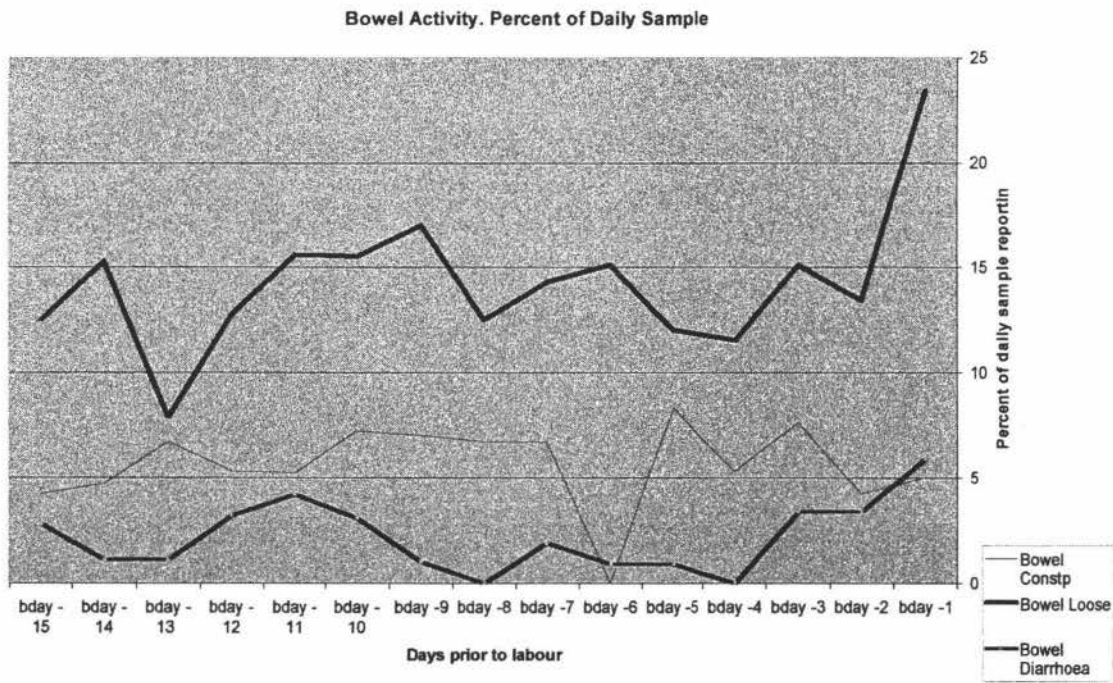
On a daily basis, between 7.9% and 23.4% of the women in the *daily samples* reported experiencing loose stools. The minimum and maximum number of *daily*



*sample* reports occurred on birth day minus 13 and birth day minus 1 respectively (fig 10).

Constipation was reported by 24.4% of women in the *total sample* (n = 29) at various times in the fortnight before labour commenced. There were no reports of constipation on birth day minus 6 and the maximum report was 8.3% on birth day minus 5 (fig 10). Seven of these women i.e. 5.9% of the *total sample* were constipated on all, or nearly all, of the recording days. It is unknown if the constipation was a long standing condition or if it was newly apparent in the recording period. Women did not record that it was a new event.

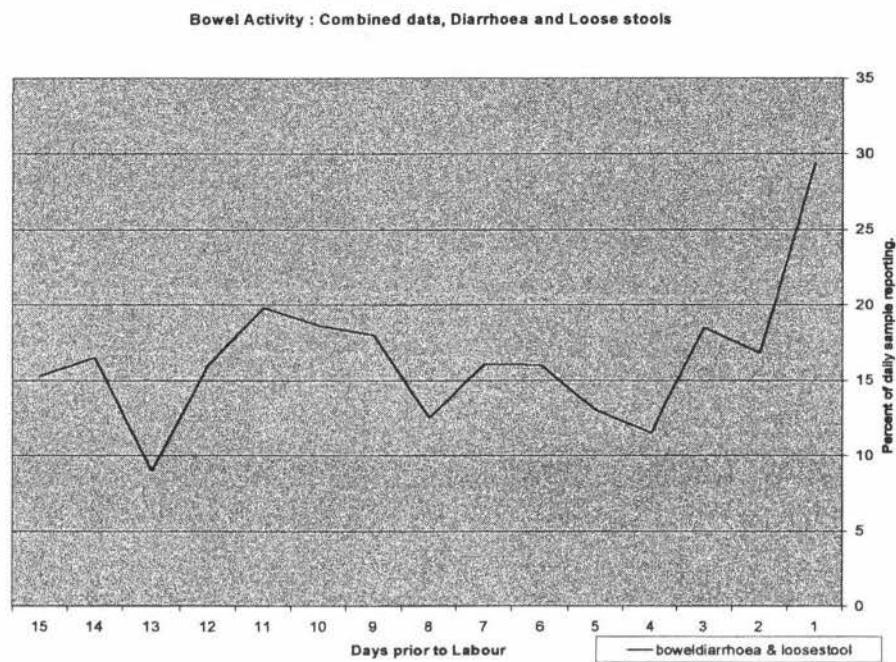
**Figure 10. Bowel Activity: Comparison of Diarrhoea, Loose Stools and Constipation.**  
*daily samples (percent)*



Women chose whether to label bowel activity as loose stools or diarrhoea. There is no way to discover how consistently the descriptions were applied across the sample. Therefore the data relating to loose stools and diarrhoea can be considered as a whole. When the data for loose stools and for diarrhoea are combined, there is a marked increase in reports of activity in the 24 hours prior to labour that in part

confirms the statements from the literature. Nonetheless, all of the daily reports of diarrhoea and loose stools represent less than 30% of the *daily samples* (fig. 11).

**Figure 11. Combined Daily Data: Diarrhoea and Loose Stools.**

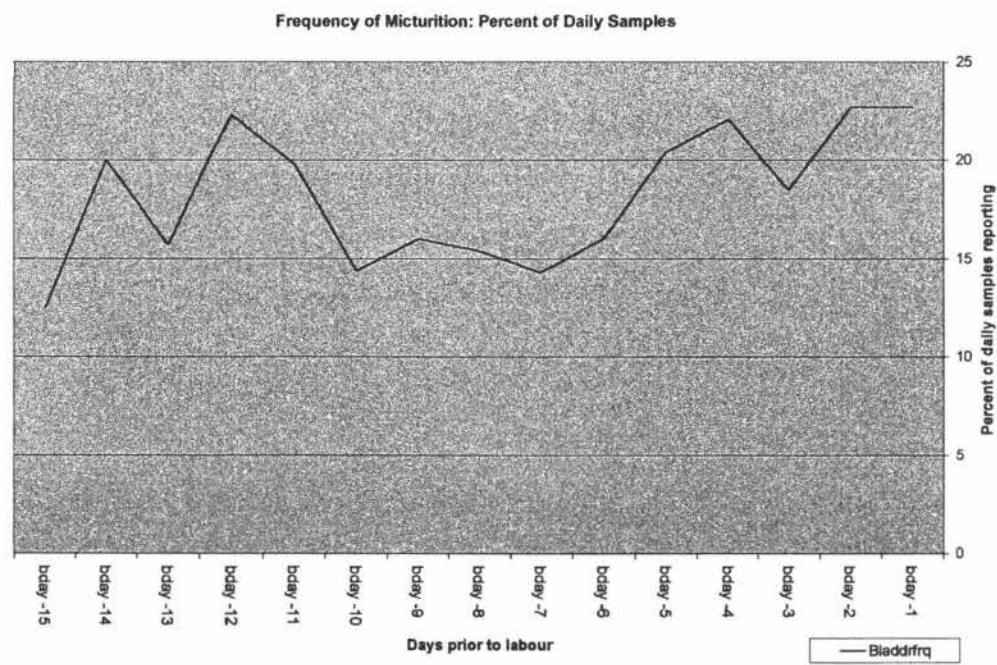


During the 72 hours before labour a change in bowel activity was reported by 46.2% of women in the study. However, only 22.7 % of the *total sample* (n = 27) experienced a change from normal or constipated bowel activity to loose bowel motions, or, more predominately, diarrhoea. The remaining women reporting loose bowel motions or diarrhoea in this period were reporting a continuation of unchanged activity from previous days.

Bladder Function

Women experienced urinary frequency throughout the recording period. Eighty-three women (69.7%) reported experiencing urinary frequency on one or more days in the final fifteen days before the commencement of labour. The percentage of reports was more consistent in the six days prior to labour when between 18.5% and 22.7% of the *daily samples* reported urinary frequency. On the day before labour, 22.7% of women reported frequency of micturition (fig.12). Forty-five and a half percent of the *total sample* reported experiencing urinary frequency at least once in the 72 hours prior to labour. These findings are consistent with midwifery texts, which describe increased urinary frequency in the last weeks of pregnancy thought to be related to the presenting part descending into the pelvis (Bennett & Brown, 1996; Sellars, 1993; Silverton, 1993; Sweet & Tiran, 1997).

Figure 12. Urinary Frequency: daily samples (percent)



The women who ticked “other” related to bladder function on the daily checklist were all either reporting a return from frequency to normal urination, or were reporting urgency not associated with dysuria. During birth day minus 2 to minus 7 there were ten reports of one or the other of these changes, whilst between birth day minus 8 and minus 15 there were eight reports of this nature.

## Vaginal Secretions

The type of vaginal secretion, as well as increases and decreases in quantity, were recorded by women in the study. Four types of secretion were reported; a 'show' of mucus and blood; mucus only; liquid mucus; and the liquor amnii that is indicative of ruptured membranes. There was a steady rise in reports of increased vaginal secretions in the five days prior to the onset of labour from 6.5% of the *daily sample* on birth day minus 5 to 18.5% of the *daily sample* on the day prior to labour (fig 13). One third of the *total sample* (37.1%) reported 'more' vaginal secretions in the final 72 hours of pregnancy. A minority of women (8.4%) reported 'less' vaginal secretions during this time period.

### Show

Just over one third of the *total sample* (34.5%), reported a show prior to the onset of labour. Thirty-five percent of primigravidae (n. 21) and 35% of multigravidae (n 20) reported having a show. Apart from four women, who reported a show at birth day minus 8, minus 11 (2), and minus 14 respectively, all women who reported a show did so within 72 hours prior to the commencement of labour (fig.13). This is consistent with Silverton (1993) who notes that a show may occur up to a week prior to labour. Ten women reported experiencing a show for two consecutive days.

Women are known to experience a show after labour has commenced (Cassidy, 1993; Silverton, 1993). Those women who did not report having a show could have experienced this after labour commenced. It is not known whether any of the women in the study experienced a show after the onset of labour as data collection ceased at the beginning of labour.

### Mucus

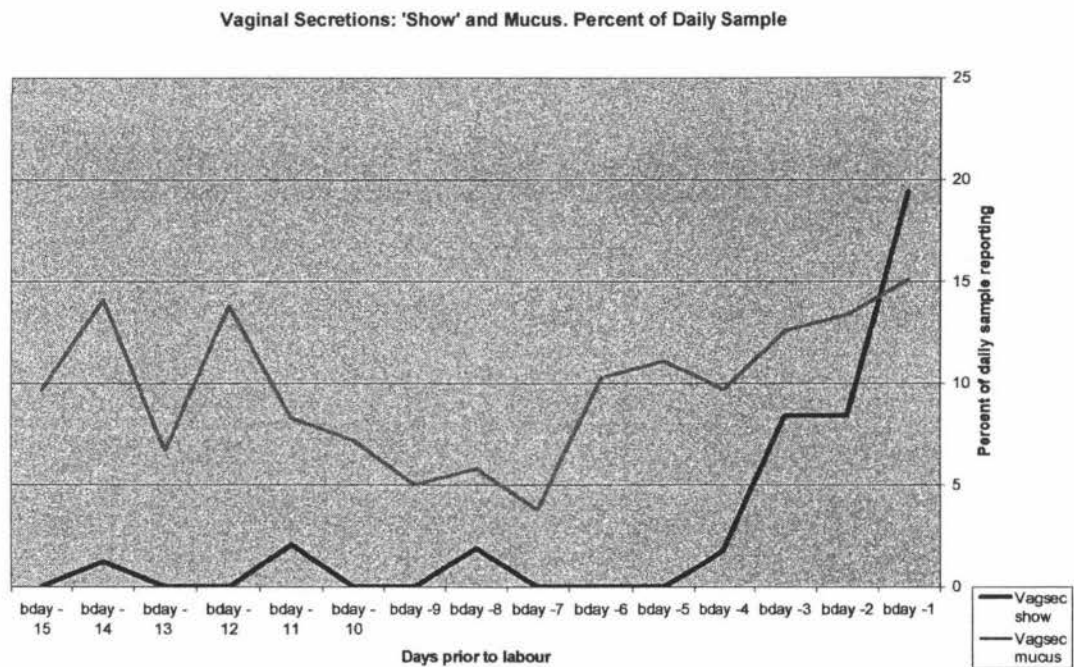
It was expected that the number of women reporting a greater amount of mucus secretions would increase as labour approached (Silverton, 1993). However, no more than 15% of the *daily samples* reported increased mucus secretion in any twenty-four hour period. The percentage of women who did report greater mucous secretions began to rise on birth day minus 6. The number of reports showed peaks on birth

days minus 14, minus 12 and in the twenty-four hours prior to labour (fig 13). The frequency of reports is too small for further analysis.

