‘The STORK Study’

The Scottish Trial Of Refer or Keep

Midwives’ Intrapartum Decision-making

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Abstract

Aim:

This thesis describes a study which aimed to explore whether midwives decision making during labour care was affected by the midwives' own attitude to risk. Specifically, whether midwives who scored highly on risk tendency would delay making a referral for medical assistance compared to those who scored lower. A secondary aim was to explore whether years of clinical experience or location had an effect on midwives' decision to refer.

Project Outline/Methodology:

Research Questions

1. Do midwives vary in their general risk propensity, as assessed by scores on a standardised measure of risk propensity?

2. Are midwives risk propensity scores related to their decisions when to seek medical assistance or transfer women to medical care during labour (transfer decisions)?

3. Are 'transfer' decisions related to the experience of the midwife or the type of maternity unit in which she practices?

Design

A correlation study examined the relationship between midwives personal risk tendency and the timing of their decision to make referrals in a series of fictitious case scenarios.

Setting and Sample

Four Scottish Health Board areas with one or more Consultant Led Units (CLU) and at least one associated Community Midwifery Unit (CMU). Sample - 100 midwives providing labour care.

Permission for access and ethics

Ethical approval was granted by the Research Ethics Committee, Department of Nursing and Midwifery, University of Stirling and the NHS Research Ethics Committee - Ref No. 05/S1401/44. Research & Development management approval was granted from each area. Permission for access was granted by the head of midwifery of each participating site.

Data collection

This was an internet based study using vignettes and questionnaires. Five vignettes were developed which represented a range of labour care scenarios. Each contained snap-shot information about five time points describing a worsening case history e.g. high blood pressure or fetal distress. Participants were asked to review each of the vignettes and decide at which time point they would refer the woman for medical care. For each case midwives could decide not to refer at all. Midwives also completed a questionnaire comprising: social

and demographic information, two validated measures of risk attitude and a personality assessment.

Key Results

Despite being presented with the same information midwives made a range of referral decisions. There was no correlation between referral scores and measures of risk, personality or years of experience. No statistically significant difference between the referral scores of midwives working in CLUs or CMUs was found. However, a significant difference did emerge between the health board areas, with midwives from one area making referrals at a significantly earlier stage. It is interesting that maternity services in this area had experienced several high profile adverse events prior to this study; possibly impacting on the midwives' timing of referrals.

Conclusions

The range of referral decisions was not due to risk propensity, personality factors, experience or location. Local factors may influence individual decision making choices.

What does this study add to the field?

This study contributes to the understanding of midwives' decision making during intrapartum care. The study also involved the development of an innovative internet based study design which will be useful for other research studies.

Implications for Practice or Policy

The study questions assumptions about midwives' decision making being influenced by personality, place of work or length of service and highlights the range of decisions made by midwives when presented with the same case factors.

Where to next?

Further study is required to explore factors which may explain the variability of midwives' decisions to refer. These factors may include individual differences for example, tolerance of ambiguity, the nature of past experience or individual thresholds for acceptable risk.

Glossary

Antenatal - existing or happening during pregnancy, but before childbirth

Asphyxiation - to deprive a person of oxygen, or be deprived of oxygen, usually leading to unconsciousness or death

Caesarean section - delivery of a fetus by incision through the abdominal wall and uterus

Cephalic - relating to the head, or in the region of the head

CLU – Consultant Led Unit; a maternity unit where the lead carers are obstertrician and midwives

CMU – Community Maternity Unit; a maternity unit where the lead carers are midwives (no medical staff in unit)

CTG – cardiotocograph; an electronic fetal monitor which is used to measure, simultaneously, both the fetal heart rate and the uterine contractions

Electronic fetal monitoring – see above

Hand held doppler – a hand held battery operated device which is used to monitor the fetal heart

Intranatal - existing or happening during childbirth

ITU - An intensive therapy unit is an area to which patients are admitted for treatment of actual or impending organ failure where they may require technological support (including mechanical ventilation) and/or invasive monitoring

Litigation - the act or process of bringing or contesting a lawsuit

NICU - A neonatal intensive care unit is a facility which provides neonatal intensive care for sick babies (see ITU).