**Liquid Mucus / Liquor Amnii**

On each day of the recording period either one or two women reported experiencing liquid mucus. There were only two reports of spontaneous rupture of membranes prior to the onset of labour.

**Figure 13. Vaginal Secretions: Frequency and Type. daily samples (percent)**



**Type of Vaginal Secretions: 72 hours prior to labour**

Apart from the two women who reported spontaneous rupture of membranes the type of secretion reported by women in the *total sample* was either mucus (25.2%) or a 'show' (22.7%). Some women reported a 'show' and an increase in mucus secretions on different days within the 72-hour period. Small percentages of women reported an increase in mucus or a 'show' on more than one day in the 72-hour period (1.7% & 6.7% respectively).

## Sleep Patterns

### Broken Sleep

Broken sleep is a feature of the last two weeks of pregnancy (Evans, Dick & Clark, 1995; Silvertown, 1993). With the exception of the twenty-four hours before labour commenced, most reports of broken sleep in this study were between birth day minus 7 and birth day minus 15. Broken sleep was reported by between 12.3% to 32.3% of the *daily samples*. Most reports of broken sleep were on birth day minus 11 (32.3%) and birth day minus 1 (31.9%). There was a sharp decrease in reported frequency from birth day minus 7 (24.8%) to birth day minus 6 (12.3%), followed by a rise in reports to 25% on birth day minus 5 (fig 14). Reports of broken sleep were examined for 'Day' and 'Parity' association using logistic regression. There were no significant results. However, for women, the persistence of broken sleep in the fortnight before labour is clinically important.

During the 72 hours prior to labour, 45.4% of women in the study reported one or more episodes of broken sleep. More than one episode was reported by 11.8% of women in the *total sample*.

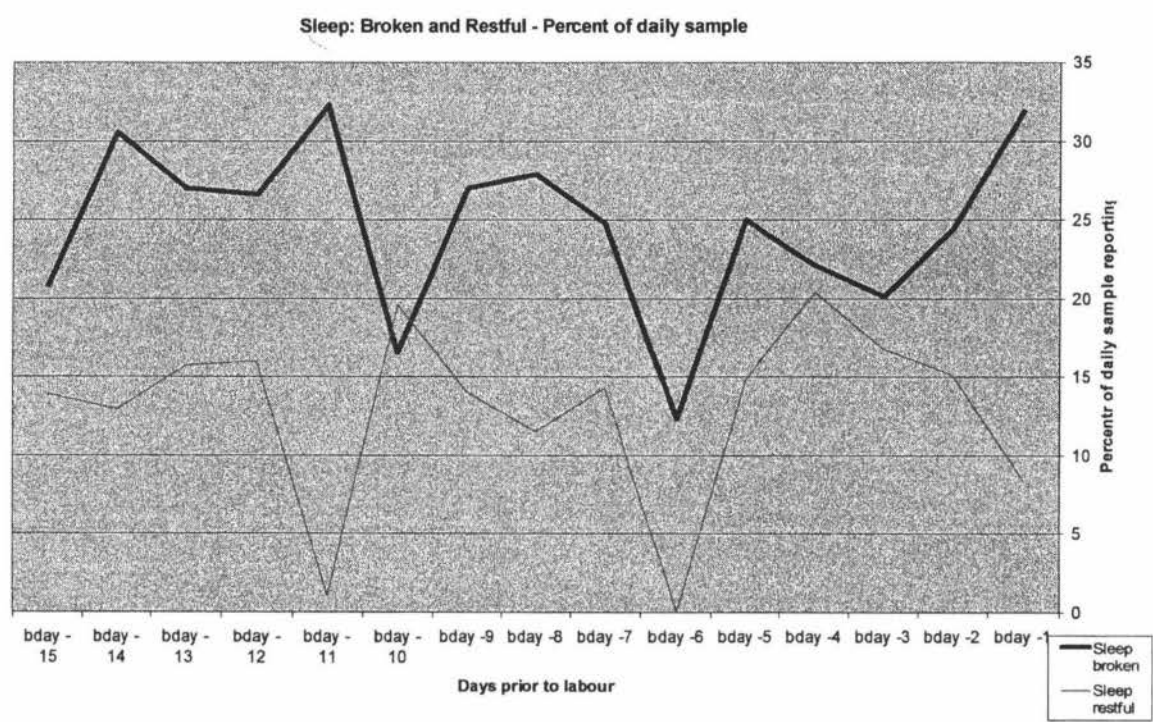
### Restful Sleep

Apart from birth day minus 6, when there were no reports, restful sleep was reported by between 1% to 20.4% of women in the *daily samples* (fig 15). It was expected that when the number of broken sleep reports increased that the number of restful sleep reports would decrease and vice versa. In this respect, restful sleep and broken sleep report patterns are congruent with each other only between birth day minus 15 and birth day minus 7 (fig 14). Between birth day minus 6 and birth day minus 3 reports of both restful and broken sleep decrease and follow a similar pattern, which appears incongruent. The likelihood is that more women who experienced usual sleep patterns prior to this period perceived their sleep pattern as different from the rest of the reporting days.



Over the 3 days prior to labour, one quarter of the *total sample* reported restful sleep on one or more occasions. One third of these women (8.4% of the *total sample*) reported more than one night of restful sleep in this time period.

Figure 14. Broken and Restful Sleep: *daily samples* (Percent)





Dreams

In spite of the consistent reports of broken sleep over the period studied, the number of women who reported dreams seems surprisingly small. No more than 16.3% of women from the *daily samples* reported dreams on any day during the recording period. The number of reports was slightly fewer on birth day minus 6 (table 18), whereas, up to 32.3% and no less than 12.3% of the *daily sample* reported broken sleep in any one 24-hour period. Most reports of dreams were made between birth day minus 11 and birthday minus 8. Fewest reports were on birth day minus 6. Pleasant and vivid dreams were more frequently reported than nightmares. The latter never exceeded three reports on any day.

Table 18. Dreams: Percent of daily sample reporting.

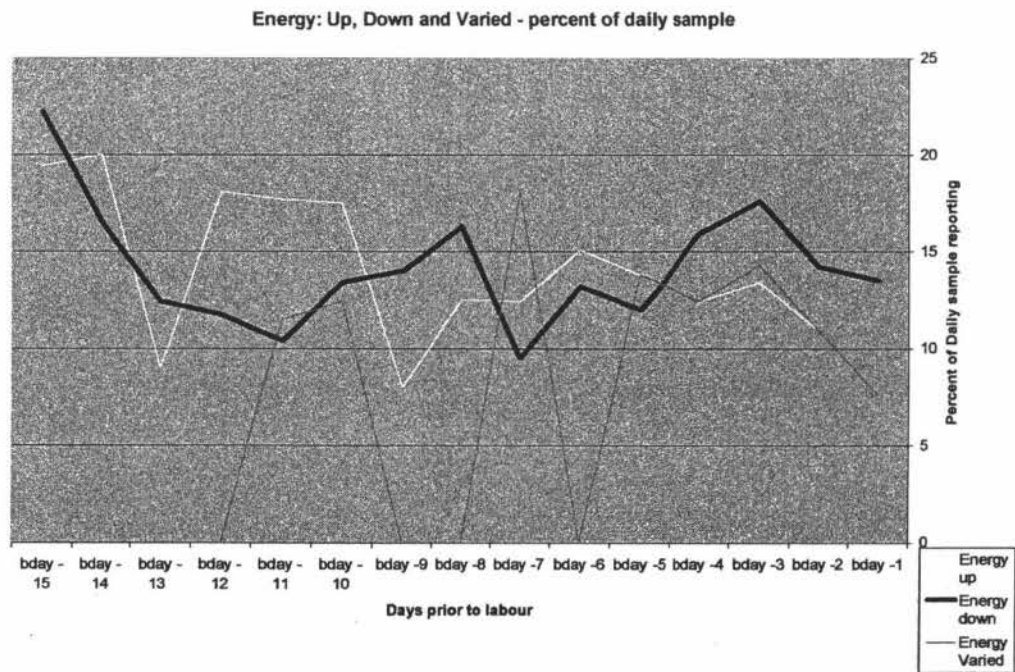
Birth day	-1	-2	-3	-4	-5	-6	-7	
Dreams %	5.0	7.6	8.4	6.2	9.2	4.6	7.6	
Birth day	-8	-9	-10	-11	-12	-13	-14	-15
Dreams %	16.3	13.0	10.3	14.6	9.6	10.1	12.9	6.9

Energy Levels.

Women were asked to report changes to energy level as up, down or varied. The results of this study show that raised energy occurs at any time between one and fifteen days prior to labour. During the 72 hours prior to labour, 63.8% of the *total sample* reported a change in energy level. The reports for raised energy (21.8%) were similar to those for both lower (24.4%) and varied (17.6%) energy levels. Thus the energy surge close to labour that is reported in midwifery texts (Bennett & Brown 1996; Silverton, 1993) is seen in only a fifth of the women in this study. Twenty-two and a half percent of the women reported a change in energy levels on more than one of the three days prior to labour.

Women experienced fluctuations in energy levels across the recording period. On birth day minus 5, the reports were evenly spread between raised, lowered and varied energy levels (13.8%, 12%, 13.8%). Most reports of raised energy levels on a single day in the recording period, (20%) occurred on birth day minus 14. Maximum reports of lower energy were on birth day minus 15 (22.2%), whilst most reports of varied energy levels were on birth day minus 7 (18.1%), (fig 16). Varied energy levels were reported on eight of the 15 days prior to labour. More reports of raised energy are not always accompanied by fewer reports of lower energy. There is no obvious agreement between the reports of differing energy levels (fig 15).

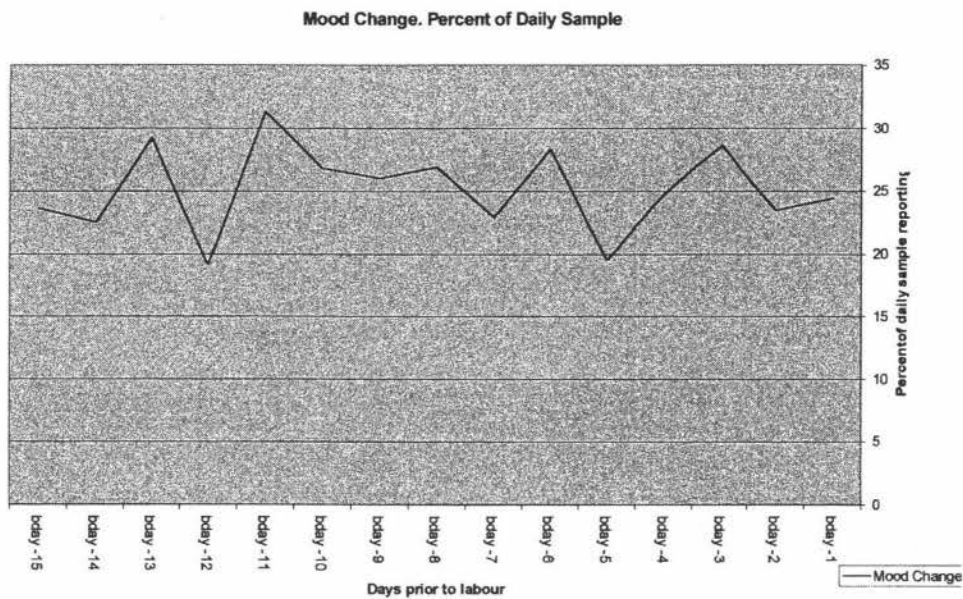
Figure 15. Comparison of Raised, Lowered and Varied Energy. (Percent)



Mood

Women reported mood change frequently. On each day throughout the recording period, between 20% and 30% of the *daily samples* reported a change in mood (fig 16). Women were not asked to record if their mood fluctuation was different from the rest of pregnancy or from when they were not pregnant. Nonetheless, the findings show that fluctuation in mood is common in the final two weeks of pregnancy.