Normal labour - as one where a woman commences, continues and completes labour physiologically at term i.e. spontaneous in onset, at term (37 to 42 weeks gestation) cephalic presentation of the baby and no intervention

Obstetrician - a doctor who specializes in pregnancy, delivering babies, and the care of women after childbirth

Partogram/graph - a visual representation of the progress of labour

Perinatal - relating to or occurring during the period around childbirth, specifically from around week 28 of pregnancy to around one month after the birth

Postnatal - occurring immediately or soon after childbirth

Protocols - the rules of correct or appropriate behaviour of a group, organization, or profession in response to specific events

SCBU - a facility which provides neonatal special care for sick babies.

Shoulder dystocia - the inability to deliver the fetal shoulders after delivery of the head, without the aid of specific manoeuvres

Foreword

I began working with the Nursing, Midwifery and Allied Health Professions Research Unit (NMAHP RU) in 2003 as a research assistant, whilst continuing to work part time in midwifery practice. I had no idea what that initial appointment would lead to; a full time career in teaching & research and undertaking this Master of Philosophy Degree.

In 2004 I began working on the STORK Study, then known as 'Is a midwives decision making during the intrapartum period affected by the midwives own attitude to risk?'; the name change came later. By the time I came to work on the project the research methods and design had already been established, but none of the actual detail of how these might be implemented had been developed; that was to be the first of many enjoyable tasks.

The STORK Study was co-funded by NMAHP RU and by NHS Quality Improvement Scotland (NHS QIS) and I would like to take this opportunity to thank both funders for that financial support. More importantly, I would like to take this opportunity to thank Helen Cheyne for her day to day support throughout the entire 'STORK' process; I could not have done it without her humour, help and advice.

It was during the early days of working on the study that the suggestion of undertaking a Master of Philosophy Degree, based on the STORK Study, was first proposed; I very quickly said 'yes'. I was more than fortunate to be assigned two fabulous supervisors, Professor Kate Niven, my Principal supervisor, who is such an inspiration and Professor Ronan O'Carroll. I cannot

thank them enough for the support and advice that has finally got me to this point. I would also like to say thank you to all the midwives who took part in the study; without their participation it would not have been the success it was.

To my late parents, Joe and Agnes, whose relentless boasting of the ‘achievements’ of their daughter must have driven their friends to distraction; I wish you were here to see this.

Finally, I would like to acknowledge the love, support and patience of my husband Dave and our ‘shared’ children Laura, David and Amy. Their constant belief in my ability has never faltered throughout this entire process, despite my frequent protestations to the contrary! I would not be where I am today without them; I love you all.

Dissemination

The findings of this study will be/have been disseminated as follows:

A report has been submitted to NHS QIS who contributed as co-funders to this project.

An executive summary has been sent to all midwife participants who requested information about the study.

The results of the study will be submitted for publication to an academic journal.

The development of methods unique to this study will be submitted to an academic journal.

Oral or poster presentations will be made at both decision making and midwifery conferences.

Acknowledgements

When I joined the Nursing & Midwifery & allied Health Professions Research Unit as a research assistant on this study exploring Midwives' Intrapartum Decision Making, the Research Proposal had already been drafted and the measures to be used to assess attitudes towards risk had already been selected. The decision to assess the timing of midwives' referral decision using vignettes had also been agreed upon.

Within this context, the research presented in this thesis was further developed, conducted and led by me, drawing as appropriate on the expertise and support of the Grant Holders.

Funding

The research was supported by funding from NHS Quality Improvement Scotland and The Nursing Midwives & Allied Health Professions Research Unit, a Chief Scientist Office funded research unit.

My role

Developed and put into operation, study methodology

Devised the idea of a web-based approach

Developed and tested study methods

Conducted recruitment and implemented study

Responsible for day to day running of the study

Data entry

Analysis plan in discussion with Grant Holders

Conducted data analysis

Ethical approval: Project Reference Number 05/S1401/44

R & D approval from four Health Board Areas

Compiled final report.

Two papers arising form the STORK Study will be submitted for publication following completion of this thesis.