Figure 16. Mood Fluctuation. (Percent)



During the final 72 hours of pregnancy sixty women reported a mood change. This number represents 50.4% of the *total sample*.

**Mood Type**

Women were also asked to record mood change as either ‘up’ or ‘down’. However, many wrote the type of mood they were experiencing in the space for qualitative remarks. The main alternatives recorded were ‘calm’ and ‘irritable’. The women who recorded ‘up’ or ‘down’ did not qualify their mood as irritable or calm. The ranges for each category of mood are displayed in table 19.

**Table 19. Mood Type Frequencies: Percent of *daily samples***

Day	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15
Up	13	3.4	5.0	8.8	5.6	3.8	5.7	7.7	8.0	9.3	8.3	8.5	10.1	7.1	11.1
Down	12	5.0	2.5	6.2	2.8	0.0	2.9	2.9	8.0	8.2	3.1	3.2	5.6	3.5	1.4
Calm	0	6.7	5.7	1.8	0.0	6.5	1.9	5.8	1.0	1.0	4.2	3.2	1.1	3.5	8.3
Irritable	7	6.9	10.1	7.1	6.5	3.8	1.0	5.8	6.0	5.2	5.2	3.2	7.9	8.2	5.6
Total%	32	22	20.3	23.3	14.9	14.1	11.5	20.6	23	23.7	15.5	18.1	24.9	22.3	26.4

While no more than 15% of the *daily sample* reported the type of mood change on any one day of the recording period, it is notable that there was a sharp rise in the reports of raised mood on birth day minus 1. However, it is equally noticeable that almost as many reports were made of lowered mood on the day prior to labour. There is no clear reason for the equal frequency of raised and lowered mood seen in the reports for the day before labour (table 19).

Throughout most of the recording period irritability was a feature for up to 10.1% of women on a daily basis. During this time women are twice as likely to be irritable than to be calm (table 19). For the women who are irritable and their families, it may be helpful to know that irritability is a relatively common occurrence in the final weeks of pregnancy, so that the woman’s family can be appropriately supportive.

### **Nesting Tasks and Deadlines.**

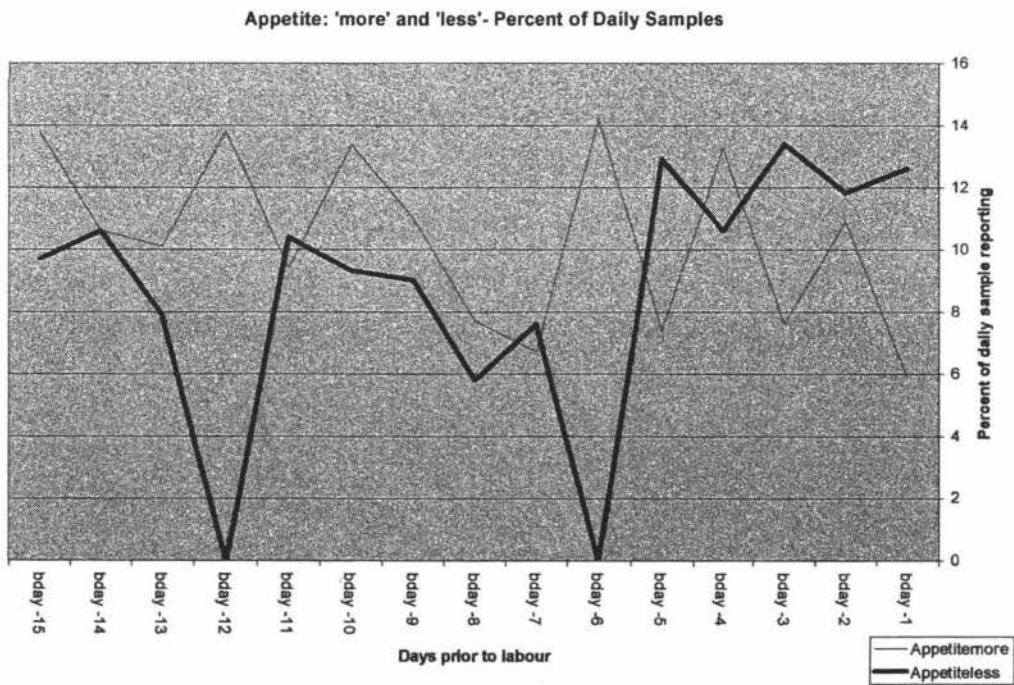
An urge to complete outstanding and/or 'nesting' tasks before the onset of labour is described in two midwifery texts as a common occurrence (Johnson & Johnson 1980; Olds, Ladewig, & London, 1995). The findings in the study support the texts. In the study, 82% of the *total sample* reported experiencing 'nesting/deadline completion' urges. Only 25% of the *total sample* reported that they had finished the tasks. Six women ticked that tasks were finished then again experienced a sense of tasks to finish several days later. On a daily basis, the number of women reporting 'nesting/deadlines' feelings is small, the maximum reports are from 13.8% of the daily samples. Generally, there were more reports of nesting/deadline completion urges between birth day minus 10 and minus 15. In the seven days prior to labour, reports from the *daily samples* did not exceed 12.4%. Reports of having finished the tasks did not exceed 6.7% of the *daily samples*. During the 72-hours before the onset of labour 19.3% of the *total sample* reported feelings of urgency to complete tasks, while 1.8% of the women in the study reported they had completed their tasks. The reports show no obvious patterns or clusters.

**Appetite**

Prior to commencing the study it was anticipated that many women would report changes in appetite in the fortnight before labour. The expectation was not met. The findings are that between nine and fifteen women (5.9% - 14.2% of the *daily samples*) reported feeling hungrier on any one day. Loss of appetite was reported by between nil and fifteen women in each 24-hour time band (0% - 13.4% of the *daily samples*). There was a small increase in the number of women reporting loss of appetite over the final five days of pregnancy (fig 17). While the frequency of reported change to appetite is too small to be statistically significant, it is important to note that these experiences are part of some women's normal pregnancy experiences.

Food preferences were reported intermittently. Almost all food groups and thirst were reported at least once in the recording period. Women in the study reported no discernible patterns of food preference during the recording period.

**Figure 17. Appetite: 'More' and 'Less' – Percent of Daily Samples**



## **Libido**

Women were asked to report raised, lowered and absent libido. The numbers of women reporting changes to libido were small, the greatest numbers of reports were for absent libido. However, every day except birth day minus 1, a small number of women, between one and thirteen, reported raised libido levels. This finding is consistent with Olds, et al., (1995) who state that some women report a raised level of libido in the final weeks of pregnancy.

## **Senses**

Whilst forty-eight women, i.e. 40.3% of the *total sample*, reported a change in one or more of the three senses examined in the study, i.e. smell, hearing and taste; the actual numbers for each sense and each day are very small. Ten of these women reported an alteration on more than one day. Two reported alterations on four days, one on five days and one on nine days. Seven women experienced alterations to more than one of the senses on the same day. All other reports of changes to senses were for a single sense, on a single day. Data from three additional women who reported sensory alteration related to head colds were excluded.

### **Smell:**

Reports of increased sensitivity of smell were most frequent on birth days minus 4 and minus 5 when eleven women reported this change. The number of reports represents 10.2% of the *daily samples*.

### **Hearing:**

Fourteen women, (11.8% of the *total sample*), reported increased hearing acuity within the 25-72 hours before the onset of labour. Even though the total number of reports is small, the increase is marked, rising from one to two reports per day prior to this time.

### **Taste:**

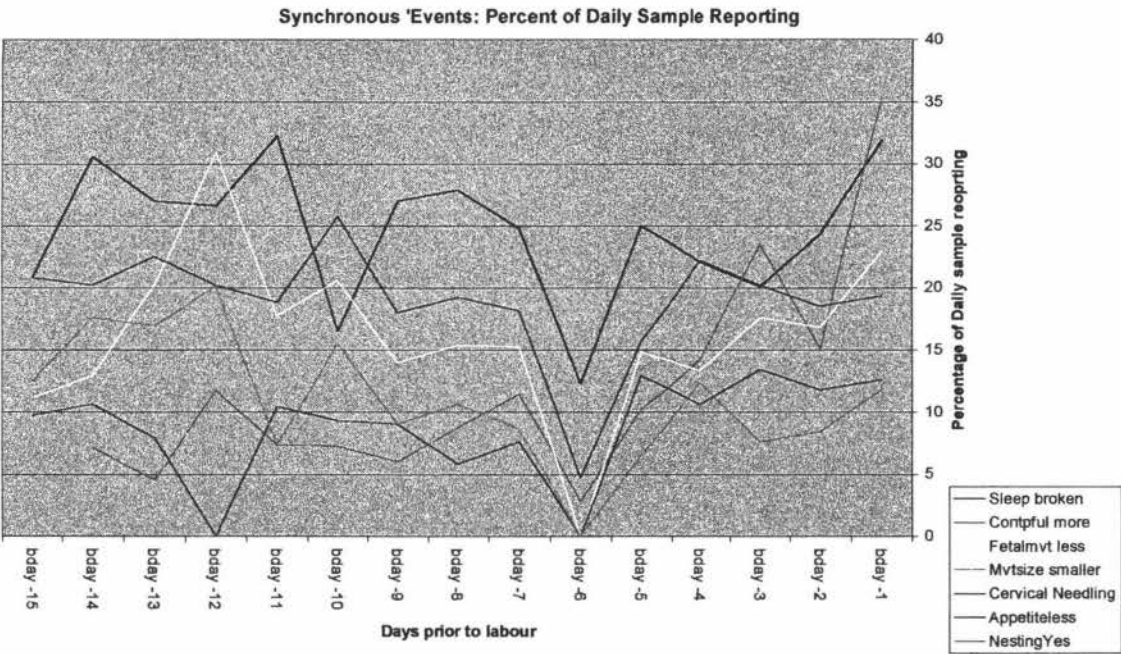
There were only scattered reports of alterations to taste.



Synchronised Report Patterns on Birth Day minus Six

For seven of the variables examined for this study women made the fewest reports on birth day minus 6. The difference is marked between the number of reports made on birth day minus 7 and on minus 5 and those made on birth day minus 6. The events that were reported daily by between one third and one fifth of the women in the study that coincided in this pattern were; cervical needling, fewer fetal movements, painful uterine contractions, and broken sleep. Other events that showed the pattern but were reported daily by less than 15% of the *daily samples* were; less appetite, smaller fetal movements and ‘nesting’/meeting deadlines (fig. 18).

Figure 18. Synchronised Reports Six Days Prior to Labour. (Percent)



If the daily reports on all of the variables in the study had shown this matching pattern then it would be logical to assume that women did not fill in the recording diary on birth day minus 6. However, the pattern of reports for this day is quite different for bowel and bladder activity, energy levels, painless contractions, mood fluctuations, raised libido, a ‘show’ and vaginal secretions. Therefore, it appears likely that the coinciding pattern of reporting on birth day minus 6 reflects a genuine reduction in the occurrence of these events representing a common ‘quiet day’ for these events.

## Summary

The results of the analysis of the events that women experience in the final fifteen days of pregnancy have been presented. Cervical needling has been shown to be a commonly occurring event that has rarely been identified in the literature. A pattern of fluctuation of fetal movements has been identified that while not statistically significant for the size of the sample in this study, may prove to be so with a larger sample. Patterns for uterine contractions, a 'show' of blood and mucus, vaginal secretions and bowel activity have been identified.

Broken sleep has been identified as a persistent feature of late pregnancy that is not statistically significant, but which has clinical importance. Frequency of micturition, mood fluctuations, variations in energy level and 'nesting' urges have been identified as commonly occurring events in the fortnight prior to labour.

Other events that occur less frequently, but which are important for the women they affect are raised libido, reduced appetite, noticeable dreaming and an increased sense of smell and acuity of hearing.

A synchronised pattern of reduced report numbers on the sixth day prior to labour has been identified for seven events. These are cervical needling, fewer fetal movements, painful uterine contractions, broken sleep, less appetite, smaller fetal movements and 'nesting'/meeting deadlines.

The results of the study are discussed in the following chapter.