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Chapter 1 - The STORK Study

The STORK Study: introduction

There are almost 4000 practising midwives in Scotland, many of whom are the main carers for the 53,000 women who deliver each year in this country. Their practice is governed by the Nursing and Midwifery Council (NMC) and must meet certain standards of proficiency. Guidelines, such as those of the National Institute for Health and Clinical Excellence (NICE), are issued which advise on best practice for particular healthcare situations. NICE, the independent NHS organisation responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health, advises on how the progress of a woman's labour in relation to cervical dilatation over time should be carefully observed, as should the condition of the fetus. In addition, many protocols exist which detail the actions to be undertaken by midwives when deviations from normal, such as prolonged labour or fetal distress, occur. In many situations, these deviations from normal will require referral to an obstetrician or anaesthetist, as specified in the Midwives' rules and standards, which will be discussed later in this chapter.

Labour and childbirth have always been regarded as the periods of greatest risk to the mother and baby; a major concern being the risk of the birth of an asphyxiated baby. Much of the care in labour is directed at detecting fetal distress, as well as observing the progress of labour; with subsequent management and/or referral, therefore midwives must be able to identify when a deviation from normal occurs in order to take appropriate action and make timely referrals.

There is an increasing expectation in the public that, as medical science becomes ever more sophisticated, most perinatal deaths can be prevented. With this increase in public expectation, there has come an increase in medical negligence claims against the NHS; the fear of which is believed to be a major driver of midwifery and obstetric practice. In turn, this fear of litigation has led to a rising level of intervention in labour, even in women whose pregnancy and labour are considered 'normal'.

A 'cascade of intervention' has been described, where one intervention in a labouring woman leads to another and so on. In Scotland, a referral can simply mean a transfer of care to an obstetrician who is on site, but for many women in labour this referral can also mean a transfer to another maternity unit due to the country's geography.

Good midwifery judgement and decision making is essential to avoid unnecessary referral, intervention and transfer of women in labour, however little is published about how midwives decide that a labour is becoming abnormal; about what factors influence midwives' intrapartum judgement and decision making. This chapter will discuss each of the points raised here in greater detail.

1.1 Location of Delivery

At the present time, there are eight levels of intrapartum care available in Scotland in a variety of birth settings. Four thousand midwives provide ante, intra and postnatal care in 40 maternity units (NMC, 2008c). These range from small rural units with less than 5 deliveries per year to large urban consultant led units with almost 6000 annual deliveries.

Levels of Intrapartum Care		Lead Carer
1a.	Home (planned)	Midwife
1b.	Stand-alone community maternity unit (CMU)	Midwife
1c.	CMU adjacent to non-obstetric hospital	Midwife
1d.	CMU adjacent to obstetric hospital	Midwife
11a.	Consultant–led unit (CLU) with no neonatal facility	Consultant+Midwife
11b.	CLU with on site neonatal facility	Consultant+Midwife
11c.	CLU (SCBU/NICU & Adult ITU <3000 deliveries)	Consultant+Midwife
111.	CLU (as above >3000 deliveries+ neonatal surgery)	Consultant+Midwife

(Classification by the Scottish Executive - Expert Group on Acute Maternity Services, 2002)

Current government policy has endorsed midwife-managed care in normal labour and supports the development of community maternity units. In Scotland, as a result of this policy, most of the 53,000 births (over 99%) take place in a variety of Hospital settings, including a diverse range of midwife led settings, with midwives as the main care providers (Scottish Executive 2002).

1.2 Midwifery Regulation

Midwifery practice is governed by the NMC, established in 2002 to replace the United Kingdom Central Council for Nursing, Midwifery and Health Visiting (UKCC). As well as maintaining a register of qualified nurses and midwives, the NMC have established standards of proficiency to be met by applicants to the

register. The NMC also offers guidance on key areas of midwifery governance such as supervision of midwives and accountability.

Supervision of midwifery was established to protect childbearing women and their babies by ensuring that midwives are competent and confident practitioners. Whilst promoting childbirth as a normal physiological experience, Supervisors of Midwives (SOMs) must make certain that there are adequate opportunities for midwives to engage with women. By working in partnership with women and midwives in practice, SOMs can ensure that maternity services are developed which reflect local need. SOMs are also a valuable resource for midwives; as mentor and advisor. However, whilst the midwife can expect advice and support from the named Supervisor; the main function of supervision is to protect the public (NMC 2008 b).