## Chapter Seven: Discussion

### Introduction

The results of this study were presented in the previous chapter and are discussed in this chapter. A discussion provides an opportunity to address the research question and its aims. The opportunity is also taken to explore the ways in which results have contributed new knowledge, confirmed or challenged existing knowledge, and deepened understanding about both events that naturally occur in the fifteen days prior to the onset of labour and about the signs of impending labour. Implications of the study's findings for practice are discussed in relation to contributing to the need to preserve and/or reclaim knowledge related to normal pregnancy and the traditional signs of impending labour. The importance of understanding that there are natural fluctuations in some events preceding labour and that the transition from pregnancy to labour is a seamless process that occurs over time is explored. To conclude this chapter, the limitations of this study and the implications for education and research are acknowledged.

### Research Question and Aims

The research question that this study sought to answer was:

- *Are there specific late pregnancy events that are associated with the onset of labour in pregnant women who are 38 weeks or more gestation when labour begins?*

The results of this study do not demonstrate any statistically significant relationships between any of the variables with the onset of labour. However, clinically significant frequencies and patterns have been identified for cervical needling sensations, fluctuations in fetal movements, uterine activity, a 'show' of blood and mucus, fluctuations in mood, disturbances to bowel activity and broken sleep.

In the next section the aims of the study and the ways in which each aim has been addressed are outlined.

## Aims

- *To identify the 'events' that women experience in the final weeks of their pregnancies.*

Fifteen events that occur as part of the normal pregnancy experience for women in the closing weeks of uncomplicated singleton pregnancies have been identified.

Events recognised as occurring frequently were, needling sensations in the cervix, fluctuations in frequency and magnitude of fetal movements, increased uterine activity, a 'show' of blood and mucus, increased vaginal secretions, broken sleep, disturbances in bowel activity, frequency of micturition, meeting deadlines/nesting activities and fluctuations in both energy levels and mood.

Events that occurred relatively uncommonly that are important for the women who experience them were also identified. These were raised libido, increased awareness of dreams, mood types, changes in appetite and heightened senses of hearing and smell. All of the events apart from heightened senses of smell and hearing have been commented upon by at least one other author.

- *To discover whether a single event or a cluster of events is experienced by all or most women.*

No one event was experienced by all the women in the study. At least one alteration to bowel activity within 15 days of the onset of labour was reported by 94% of women in the *total sample*. Uterine activity was reported by 92.4% of the *total sample*, whilst a feeling of nesting or an urge to meet deadlines was experienced by 82% of women in the *total sample* on at least one day during the recording period. At least one report of an alteration in fetal movements was reported by 79% of the *total sample*. Three quarters of the women in the study experienced at least one episode of cervical needling sensations and frequency of micturition was experienced by 69.7% of women in the *total sample*.

- *To investigate whether any of the identified events are associated with the onset of labour*

The events entitled 'fewer fetal movements,' 'cervical needling' and 'broken sleep', were examined for 'Day' or 'Parity' association with the onset of labour. These events were selected for further analysis because the patterns and frequency of occurrence was suggestive of an association. There was no statistically significant 'Day' or 'Parity' association with the onset of labour for any of these events. No other single event showed report patterns that were sufficiently suggestive of a 'Day' or 'Parity' association with the onset of labour to subject to analysis.

The results of the current study showed fluctuations in fetal movement patterns that were not clinically sinister. Because there is a known association of abnormal reduction in fetal movements with serious fetal compromise and late fetal death (Enkin, Keirse, Renfrew et al., 1995), a pattern of 'normal' fluctuation in fetal movement has clinical significance for both women's knowledge and midwives' clinical decisions.

Cervical needling was experienced by 74% of the *total sample* at least once during the entire recording period. This is a clinically significant result because apart from one non-specific reference (Frye, 1998), the event is not discussed or mentioned in any of the literature examined for this study.

A 'show' of blood and mucus, was experienced within 72 hours of the onset of labour by 35% of the *total sample*. This result is clinically significant in that it confirms the published traditional information that a show is often experienced within the 72 hours prior to labour. However, the incidence seen in the results of this study (35% of the *total sample*) is lower than expected given the almost universal citing in the texts that the show is a sign of impending labour (Appendix II).

The surge of uterine activity experienced by the women in this study during the 72 hours prior to the onset of labour is similar to that seen in a large study carried out by Nageotte, et al. (1988), thereby providing a measure of confirmation of the results of

that study. This result also supports the validity of the data collection instrument used in the current study for this aspect.

- *To identify which, if any events have potential for further investigation*

The potentials for further investigation are discussed in the Implications for Research section of this chapter.

- *To trial the use of the daily recording diary as a data collection instrument.*

Evaluation of the daily recording diary (Ch.4.) showed that the instrument was generally suitable for the purpose of data collection for the current study. That is, it gathered data about the occurrence of, and/or change in, fifteen 'events' over the final weeks of pregnancy.

## Discussion

### The Daily Recording Diary

The daily recording diary used for data collection in this study proved suitable for the purpose. The returned diaries showed a high completion rate (99.17%). Diary entries from both primigravidae and multigravidae were consistent with each other. Eighty-six and a half percent of the women in the study filled out the daily recording diary on 80% or more of the days available prior to their birth. There were frequent qualitative entries in the 'comments' section from 97.5% of the study participants.

Alterations to include a 'baseline data' page at the beginning of the diary, and the addition of a 'no change' checkbox on each of the daily recording pages, would help to clarify events that occurred continuously, but which did not vary sufficiently to be considered a 'change'. Alternatively, women could be asked to record everything, everyday, on a yes/no basis, even though this may increase the time taken to complete the diary each day, in order to capture continuous, non-fluctuating events.

The internal validity of the data from this study was open to risk in a number of ways (Ch.4). In the current study the risks to internal validity were counterbalanced by: an acceptable return rate, a high diary completion rate, a longitudinal approach to data collection as suggested by Minichiello et al. (1999), an even distribution of parity in

the sample and consistency of entries between primigravidae and multigravidae. Furthermore, there were qualitative entries in the comments section that consistently identified concurrent health conditions such as candidiasis or gastro-intestinal upsets.

These results show that even without the alterations to improve the diary identified above, the daily recording diary is a reliable tool for collecting large amounts of data over time. The instrument is in the tradition of diary keeping for situations in health research where data, about multiple variables that relate to lifestyle activities or minor health events, needs to be collected over a substantial period of time (Boyle et al, 1985; Minichiello et al., 1999; Polit & Hungler, 1995). Thus, with the incorporation of the suggested alterations, the daily recording diary can be usefully employed for future studies, especially in areas where there is little or no research.



## Discussion

### Late Pregnancy Events

The results of the current study in relation to the events experienced by women in the period prior to labour are discussed in the following pages. New findings will be presented, followed by findings that reflect prior studies, those that confirm or challenge published 'traditional information', and results that may be important for individual women.

### New Findings from this Study

#### Needling Sensations in the Cervix

Three-quarters of the women in this study experienced cervical needling in the two weeks prior to the onset of labour. Women noted in their qualitative remarks that the needling sensation could be quite painful. They described it as '*quite sharp*', '*sharpish*', and '*awareness and pain in the area*' (respondents, 2, 105, & 104 respectively).

The sensation of needling in the cervix was included in the current study as a late pregnancy event because women I had cared for as an independent midwife had nearly all mentioned experiencing the sensation in the latter part of pregnancy. At the time, the knowledge that this sensation occurred was new to me. When asked, other midwives recollected that women they cared for had sometimes reported a similar sensation. On page 11 of this report the single reference located that describes sensations in the cervix in late pregnancy, is discussed. Given the silence in the literature, the frequency with which women in the current study experienced needling sensations in the cervix was unexpected.

Leppert (1998) describes the physiological process whereby the tightly bound triple helices of collagen in the cervix are unbundled and the resulting collagen fibrils dispersed throughout the matrix of the cervix. At the same time, the cervix becomes more hydrophilic. It is widely understood that the cervix begins to soften and efface during the final weeks of pregnancy. It seems reasonable to suggest that the cervical needling sensations that women experienced in this study may be a physical

manifestation that mirrors the physiological processes involved in softening and/or effacement of the cervix. It is important for midwives and women to recognise cervical needling as a commonly experienced sensation that may be quite painful, and that it is part of the normal processes in the latter weeks of pregnancy.

However, the results related to the women who did not experience needling tend to contradict the idea of needling being associated with cervical effacement. In this group of women, representing a quarter of the *total sample*, there were twice as many primigravidae as there were multigravidae ( $\chi^2$  p. = 0.001). The cervix usually effaces in the weeks prior to labour in primigravidae, whereas in multigravidae effacement and dilatation tend to occur together, often close to, or during labour.

Nonetheless, the study results for cervical needling pose many questions, for example, there is potential for future researchers to explore whether the sensation of cervical needling really is a reliable marker for cervical change; or, whether cervical needling is merely a useful physical alert that women can readily identify as a harbinger of labour.

## **Fluctuations in the Pattern of Fetal Movements**

The results of the current study show that as labour approaches, there are 'normal' fluctuations in the frequency and/or magnitude of fetal movements for some women.

### **Fluctuations in the Frequency of Fetal Movements**

#### **'Less' Frequent Movements'**

In the fifteen days prior to the onset of labour, 72.3% of women in the study experienced 'less' fetal movements on at least one occasion. Twelve days prior to labour, 30.9% of the women in the *daily sample* reported experiencing fewer fetal movements. Similarly, on the day prior to labour, 22.9% of the daily sample reported fewer fetal movements (p. 79). Although women in the current study reported fewer movements, the number of movements reported by them was still within the accepted range of more than ten movements in 12 hours (Enkin, Keirse, Renfrew, et al., 1995;

Varney, 1997). These results confirm Balaskas and Gordon's (1987) belief that babies may move less before labour commences (p. 12).

The current study shows that for some women, fluctuations in fetal activity that are perceived as 'fewer' fetal movements are a common experience in late pregnancy. Thus, for women and practitioners, there is potential for confusion between commonly occurring fetal movement patterns and sinister changes in fetal movements that herald fetal compromise (Enkin, Keirse, Neilson et al., 2000; Telfer, 1997; Thomson; 1993). These results reinforce the need for midwives to carefully assess each woman who reports fewer fetal movements in order to discriminate between recognising a 'normal' pattern and the need for further investigation if there is a suspicion of complications.

### **'More' Frequent Fetal Movements**

Fifty five percent of the study participants reported at least one episode of 'more' frequent fetal movements during the recording period. Throughout the recording period, there were reports of more fetal movements from a small percentage of women in each *daily sample*. Six days before labour commenced 18.9% of the *daily sample* reported experiencing more movements. Despite the possibility that some of the reports of more movements may represent a return to the usual frequency of movements after a period of 'fewer' movements; it is immaterial whether the increase in movements is a return to normal frequency or a real increase in fetal movements, the women will still perceive the change as more movements. This study finding confirms Balaskas and Gordon (1987), Thomson (1993), and Varney's (1997) view that fetal movements for some women, do at times appear more frequent.

### **A Paradox for Midwifery Practice**

The results from the current study that relate to fetal movement frequencies reveal a paradox for midwifery practice. Current New Zealand practice is for women to count movements, or at the very least observe movement patterns on a daily basis (HFA, 1998). Women are instructed to contact their midwife if they identify fewer than ten fetal movements within a 12-hour period.

Thus, the new evidence described by Enkin, Keirse, Neilson et al. (2000), that the value of formal fetal movement counting to prevent late fetal death has not been proven as a useful practice, is a challenge to the evidence upon which current midwifery and obstetric practice is based. The results of this study challenge the accepted wisdom that daily fluctuations in fetal movements are not a normal finding in late pregnancy. The results of this study show that there is a 'normal' range of fetal movement variation, i.e. not associated with fetal compromise, which is congruent with Balaskas and Gordon's opinion (1987) that women may notice their baby move less near to labour, but that sometimes the baby will move more. The parameters of the 'normal' fluctuations in fetal movements in the final fortnight of pregnancy have yet to be established.

There are obvious tensions in this situation. On the one hand, this study reveals that it appears usual for fetal movement to occur in a fluctuating pattern in the final weeks of pregnancy, and Enkin, Keirse, Neilson et al. (2000) have revealed that there is no evidence that formal fetal movement counting prevents late fetal death. On the other hand, it is known that late fetal death is frequently preceded by reduced fetal movements (Enkin et al., 1996 & 2000; Olds et al, 1995; Telfer, 1997) and / or that a flurry of violent fetal movement activity may herald serious fetal compromise (Enkin, Keirse, Neilson et al., 2000; Thompson, 1999). It is also possible for abnormal events to mimic a normal pattern (Smythe, 1998). Heidegger (1927/62) understood this latter type of phenomenon when he proposed his concept of *semblance*. This concept refers to something that shows itself as 'what it is not'.

The challenge for practitioners is to discriminate carefully in their assessments of women who report changes in fetal activity. The challenge for future researchers is to establish the parameters of normal fluctuations in fetal movement in the final weeks of pregnancy so that the movement patterns exhibited by a compromised fetus may be identified with greater confidence.

### **Fluctuations in the Magnitude of Fetal Movements**

Women in this study reported the size of fetal movements as smaller or larger. Each day for the fifteen days prior to labour, between four and fourteen women reported

changes in the magnitude of their fetal movements. There were similar numbers of reports for bigger and for smaller movements on most days. The numbers in each category are far too small to draw any conclusions in relation to patterns of occurrence. However, the current study has shown that alteration in the magnitude of fetal movement is a feature of late pregnancy for a small number of women. As Thomson (1999) implies, women may not always recognise that the change they have noticed in their baby's movements is an alteration in magnitude rather than a change in frequency. Understanding that some changes in fetal movements are alterations in magnitude rather than frequency enables midwives to ask the discriminatory questions to arrive at a clear clinical picture that can reassure women and guide midwives' clinical decision making.

### **Occipito-Posterior Fetal Position at the Onset of Labour**

The information relating to the fetal position at the onset of labour was collected to exclude any pre-labour events that may be associated with babies in the occipito-posterior position. The results are informal as there was no attempt made to standardise the way that midwives carried out the procedure of abdominal examination.

Occipito-posterior position does not appear to be related to complicated birth outcome, or to gestation for the 20% of primigravidae in this study whose midwives reported an occipito-posterior position at the onset of labour. Only one of the twelve primigravidae who reported an occipito-posterior position at the onset of labour had a caesarean section, whilst one woman's birth outcome is not known. Primigravidae in the current study who had an occipito-posterior position at onset of labour had a gestation range of 38.4 - 41.2 weeks.

However, three of the four multigravidae who were reported to have an occipito-posterior position at the onset of labour experienced complicated birth outcomes, while all four women were also more than 40 weeks gestation. These results provide a tantalising glimpse of a possible context in which multigravidae may need closer observation in labour. The number of multigravidae who had an occipito-posterior position at the onset of labour is too small for analysis. However, these outcomes

raise questions for further research to determine whether the results are merely chance or whether they are significant for maternity care of multigravidae who have a fetus in the occipito-posterior position at the onset of labour and who are also post term.

## Results that Reflect Findings of Prior Studies

In the current study the results of two events, uterine activity and sleep, reflect the results of previous studies that have examined these individual events in the last weeks of pregnancy.

### Uterine Activity

The experience of uterine activity, especially contractions, in the last few weeks of pregnancy is widely known. It was noted in Chapter Two that various forms of uterine activity, which occur in the final weeks of pregnancy are almost universally cited in the literature. The activity is usually cited as Braxton Hicks contractions gradually merging into painful contractions, which then become the rhythmic contractions of labour. Results from this study provide evidence that many women experienced these types of fluctuations in uterine activity over the entire recording period. Fluctuations in occurrence, intensity and patterns of uterine activity in the final weeks of pregnancy are noted and described by several authors as practising for labour (Balaskas & Gordon, 1987; Frye, 1998; Gaskin, 1990; Johnson & Johnson, 1980; Kitzinger, 1991; Silverton, 1993).

In the current study, there were more reports of painless uterine activity in the second to last week of pregnancy. This finding is supported by Silverton (1993) who states that Braxton Hicks contractions are more co-ordinated and easily felt in the last weeks of pregnancy. There was an increase in reports of uterine activity from birth day minus 3 until the onset of labour. The increase in uterine contractions during the 72 hours prior to labour that is seen in this study, is similar to the findings of the large study (N = 2446) undertaken by Nageotte, et al. (1988). It should be noted that in the current study, nine women (7.6% of the *total sample*) went into labour without noticing any uterine activity before the onset of labour.

The results of the current study support published data in that painful uterine contraction activity is a normal feature of the final weeks of pregnancy (Appendix III). The results show that while more women report painless contractions in the second to last week of pregnancy, more women report painful contractions in the final five days of pregnancy. From their respective clinical experiences Frye (1998)



and Llewellyn-Jones (1986, 1999) describe ways, such as varying length and frequency, combined with low palpable strength, to differentiate between pre-labour painful contractions and the painful contractions that are associated with the beginning of true labour. However, even these authors state that differentiation is often difficult. Information that could assist women to distinguish between pre-labour uterine activity and 'the real thing' could be helpful in reducing unnecessary midwifery call outs or admissions to hospital. Further research to practically identify the differences in types of uterine activity is required.

### **Broken Sleep**

The results of this study show that for up to a third of the *total sample*, broken sleep is the norm rather than the exception for two weeks prior to labour. The women in the study experienced broken sleep intermittently throughout the fifteen days prior to labour, and especially reported broken sleep in the second to last week of pregnancy. Thus, for them, broken sleep is a persistent feature of the final weeks of pregnancy. The results of this study showed similar disturbances to sleep patterns in the week prior to labour as those seen in the study by Evans et al. (1995). Midwifery and obstetric texts are virtually silent about this frequent feature of late pregnancy. The only references located in the current obstetric and midwifery texts examined for this study that relate to sleep in the final weeks of pregnancy are from Jamieson (1999) and Varney (1997), who mention the topic in a very generalised manner. Reassurance that sleep disturbance is normal in the final weeks of pregnancy may help women to cope and to initiate other strategies such as day time naps to prevent over tiredness. Midwives can easily modify the information they give to women to incorporate this simple advice.

## **Findings that Confirm or Challenge Published 'Traditional Information'.**

No research has been located in the material examined for information about the following late pregnancy events that were explored in this study. Where these phenomena are noted, in the texts, as associated with impending labour, they are discussed as fact i.e. 'received wisdom'. In successive editions of textbooks the language barely changes (Myles, 1971; Bennett & Brown, 1993, 1999; Llewellyn-Jones, 1986, 1999). The current study has provided evidence for some of the published 'received' wisdom, e.g. an increase in vaginal secretions as labour approaches. The traditional information related to the frequency with which some events occur e.g. a 'show', has been challenged by the results of this study. It has found that the incidence of a 'show' prior to labour is smaller than the published material suggests. The results of the current study have deepened understandings about some phenomena, e.g. disturbances to elimination patterns. The existence of other events that have been mentioned only sporadically in the literature, such as mood fluctuations has been confirmed. The findings are discussed in the following sections.

### **Vaginal Secretions and 'Show' of Blood and Mucus.**

Between five and fifteen percent of women in the *daily samples* reported increased vaginal secretions in the fortnight before labour, thus confirming the published statements that increasing vaginal secretions are a constant feature in the last two weeks of pregnancy for some women (Bennett & Brown, 1993 & 1999; Gaskin, 1990; Johnson & Johnson, 1980; Llewellyn-Jones, 1986, 1999; Myles, 1971; Oxorn, 1986). However, the frequency of reports is much lower than expected considering that the event is cited in both midwifery and obstetric texts.

Results from this study confirm that when a 'show' of blood and mucus occurs before labour commences, it usually occurs within 72 hours of labour onset. The study findings also concur with Balaskas and Gordon, (1987), Pullon (1991) and Silverton (1993) that the show may occasionally occur up to three weeks before the

onset of labour. The current study also confirms that some women experience a show on more than one day (Balaskas & Gordon, 1987; Pullon, 1991).

Most texts describe the advent of a show as a sign that labour is imminent or has started (20 refs. Appendix 2). This study provides further evidence for Cunningham et al.'s view (1997) that women may already be in labour when they experience a show, as only 34.5% of the women in the current study reported a show prior to the onset of labour.

Although the common understanding that the presence of a show signals that labour is approaching, is supported by the results of this study, the results challenge the published idea that the show is a reliable sign of the onset of labour (20 refs., Appendix 2). The percentage of women in the study who reported a show prior to labour was unexpectedly low.

### **Energy Levels**

As seen in Chapter Two (p. 17), the literature located on the topic of energy levels in the final weeks of pregnancy is contradictory. The results of this study support both authors who describe an energy surge in the 24-48 hours prior to labour (Balaskas & Gordon, 1987; Bennett & Brown, 1993, 1999; Johnson & Johnson, 1980; Olds et al., 1995), and Varney (1997), who describes low energy levels at this time. In the 72 hours prior to labour, although 63.8% of women experienced a change in energy level, the type of energy reported was almost equally divided between raised energy (21.8%), lowered energy (24.4%), and varied energy levels (17.6%). Similarly, women reported variable fluctuations in energy levels on daily basis throughout the fifteen days prior to labour. Energy levels in the last weeks of pregnancy appear to fluctuate in a much more complex fashion and for a longer period of time than the literature suggests.

## Bowel Activity

Nearly all women in this study (94.5%) reported at least one alteration to their normal elimination pattern at some point during the fifteen days prior to labour. These alterations were diarrhoea, loose stools, and constipation.

Llewellyn-Jones' (1986, 1999) assertion that constipation is common in the last weeks of pregnancy is not supported by the results of this study. A maximum of 8.1% of the *total sample* experienced constipation in the two weeks prior to the onset of labour.

The study results provide support that there is an increase in the number of women experiencing loose or diarrhoea-like bowel activity in the 24 hours prior to labour. This increase is represented by a change in occurrence from 16.8% of the *total sample* two days prior to labour to 29.4% of the *total sample* on the day before labour commenced. This finding confirms the few references in the literature (Balaskas & Gordon, 1987; Corkhill, 1948; Olds et al., 1995; Varney, 1997). These authors also refer to diarrhoea for some women. However, in the 24 hours before labour, reports of loose stools or diarrhoea were made by less than 30% of the *total sample*. The results of the current study show that diarrhoea or loose stools do not appear to be as universally experienced in the 24 hours prior to labour as implied either anecdotally by midwives, or in the literature.

The women in the current study reported loose stools or diarrhoea over the entire recording period. This study shows that 69.7% of the *total sample* experienced one or more episodes of loose stools in the fifteen days before labour commenced. The disturbances to bowel activity in the fortnight prior to labour appear more frequent, more complex and over a longer period of time than suggested by most of the literature. However, the results of this study confirm Corkhill's (1948) view that intestinal disturbance and 'natural' diarrhoea are common in the final weeks of pregnancy. Midwives and women can therefore be reassured that disturbances to bowel function are a normal occurrence over this time.

It is interesting to note that the results from the current study related to bowel activity are most similar to a reference from an historical text that is 53 years old (Corkhill, 1948). Instances such as this raise questions about the intergenerational transmission of knowledge about the normal features of the last weeks of pregnancy. It appears that the 'everyday' knowledge about this period of pregnancy has not survived in its entirety in the face of the explosion of technological knowledge that began in the 1970s and that continues today.

### **Frequency of Micturition**

Eighty-three (69.7%) women in the study reported experiencing urinary frequency on one or more days during the fifteen days before the commencement of labour. It does not appear that parity is associated with reports of urinary frequency. There were a similar number of reports from primigravidae and multigravidae.

As noted in Chapter Two, ten authors state that women experience frequency of micturition in the last four weeks of pregnancy (Balaskas & Gordon, 1987; Bennett & Brown, 1999; Corkhill, 1948; Frye, 1998; Gaskin, 1990; Green, 1976; Llewellyn-Jones, 1982, 1999; Myles, 1971; Pullon, 1991; Sellars, 1993). The current study confirms these assertions.

### **Fluctuations in Mood**

Half the women in the study (50.4%) reported a change in mood in the 72 hours prior to labour, and between 20% and 31% of the women in the *daily samples* reported unspecified mood changes each day for the fifteen days before the onset of labour. These results confirm the opinions of Cassidy, (1999), Green, (1975), Morrin (1997) and Varney (1997) discussed in Chapter Two, that women experience labile mood patterns as labour approaches. However, the frequency of mood fluctuation seen in this study provides evidence that mood lability is an important and frequently occurring feature of the final weeks of pregnancy. Given the growing body of literature that associates women's feelings and thoughts with the quality of birth experience and outcomes, the widespread occurrence of mood fluctuation prior to labour assumes importance as an area for midwives to actively include in their assessments and discussions with women.