Established standards of proficiency are set out for midwives in the booklet entitled 'Midwives rules and standards' (NMC 2004). This booklet clearly defines the scope of midwifery practice and responsibility in relation to the provision of antenatal, intranatal and postnatal care. It also clearly states the responsibility of the midwife when confronted by an emergency or a situation that deviates from normal.

Part 6 of the 'Midwives rules and standards' booklet of 2004 states that:

1. A practising midwife is responsible for providing midwifery care, in accordance with such standards that the Council may specify from time to time, to a woman and baby during the antenatal, intranatal and postnatal periods.

2. Except in an emergency, a practising midwife shall not provide any care, or undertake any treatment, which she has not been trained to give.
3. In an emergency, or where a deviation from the norm which is outside her current sphere of practice becomes apparent in a woman or baby during the antenatal, intranatal or postnatal periods, a practising midwife shall call such qualified health professional as may reasonably be expected to have the necessary skill and experience to assist her in the provision of care.

In the clinical areas protocols exist which detail what action should be taken when an emergency or deviation from normal occurs (Appendix 1). These protocols usually direct the midwife to refer the care of the woman to medical staff (usually a mid grade doctor and/or consultant obstetrician), who then assume responsibility for the management of the woman and of the situation. However, in most cases, the midwife will continue to provide midwifery care under the direction of the obstetrician.

However, as a healthcare professional the midwife is entirely accountable for her practice; answerable for her actions or omissions (NMC 2008a). The NMC demand that the midwife is able to justify her decisions. The inability to do so may result in the midwives' fitness to practice being brought into question (NMC 2008a). The midwife must be swift to alert the relevant authority if she believes that her practice, or the practice of others, is putting a woman or baby at risk. The public must be confident that their heath and wellbeing are the primary concern of those in whom they place their trust.

1.3 Standards of Proficiency in Midwifery

The standards for proficiency in midwifery practice have been guided by the definition of a midwife adopted by the International Confederation of Midwives (ICM), which is an international non-governmental organisation that unites 85 national midwives' associations from over 75 countries.

In July 2005 the ICM defined a midwife as 'a person who, having been regularly admitted to a midwifery educational programme, duly recognised in the country in which it is located, has successfully completed the prescribed course of studies in midwifery and has acquired the requisite qualifications to be registered and/or legally licensed to practise midwifery. The midwife is recognised as a responsible and accountable professional who works in partnership with women to give the necessary support, care and advice during pregnancy, labour and the postpartum period, to conduct births on the midwife's own responsibility and to provide care for the newborn and the infant. This care includes preventative measures, the promotion of normal birth, the detection of complications in mother and child, the accessing of medical care or other appropriate assistance and the carrying out of emergency measures'.

This definition supports the previously mentioned current government policy which endorses midwife-managed care in normal labour. The Royal College of Midwives (RCM 2007a) goes on to state that 'Midwives are expert professionals skilled in supporting and maximising normal birth, (and that the) role of the midwife is integral to models of care, which promote normality'. It is important that midwives have a clear understanding of what normal labour is, as they are the practitioners who work most closely with women during this crucial time; and

that they understand that the judgements and decisions they make may determine the quality of care (Gould 2000).

1.4 Labour

Labour is a clearly defined period: from the onset of regular uterine activity accompanied by dilatation and effacement of the cervix to the expulsion of the fetus, placenta and membranes; with dilatation of the cervix occurring at a rate of approximately 1 to 2cm per hour (Fraser & Cooper, 2003). The RCM defined 'normal childbirth' as one where a woman commences, continues and completes labour physiologically at term i.e. a labour which is spontaneous in onset, at term (37 to 42 weeks gestation) with cephalic presentation of the baby and no intervention (RCM 2007).

Furthermore, the Maternity Statistics Bulletin, published by the Information Centre for Health and Social Care (Department of Health 2007) describe a woman's labour as being without intervention if there has been:

No induction of labour

No anaesthesia (general, spinal or epidural)

No caesarean section (planned or emergency)

No instrumental delivery (forceps or ventouse/vacuum)

No episiotomy

Using the definitions detailed here, the Scottish Information and Statistics Division (ISD) report a Normal Birth rate of 39.4% for the year ending 2004 (ISD 2008).