## **Nesting/Urges to meet Deadlines**

The experience of a nesting urge was reported consistently over the whole recording period. Although only a small number of women reported the event on each day, 82% of the *total sample* reported experiencing this event at least once. Given the number of women who experienced this event, it is surprising that only two references were found in the literature examined for this study (Johnson and Johnson, 1980; Olds, et al., 1995). Whilst the event is not important for clinical decision-making, recognition of the event as a normal occurrence for most women enables women and midwives to have a complete picture of the usual occurrences in the weeks approaching labour.

## **Reduced Appetite**

Nine to fifteen women from the *daily samples* experienced greater hunger at times during the fortnight prior to labour. However, Varney's (1997) observation that some women experience a reduction in their appetite as labour approaches, was confirmed by this study. Reduced appetite during the 72 hours prior to labour was reported by 26.9% of the women in the *total sample*. It is notable that no women reported reduced appetite on birth day minus 6 and minus 12. These days corresponded with peaks in reports of increased appetite. However, the peaks represent only 14% of the *daily samples*. The frequencies from this study are too small for statistical testing, thus the patterns related to appetite seen in this study may merely be chance findings. Nonetheless; sudden loss of appetite may be one indication that labour is near. Midwives need to be mindful that some women experience loss of appetite close to labour if they recommend increasing general food intake or a specific type of food to maintain energy stores for labour.

## Findings that may be Important for Individual Women

The current study has provided information about a number of events that occur for a small number of women. None of these events occur sufficiently frequently to be considered commonly occurring, but all may be important for the individual women who experience them. They are clinically important insofar as midwives need to be aware of the possibility that these events can occur. Lack of appreciation by the midwife of the effect of such phenomena on the woman, has the potential to affect the quality of women's experience of late pregnancy and childbirth.

Irritability and calmness are *mood types* reported by up to 10% of the women in the study. Reassurance that these mood states are a transient feature of late pregnancy for some women may contribute to the woman feeling supported at a time of labile moods. Such reassurance has the potential to reduce or minimise anxious mood states, thereby increasing women's chances of a positive childbirth experience.

Apart from birth day minus 1, between one and thirteen women reported *raised libido* levels every day of the recording period. These results confirm the assertions by Olds et al. (1995) and Bing (1988), who state that raised libido is experienced by a small number of women. Midwives need to be sensitive to the possibility of enhanced sensuality and sexuality being the reality for some women and to individualise the information that they impart to women in their care.

A small number of women (up to 16.3% of the *daily samples*) reported *remembering dreams* during the recording period. Pleasant and vivid dreams were more frequently reported than nightmares. These findings confirm statements by Olds et al. (1995) and Schroeder-Zweller (1988), that vivid dreams can occur in the last weeks of pregnancy.

Finally, the study findings show that 10-11% of the *total sample* experienced an *enhanced sense of smell*, or, *raised hearing acuity*. This is a new finding. It behoves midwives and others to bear in mind that a small number of women have these experiences and to modify their practice accordingly. Further research that explores



sensory experiences in labour could be a useful addition to the 'everyday' knowledge about childbirth.

## **A 'Still Point'?**

The 'non' reports in this study may be as important as the actual reports. Seven events demonstrated a synchronous pattern that showed a marked reduction in reports from the women in the *daily samples* on birth day minus 6 (p.98). Whilst any attempt at determining the meaning of this synchronous pattern is purely speculative, one cannot help but postulate the existence of a 'quiet day' for these events. A day when action in relation to the seven events pauses before the final burst of activity that results in the onset of labour. Further research may clarify the synchronous report pattern seen in this study as an artefact of the sample size or of the data collection tool. However, the possibility of the existence of a 'still point' that acts as an external signal for the onset of labour is seductive. How fitting if the signal for the natural process of labour that has been assiduously sought for so long, turns out to be a non-event, a pause, the "still point of the dance" (T.S. Eliot/Smythe, 1998. p.153). Further research is required.

## **Approaching Labour:**

### **Protecting the normality of the events experienced by women.**

The knowledge and understanding of the normal processes of pregnancy and childbirth are in danger of being lost (Gould, 2000; Page, 2000; Wagner, 1994). According to Page (2000) defining normal childbirth is increasingly different and difficult. The birthing population has altered in recent years. Women are giving birth at an increasing age (HFA, 1999), and are more likely to have conditions that may have the potential to complicate pregnancy and birth. An example is the increased likelihood of older women receiving fertility treatment to achieve a pregnancy (National Women's Hospital, 2000). Many women with medical conditions who would have been advised not to have children in the past, are now able to have a baby (National Women's Hospital, 2000). What was once normal now has possibilities of being investigated and/or treated, which has the potential to strip it of

its normality. Medical knowledge is so enmeshed in midwifery care (Gould, 2000), that the non-medical knowledge about uncomplicated pregnancy, labour and birth is considered everyday common sense or not considered at all. The literature examined for this study in relation to women's experiences in the final weeks of pregnancy is virtually silent about the everyday normality of late pregnancy and women's experiences of their bodies' preparation for labour. Page (2000) challenges such silence when she states that

*While the need for midwives to make a medical referral is well established, the need for midwives to confirm the normal and to be able to support, protect and encourage healthy birth has received less attention.* (p.105).

The example of information, confirmed in the current study, that relates to bowel disturbance in the final weeks of pregnancy that is present in an early publication (Corkhill, 1948), but which is absent from modern texts, highlights how easily practice wisdom is lost. Reclamation of the knowledge of normal processes and affirmation of what *can* be normal is essential if midwives are to achieve Page's aim of midwifery care that is produced above.

Understanding the normal experiences of late pregnancy minimises the chance of women's confidence being undermined by unnecessary anxiety (Crowe & von Bayer, 1989; Read, 1950). A body of research has focussed on fears and anxieties in pregnancy and childbirth (Crowe & von Bayer, 1989; Dick-Read, 1950; Lederman, 1984; Melender & Lauri, 1999; Tarkka & Paunonen, 1996; Teixeira, Fisk & Glover, 1999; Wutchik, Hesson & Bakal, 1990; Wutchik, Bakal & Lipshitz, 1994). Read (1950) identified the need to break the fear-tension-pain cycle in pregnancy and labour. Mental preparation for childbirth, both emotional and cognitive, and other psycho-emotional factors appear intricately entwined with the physiological processes of labour and birth (Callister, Semenik, & Foster, 1999; Read, 1950; Tarkka & Paunonen, 1996; VandeVusse, 1999). Anxiety in pregnancy is known to be associated with poor labour and birth experiences (Crowe & van Bayer, 1989; Green, 1993; Lowe, 1991; Wutchik, Bakal & Lipshitz, 1994).

Considering the historical and the ongoing research into anxiety in pregnancy and into women's birth experiences, the number of women who reported an anxious mood in the current study was unexpectedly small (n.10). However, mood lability was experienced by more than half of the women in the current study. Minimising anxiety and fearfulness as labour approaches must feature prominently in midwives' practice repertoire.

The style of midwifery care that the women received may have influenced the number of women reporting anxious feelings. All the women in the study had an Independent Midwife who provided continuity of care. It is possible that the information and support provided by a known midwife kept women's anxiety to a minimum. The instrumental and operative outcomes reported by the women in the study are low compared to national figures (HFA, 1999).

As the birth outcome data is informal, and the reports of anxious mood are too few for complex analysis, there is no way to determine from this study whether the style of midwifery care is associated with the low reported anxiety levels and good birth outcomes.

Nonetheless, it is known that women in labour draw emotional support from their midwife (Tarkka & Paunonen, 1996) and that a supportive trained female companion in labour improves birth outcomes (Anderson, 1996; Arulkumaran & Symonds, 1999; Butler, Abrams & Parker, 1993; Gagnon, Waghorn & Covell, 1997; Hodnett, 1996a, 1996b; Kennell, Klaus, McGrath, Robertson & Hinckley, 1991). Women's confidence in their own bodies and in their ability to cope with childbirth is associated with positive labour and birth experiences (Callister, Semenic & Foster, 1999; Crowe & von Bayer, 1989; Lederman, 1984). Making the way familiar is an important feature of midwifery practice. Oakley and Houd (1990) and Berg, Lundgren, Hermansson and Wahlberg (1996) speak of the midwife taking a navigator role. Smythe (1998) identified anticipatory practice as an element of safe practice. The information and guidance that midwives provide to women to assist the development of women's knowledge about childbirth can be regarded as '*anticipatory information*'. Such information provides signposts that make the unknown more familiar. When midwives highlight normal experiences women are

helped to stay calm and confident in their bodies and in the processes of normal pregnancy and childbirth. As discussed above, calm, confident women have better childbirth experiences and better birth outcomes. Providing '*anticipatory information*' is a key midwifery activity to foster calmness and confidence in childbearing women. The small number of women reporting anxious mood states in the fortnight before labour and the informal results of the birth outcome data gathered in the current study imply that midwives may have supplied women with '*anticipatory information*'.

Rothman (1996) underlines the importance of women having confidence in their bodies and in the processes of normal childbirth. "Because birth is not only about making babies. Birth is about making mothers – capable mothers who trust themselves and their inner strength" (1996. p.254). Rothman's opinion is supported by the ideas of women trusting their inner strength and of mental and emotional strength as a force in childbirth by VandeVusse (1999) and Callister, Semenik and Foster (1999). Further research that explores associations between the style of midwifery care, giving '*anticipatory information*', mood states, and birth outcome is needed.

## **Limitations of the Study**

This study is a preliminary investigation therefore the results should also be regarded as preliminary. Women self selected into the study, which resulted in the demography of the sample being non-representative of the national child-birthing population for, age, ethnicity and parity (HFA, 1999). The proportion of primigravidae in the sample is greater than in the national data set (HFA, 1999). The dissimilarity for parity may be the reason for the generally later gestational age at birth that is seen in the current study.

All participants in the study had an independent midwife as their Lead Maternity Carer (LMC) who provided continuity of midwifery care. Outcome data may be reflective of this style of midwifery care. The style of midwifery care was not examined in this study.

The dearth of research in the area under examination determined that an original instrument was developed for the data collection. There may be unknown biases inherent in the data collection tool. All of the categories for the events examined in the study produced nominal data. The statistical tests available to analyse nominal data are limited. Although the size of the sample is sufficient to calculate frequencies and further analyse the results of several variables, the data related to broken sleep, cervical needling and fewer fetal movements that was able to be analysed using logistic regression would be further clarified using a larger, representative sample. Similarly, the data that is suggestive of a 'quiet' day requires greater power to determine whether the synchronous reports seen on birth day minus 6 is real, or an artefact of the sample size or demography.

## **Implications of the Study**

This preliminary study has used quantitative descriptive methods to identify the events that women experience in the final weeks of pregnancy (pp.35-36), to describe the occurrence of the events (pp 68-100) and has examined the frequencies of three events for 'Day' association with the onset of labour (pp70, 79, & 90). The daily recording diary was also trialled and evaluated (Ch. 4). The conclusion of the study provides an opportunity to indicate some of the implications from the study findings for practice, education and future research.

## **Implications for Practice**

The study findings provide evidence that the events that were examined in this study, are all part of the normal experience of the final weeks of pregnancy. For both women, and midwives, awareness of the usual patterns and frequency of all these events is important, because awareness has the potential to build women's confidence in their bodies and in the normal experiences of late pregnancy and transition to labour.

The current study has provided evidence that cervical needling is a commonly experienced and often quite painful event that may indicate that the cervix is

softening or effacing. Critical analysis of reported fluctuations in fetal movement patterns is required to distinguish the 'normal' fluctuations, not associated with fetal compromise that were identified in this study, from the alterations to fetal movement patterns that do indicate serious fetal compromise.

From the patterns of uterine contractions seen in this study, there is the potential for midwives and women to more confidently differentiate the onset of labour from 'practice' contractions, thereby these minimising call-outs and/or unnecessary admissions to hospital. Mood lability was experienced by half of the study population. Midwives can support women to develop confidence in transition from pregnancy to labour by sharing 'anticipatory information with women to actively minimise anxiety and thereby contribute to better labour and birth experiences. Evidence-based midwifery advice protects the normal processes of childbirth and can assist in the articulation and application of specific midwifery practice knowledge (Gould, 2000).

Until further research is undertaken, the study results provide a prompt for midwives to closely monitor the labour of any multigravida who is post term and who also has a fetus in an occipito-posterior position at the onset of labour.

### **Implications for Education**

The study findings identify a number of areas of importance for the education of midwives. It is necessary that student midwives acquire the knowledge that underpins their practice. The findings from this study provide new knowledge to add to the midwifery curriculum. The information about late pregnancy experiences that is available in the literature has also been gathered together in one place rather than scattered throughout multiple sources.

Acquiring the ability to practice the art of midwifery that includes recognition of the normal processes and active practice to prevent complications is part of every student midwife's development. The results of the current study show some of the links between the physiological, psychological and physical experiences of late pregnancy. Giving 'anticipatory information' is a midwifery art that is critically important to excellent midwifery practice. It is an ability that can be learned, through both

classroom learning and by emulation of role modelled midwifery practice. The idea of the midwife as the guide and guardian for women during the childbirth year is ancient. The results of this study provide knowledge that can assist new generations of midwives to develop this role.



## **Implications for Further Research**

This study has raised many ideas and issues that have potential for further study. Some of these ideas have already been outlined in the discussion thus far. The following potentials for further study have been identified.

### **Replication to Strengthen Results**

Replication of this study with a representative sample and a modified data collection diary could clarify and add strength to the findings of the current study.

### **Synchronous Reduction in the Occurrence of Some Events**

Synchronous reports of reduced frequency for the occurrence of seven events was seen on the sixth day before the onset of labour. This synchronous pattern may be merely an artefact of sample size or of the data collection tool. A further study has the potential to determine the nature of the synchronous pattern suggesting a 'quiet day' that was seen in this study. Such a study could determine whether the pattern represents a real reduction in the occurrence of the events, and if so, whether there is an association between the day that the synchronous pattern occurs and the onset of labour.

### **Needling Sensations in the Uterine Cervix**

The high percentage of women who reported experiencing this sensation seems worthy of further investigation. The following questions are raised by the study findings: does cervical needling only occur in the final weeks of pregnancy? Does cervical needling occur as frequently in a representative sample of women? Does the sensation of cervical needling mirror the process of cervical softening or effacement? Do all women who experience cervical needling in pregnancy, go into labour within a specific time frame? Is not experiencing cervical needling associated with not going into labour? Do women who go into pre-term labour also experience cervical needling? Is cervical needling a reliable marker for labour? Further research is required.

### **Fluctuations in Fetal Movements**

Commonly experienced patterns of daily fetal movement fluctuation over the final weeks of pregnancy require identification. A representative sample and a larger sample size may clarify whether there is a 'Day' association of the pattern of fetal movement with the onset of labour. Further studies may be employed to determine relationships between fetal activity and outcomes including position, fetal well being in labour, type of birth, gender, and apgar score.

The findings from this study indicate that a further study to establish the normal pattern of fluctuation in fetal movements has the potential to inform practice decisions and to possibly increase confidence in the identification of fetal compromise.

### **Uterine Activity**

Patterns of uterine activity in the weeks approaching labour have been explored in the past. However, Nageotte et al.'s (1988) study captured measured uterine activity on an intermittent basis. A further study, employing the prospective daily recording diary used in this study and a representative sample, has the potential to confirm the findings of this study and to clarify patterns of pre-labour uterine activity.

### **Mood Fluctuation**

Little appears to be documented in relation to commonly experienced mood changes in late pregnancy, however, there is a growing body of literature related to the effect of mood, feelings and expectations upon women's experience during labour, and upon the outcomes of labour and birth. The results of this study have identified that fluctuations in mood are frequently experienced in the final weeks of pregnancy. A further study is required to establish the 'usual' fluctuations in mood that are experienced by women at this time, to identify the measures that can be undertaken to effectively reduce anxiety in late pregnancy and to determine whether such measures are effective in improving birth experiences and outcomes.

### **Post-term Multigravidae**

The tantalising glimpse of a possible association with operative birth outcome of babies in an occipito-posterior position at the onset of labour, in multigravidae who are post dates, requires following up. A retrospective chart analysis could readily identify whether results from the extremely small numbers of women in this study represent a chance finding or whether such a relationship exists.

### **Anticipatory Information**

In Chapter Two of this report, the effectiveness of prenatal information to identify the signs of labour demonstrated by Bonovich (1990) was discussed. The findings of this study point to research related to whether the provision of '*anticipatory information*' is associated with improved labour and birth outcomes and experiences. In particular, a study to examine the possible association of '*anticipatory information*' with reduced mood lability, especially anxiety and irritability, in the final weeks of pregnancy and in labour is required. The consequences of reduction in the latter moods in terms of labour and birth outcomes and experiences could then be pursued and identified.

### **Transition to Labour and Early Labour**

This study has focussed on the last weeks of pregnancy up to the onset of labour. It would be intriguing to investigate the women's experience of the transition from pregnancy to labour and the experience of early (or latent phase) labour.

## Concluding Remarks

The research question for this study was:

*Are there specific late pregnancy events that are associated with the onset of labour in pregnant women who are 38 weeks or more gestation when labour begins?*

The aims of this study were:

- *To identify the 'events' that women experience in the final weeks of their pregnancies.*
- *To discover whether a single event or a cluster of events is experienced by all or most women*
- *To discover whether a single event or a cluster of events is experienced by all or most women*
- *To highlight which, if any events have potential for further investigation*
- *To trial the use of the daily recording diary as a data collection instrument.*

The research question and the aims of the study have been addressed. The results of the current study have begun the process of revealing the patterns of the 'events' that are women's everyday experience in the fifteen days prior to the onset of labour.

Evidence has been produced about the following events that women experience in the final two weeks of pregnancy from the current study. A sensation of cervical needling is a frequent and commonly painful experience for women. Cervical needling may mirror the physiological process of cervical softening or effacement.

Fluctuations in fetal movements have also been shown to be a common occurrence in uncomplicated pregnancies as labour approaches. This finding has highlighted a paradox in midwifery practice and has the potential for tensions in decision making. The parameters of these 'everyday' fluctuations in fetal movements are yet to be confirmed.

Uterine activity has been shown to be similar to previous research, as has the experience of broken sleep. Despite the majority of women experiencing feelings of

urgency to complete 'nesting' tasks, only two references to this frequently experienced event were located (Johnson & Johnson, 1980; Olds et al., 1995).

Evidence has been provided to support and/or challenge the knowledge that has previously been regarded as 'received wisdom'. These events are a 'show', increased vaginal secretions, disturbed bowel activity, mood fluctuations, frequency of micturition, 'nesting' sensations, and varied energy levels. These events occur in a more complex pattern that has been commonly thought. In particular, a 'show' is not a reliable indicator of the onset of labour for most women.

Several events are experienced by only a small number of women, however, the quality of the woman's experience can be enhanced by midwifery care that acknowledges that these events occur. These events are raised libido, vivid dreams, reduced appetite as labour approaches, irritability, and enhancement of the senses of smell and hearing.

Women and midwives can use the knowledge generated by this study to understand and support the normal experience of the preparation of the woman's body for labour. The findings from this study may help women to better understand the commonly experienced events in the last weeks of uncomplicated pregnancy. Providing *anticipatory information* is a key midwifery practice. Informed women can become more confident about the normal processes of late pregnancy and the onset of labour. There is also potential for such knowledge and confidence to reduce the likelihood of women experiencing anxiety at this time. Lack of anxiety or fearfulness is known to be associated with better birth outcomes and experiences. The uniqueness of some women's experience is able to be valued and midwifery practice modified in the light of individual women's pregnancies.

The results from preliminary studies such as the current study, are not generalisable, but rather, provide a platform of knowledge for further research. In keeping with this, the study has generated as many questions as it has produced answers. There are fascinating glimpses in the study results of many future research possibilities.

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## Appendix IV

### References related to Effacement of the Uterine Cervix

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## **Appendix V**

**Information Sheet for Women**

and

**Consent Form**



30 April 1999

## Information Sheet (Pregnant Women)

### A Preliminary Study into Late Pregnancy Events and their Association with the Onset of Labour

#### INTRODUCTION

You are invited to participate in this study about the events that women experience in late pregnancy.

My name is Jackie Gunn. I am a lecturer in midwifery and an independent midwife. I am very interested in this area of pregnancy. **I have the opportunity to undertake this research as part of my studies for an MA (Midwifery) degree through Massey University.** My supervisor for the study is Dr. Gillian White PhD. The study has been approved by the Massey University Human Ethics Committee.

#### WHAT IS THE RESEARCH STUDY ABOUT?

A lot of information is known about the biological processes that get a woman started in labour, but we do not know enough about the things that women *experience* in the last few weeks of pregnancy. Things like mood, energy, contractions, vaginal loss etc. Women and midwives have talked about their individual experiences over the years, but very little research has been done to see if all women experience the same changes in the last few weeks of pregnancy. This study is trying to discover what changes women experience *and* whether most women experience them. It is also trying to discover if any of the experiences are associated with how close the beginning (onset) of labour might be.



Midwives throughout the city have been requested to invite the women they see at the 37 week antenatal visit to participate in the study.

**You are invited to participate in this research study if:**

- You are 38 or more weeks pregnant
- Are carrying only one baby (not twins or more)
- you are having an uncomplicated pregnancy
- Your Lead Maternity Carer is a primary maternity care provider. That is, a midwife .

If you are looked after by your midwife through pregnancy and your care is transferred to an obstetrician in labour it will not matter, because the focus of this study is the last few weeks of pregnancy and the very beginning of labour.

#### **WHAT YOU WILL BE ASKED TO DO.**

1. I would like you to fill in a recording diary every day from when you are 38 weeks pregnant until you go into labour. It should take between five and ten minutes each day to fill in . The recording diary lists things that women have said change or happen for the first time in the last few weeks of pregnancy. The recording diary is mostly tick boxes like a questionnaire. However, there is a place for you to note anything else, such as how big the change is, or what type of change has happened.

You do not have to tick or write about any of the events that you do not wish to.

If you find that filling in the diary causes any distress at all please stop and return the diary to the researcher.

*For my own convenience.. I have called all these late pregnancy experiences , events.*

2. When you go into labour please write the time and date you started regular painful contractions in the place provided in the front of the recording diary. It is all right to fill this in after your baby is born.

**3. When you go into labour** and your midwife examines your abdomen (tummy) for the first time please ask her to write the baby's position in the space in the front of the recording diary.

**4. After your baby is born**, please write the date and time baby was born in the space in the front of the recording diary.

**5. When you have had your baby** please put the recording diary ( whether it is completed or not) in the stamped addressed envelope and post it.

The diary is being trialled as a means of collecting data, therefore , I would like them all back to see if any or all aspects worked well or did not work etc.

#### **WHAT HAPPENS TO MY INFORMATION?**

All of your personal information will be kept confidential. The data in the recording diary will only be available to myself and my supervisor.

Your information will not be published in any way that can be recognised.

All the information from all the women will be put together as bulk statistics. The consent forms and the questionnaires will be kept separately from each other in a locked cupboard in my office. It will be impossible to know which recording diary belongs to which woman as the diaries have no names or addresses. They will have a number. This number is to keep track of the number of recording diaries that have been issued. The consent forms are not numbered.

At the end of the study, Recording Diaries will be destroyed by shredding. If you want your diary returned, please fill out the enclosed envelope

### ***TAKING PART IS YOUR CHOICE***

Taking part in this study will not affect the care you receive from your LMC (midwife).  
Taking part is voluntary (your choice). If you do not want to participate, your maternity care will not be affected in any way. You are free to withdraw from the study at any time up to the time you post back your diary .Your care will not be affected.

### ***WHEN WILL I FIND OUT THE RESULTS?***

There is approximately two years between the collection of the information and the final results becoming available.

### ***WHO CAN I CONTACT IF I HAVE QUESTIONS?***

Jackie Gunn

c/- School of Nursing & Midwifery, Auckland Institute of Technology, Private Bag, Auckland.

Phone [REDACTED]

e-mail [REDACTED]

### ***IF YOU HAVE CONCERNS ABOUT THE RESEARCH, OR YOUR PART IN IT:***

You can contact the **Health Advocates Trust**. The trust is an independent group whose role is to specifically help you. Their phone number is [REDACTED]

OR

You can contact the chairperson of **Massey University Human Ethics Committee, Dr. Mike O'Brien**. The Phone number is [REDACTED]

**THANK YOU FOR YOUR TIME AND WILLINGNESS TO PARTICIPATE**

## Consent Form (Pregnant Women)

### A Preliminary Study into Late Pregnancy Events and their Relationship to the Onset of Labour

**1.1** I have read and I understand the information sheet dated April 30 1999 for **volunteers** taking part in the study designed to identify and understand the events that women experience in the last few weeks of pregnancy and to see if any of the events are associated with the onset of labour.

**1.2** I have had the opportunity to discuss this study. I am satisfied with the answers I have been given.

**1.3** I understand that if I wish to delete any information or not answer any particular question, I can do so.

**1.4** I understand that taking part in the study is my choice (voluntary) and that I may withdraw from the study at any time until I have posted back the diary and that this will in no way affect my *continuing maternity care*.

**1.5** I understand that my participation in this study is confidential and that no material which could identify me will be used in any reports on this study

**1.6** I have had time to consider whether to take part.

**1.7** I know who to contact if I have any questions about this study

**1.8** I wish to receive a copy of the results sign.....

Address to send results \_\_\_\_\_

**2.0** I \_\_\_\_\_ (full name) hereby consent to take part in this study.

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Researcher:** Jacqueline Paula Gunn, Phone [REDACTED]

**Supervisor:-** Dr, Gillian White, Phone [REDACTED]

## **Appendix VI**

**Information Sheet for Midwives**

**and**

**Consent Form**

30 April 1999

### Information Sheet (Lead Maternity Carer)

## **A Preliminary Study into Late Pregnancy Events and their Relationship to the Onset of Labour**

### ***Introduction***

You are invited to participate in this research about the events that women experience in late pregnancy by recruiting women for the study.

My name is Jackie Gunn. I am a lecturer in midwifery and an independent midwife. I am very interested in this area of pregnancy. **I have the opportunity to undertake this research as part of my studies for an MA (Midwifery) degree through Massey University.** My supervisor for the study is Dr. Gillian White PhD. The study has been approved by the Massey University Human Ethics Committee.

### ***What is the research study about?***

There has been a considerable amount of research into the physiological processes of labour, and in particular, into the physiological triggers for labour. However, there is only limited research into the events such as mood, energy, contractions, vaginal loss etc., that women *experience* in the last few weeks of pregnancy. Women and midwives have talked about their individual experiences over the years, but very little research has been done. This study is trying to discover what changes women experience and whether most women experience them. It is also trying to discover if any of the experiences are significantly associated with the onset of labour.

### ***Inclusion Criteria***

- 37 or more weeks pregnant
- Singleton pregnancy
- uncomplicated pregnancy
- Lead Maternity Carer is a primary maternity care provider. That is, a midwife

It is not known if the experiences in late pregnancy are the same for women with pregnancy complications. Therefore, this study will only include women with uncomplicated pregnancies. If the woman's care is transferred to an obstetrician in labour it will not matter, because the focus of this study is the last few weeks of pregnancy and the very beginning of labour.

### ***What you are asked to do.***

1. ***At the 37 week antenatal visit*** I would like you to advise women about the existence of the study and invite them to participate by giving each woman a study pack containing information sheet, consent form, recording diary and return envelopes. This should take no more than 5 minutes.
2. ***At the 37 week antenatal visit*** , Put the two 'reminder to post the diary' notices into the woman's notes. One at the birth page. and the second in the postnatal notes part of the notes.
3. ***When the woman goes into labour*** , please write the baby's position at the first abdominal palpation in the space in the front of the recording diary. The purpose of this is to identify the posterior position fetus' so that, if by chance an event is associated with posterior position, then the data can readily be identified.

### ***What the women are asked to do.***

The women are asked to **keep a daily record of pregnancy events from 38 weeks to the onset of labour.**

When the woman goes into labour, she is asked to **write the time and date she started regular painful contractions** in the place provided in the front of the recording diary. It is all

right for her to fill this in after the baby is born. After the baby is born, the **woman is asked to fill in the date and time of birth and to post the diary to the researcher.**

**All information will be kept confidential.** All the information from all the women will be put together as bulk statistics. The consent forms and the questionnaires will be kept separately from each other in a locked cupboard. It will be impossible to know which recording diary belongs to which woman as the diaries have no names or addresses. They will have a number. This number is to keep track of the number of recording diaries that have been issued. The consent forms are not numbered. Consent forms and diaries will be shredded at the end of the study unless the women request return of their diary..

**Taking part in this study will not affect the professional relationship you have with the researcher or your clients. Taking part is voluntary. If you do not want to assist in recruiting women for the study, as far as I am concerned, our professional relationship will not be affected in any way. You are free to stop recruiting at any time.**

***You are requested to sign the attached consent form and return it in the attached pre stamped and addressed envelope.***

**When will the results be available?**

There is approximately two years between the collection of the information and the final results becoming available.

**Researcher: Jackie Gunn,** [REDACTED]  
[REDACTED]

**Supervisor: Dr. Gillian White,** [REDACTED]

**THANK YOU FOR YOUR TIME AND WILLINGNESS TO PARTICIPATE.**



## Consent Form (Lead Maternity Carer)

### A Preliminary Study into Late Pregnancy Events and their Relationship to the Onset of Labour

1.1 I have read and I understand the information sheet dated April 30 1999 for Lead Maternity Carers who have volunteered to **recruit women into** the study designed to identify and understand the events that women experience in the last few weeks of pregnancy and to see if any of the events are associated with the onset of labour.

I have had the opportunity to discuss this study. I am satisfied with the answers I have been given.

1.2 I understand that recruiting women for the study is my choice (voluntary) and that I may withdraw from the study at any time and that that this will in no way affect my *continuing professional relationship with the researcher*.

1.3 I understand that my participation in this study is confidential and that no material which could identify me will be used in any reports on this study

1.4 I have had time to consider whether to take part.

1.5 I know who to contact if I have any questions about this study

2.0 I \_\_\_\_\_ (full name) hereby consent to take part in this study.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Researcher: Jacqueline Paula Gunn - [REDACTED]

Supervisor: - Dr. Gillian White - [REDACTED]

## **Appendix VII**

### **Ethics Approval**

23 July, 1999

Ms Jacqueline Gunn  
C/O School of Health Sciences  
Massey University  
Albany Campus

Dear Jacqueline

**HUMAN ETHICS APPROVAL APPLICATION – 99/029  
A PRELIMINARY STUDY OF EVENTS EXPERIENCED BY WOMEN IN LATE PREGNANCY  
AND THEIR POSSIBLE ASSOCIATION WITH THE ONSET OF LABOUR.**

Thank you for your letter of 06 July 1999.

The amendments you have made now meet the requirements of the Massey University, Albany Campus, Human Ethics Committee and the ethics of your application, therefore, are approved.

Yours sincerely



Dr Mike O'Brien  
**CHAIRPERSON,  
MASSEY UNIVERSITY, ALBANY CAMPUS  
HUMAN ETHICS COMMITTEE**

cc. Dr Gillian White, School of Health Sciences, Massey University, Albany

**Appendix VIII**

**Daily Recording Dairy**

# DAILY RECORDING DIARY

## A Preliminary Study of Events Experienced by Women in Late Pregnancy

*This study is for an MA (Midwifery) thesis.*

*The study has been approved by the Massey University Human Ethics Committee*

### **MAIL TO:**

Researcher: *Jackie Gunn*

c/o School of Nursing and Midwifery, Auckland Institute of  
Technology, Private Bag 9200, Auckland

Phone

[REDACTED]

e-Mail

[REDACTED]

## RECORDING DIARY

### INSTRUCTIONS FOR USE

**Please fill in each day      One day to each page      It should only take 5 minutes.**

1. Each page is already marked with the week/day of pregnancy e.g. 39/2
2. Tick events if:  
  
    you notice them for the first time OR  
  
    you notice a change in the event
3. Write in the comments line if you can describe:  
  
    any features of the change, e.g. how strong, what type, how big.
4. Depending when your baby is born, you may not need to fill in all the pages (the days go up to 43 weeks).

### **NOTE:**

**Some women have no new signs and no changes at all before they go into labour.**

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL.**

*Stop recording if you are distressed or uncomfortable with the process in any way.*

**Return the diary even if it is unfinished**

**Pregnancy and Birth Data** *Please answer the following questions.*

***Please Note:*** This information will be included as bulk statistics.

For example, 'there are 100 first time mothers and 200 second time mothers in the study group'.

**Pregnancy**

**Age:** under 16( ) 16 - 19( ) 20 - 24( ) 25 - 29( ) 30 - 34( ) 35 - 40( ) 40+( )

**Number of previous pregnancies:** 0( ) 1( ) 2( ) 3( ) 4( ) 5( ) more than 5 ( )

**Number of children:** 0 ( ) \* 1 ( ) \* 2 ( ) \* 3 ( ) \* 4 ( ) 5 ( ) more than 5 ( )

**Which ethnic group do you identify with:** \_\_\_\_\_

**Onset of Labour:**

**Weeks Pregnant** \_\_\_\_\_

**Date labour began** \_\_\_\_\_

**Time:** \_\_\_\_\_

**Onset spontaneous:** Yes ( ) No ( )

**Induction:** Yes ( ) No ( )

**Position of Baby at 1st palpation in labour:** \_\_\_\_\_

(Ask your midwife to fill the position in)

**Time and Date of Birth:** \_\_\_\_\_

**RECORDING DIARY: Please fill in each Day - One day to each page**

**Tick events** if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL**

**WEEK/DAY OF PREGNANCY: 40/0**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( ) Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up (✓) Down ( ) (varies ( )		✓
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening(✓) Day ( ) Runs (✓) How long? Comment	✓	
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		

**A Sample to Guide You**



Number	Comments	Coding
1		
2		
3		
4	Bright and busy today	
5		
6		
7	Run of regular painful contractions 2 hours this evening petered out.	
8		
9		
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15		

**RECORDING DIARY: Please fill in each Day - One day to each page**

**Tick events** if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL**

**WEEK/DAY OF PREGNANCY: 38/0**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		

Number	Comments	Coding
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**RECORDING DIARY: Please fill in each Day - One day to each page**

Tick events if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL

WEEK/DAY OF PREGNANCY: **38/1**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		

Number	Comments	Coding
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**RECORDING DIARY: Please fill in each Day - One day to each page**

**Tick events** if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL**

**WEEK/DAY OF PREGNANCY: 38/2**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		

Number	Comments	Coding
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**RECORDING DIARY: Please fill in each Day - One day to each page**

**Tick events** if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL**

**WEEK/DAY OF PREGNANCY: 38/3**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		



Number	Comments	Coding
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**RECORDING DIARY: Please fill in each Day - One day to each page**

Tick events if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL**

**WEEK/DAY OF PREGNANCY: 38/4**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		

Number	Comments	Coding
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**RECORDING DIARY: Please fill in each Day - One day to each page**

**Tick events if -you notice them for the first time OR you notice a change in the event.**

Some women will have no changes or new signs.

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL**

**WEEK/DAY OF PREGNANCY: 38/5**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		

Number	Comments	Coding
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**RECORDING DIARY: Please fill in each Day - One day to each page**

Tick events if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL

WEEK/DAY OF PREGNANCY: **38/6**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		

Number	Comments	Coding
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**RECORDING DIARY: Please fill in each Day - One day to each page**

**Tick events** if -you notice them for the first time OR you notice a change in the event.

Some women will have no changes or new signs.

**YOU MAY NOT FIND ANY CHANGES AT ALL. THIS IS NORMAL**

**WEEK/DAY OF PREGNANCY: 39/0**

Number	Late Pregnancy Event	Tick	New	Change
1	Sense of smell/hearing /taste	more ( ) Less ( ) which sense?		
2	Sleep Patterns/ Dreams	Broken( ) Restful( )Vivid( ) pleasant ( ) Nightmare ( )		
3	Mood/feelings	Yes (..) No (..) Please comment		
4	Energy levels	Up ( ) Down ( ) (varies ( )		
5	Food intake and /or type of food	More food (..) Less ( ) Type? Comment		
6	Painless Contractions of the uterus (womb)	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
7	Painful Contractions of the uterus (womb) -	More ( ) Less ( ) Night ( ) Evening( ) Day ( ) Runs ( ) How long? Comment		
8	Baby movements	More ( ) Less ( ) Bigger ( ) Smaller ( )		
9	Vaginal secretions	More( ) Less( ) Show( ) Mucus( ) Liquor( )		
10	Bladder function	Frequency ( ) Other ( )		
11	Bowel function	Constipation ( ) Loose ( ) Diarrhoea ( ) Other ( )		
12	Libido (sex drive)	Raised ( ) Lowered ( ) Absent ( )		
13	'Needling' in vagina or cervix	Yes ( ) No ( )		
14	'nesting' /urge to finish tasks before labour	Yes( ) No( ) Finished( ) please comment		
15	Other	Please State in comments		



Number	Comments	Coding
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