The fact that, by the above definition, only 39% of women are recorded as having experienced a ‘normal birth’ could be regarded as controversial. Normal in the statistical sense cannot apply to the minority. Many women who have an epidural anaesthetic, but then go on to have an uncomplicated vaginal delivery, may regard themselves as having had a ‘normal birth’; questioning why one method of pain relief is regarded as an intervention, when another is not? Also, many women whose labour is induced merely undergo artificial rupture of membranes and will labour without the need for oxytocin; particularly parous women. These women may also regard themselves as having experienced a normal birth. The parameters of ‘normality’ require further debate. As advocates for normality in childbirth, surely midwives should be considering, in consultation with the women in our care, what is ‘normal’ in the 21st century?

During labour a standard set of observations assessing maternal and fetal wellbeing will be regularly performed by midwives with the purpose of detecting deviation from normal. As recommended by the World Health Organisation (WHO) in 1994, these observations are usually recorded on a partogram/partograph, a chart which provides a visual representation of the progress of labour (Appendix 2). Maternal and fetal observations are recorded, as well as the progress of labour. These observations include cervical dilatation, descent of the fetal head into the pelvis and fetal heart rate. By plotting observations on such a chart, it facilitates the early detection of deviations from normal as preset lines on the partogram plainly distinguish between progress that is considered normal and that which may be considered prolonged or becoming complicated.

Currently there is a debate about the usefulness of the partogram in relation to action lines and labour outcomes. The Royal College of Obstetricians & Gynaecologists and NICE recommend that a partogram with a 4 hour action line should be used (NICE 2004; RCOG 2004) as there is some evidence to suggest that the use of a four hour time frame reduces the number of Caesarean Sections compared to a 2 or 3 hour action line. However, both RCOG and NICE recommend that further research is urgently required to evaluate the use and utility of the partogram.

In view of these recommendations for further research it is interesting to note that a survey looking at partogram use in England found that there were wide variations in partogram format and use in the 126 maternity units who returned the completed survey (response rate 71%); no two were found to be the same (Lavender et al. 2008). The survey found that, of the eleven units choosing not to use a partogram, ten were the low risk settings for which the partogram was developed. As with RCOG and NICE guidance, the authors suggest that, in the absence of robust evidence of the best format, using a partogram with a four hour action line is recommended.

One example of the utility of the partogram is the recording of the rate of cervical dilatation over time. According to NICE Intrapartum Guidelines (2007), in normal labour, cervical dilation is expected to progress at the rate of no less than 2 cm in four hours. If cervical dilatation does not proceed at the recommended rate, NICE advises referral to the appropriate healthcare professional. In addition WHO (1994) recommends that the woman is transferred to a unit with the facilities to perform a caesarean section. Of the eight levels of intraparutm care delivered in Scotland, the midwife is the lead

carer in four of these levels without easy, immediate access to medical staff. In these situations there is no obstetric or anaesthetic cover and, as such, there are no facilities or staff available to perform a caesarean section. Therefore, when the midwife in this situation is considering referring the woman to an obstetrician, this will include a decision to transfer, by ambulance or air ambulance, to the nearest obstetric unit with the necessary facilities and staff.

It is vital, therefore, that the midwife accurately records the findings of each examination (assessing progress and maternal and fetal well-being during labour). When assessing these observations, it is crucial that the midwife makes the correct judgements to facilitate timely, appropriate management of the situation if necessary.

1.5 Medical Vs Midwifery View of Labour

Traditionally doctors are considered to view labour (and pregnancy) as being normal only in retrospect; that birth is normal if there were no intervention and no adverse outcomes (Wagner 1994). Midwives, however, are expected to come from the opposite perspective, namely, they anticipate that labour and delivery will be normal until proven otherwise. In 1994 Wagner went so far as to suggest that the midwives' definition of normal labour is that labour is normal if the woman sees it as such. However, regardless of definitions of normality, labour and childbirth have always been considered to be the period of greatest risk for both mother and baby; a series of government reports throughout the last century culminated in the recommendation for 100% hospital confinement due to the perceived risks of childbirth (Tew 1979).

More recent Government reports such as the UK Obstetric Surveillance System (UKOSS) Annual Report (Knight et al. 2007) and the report of the Confidential Enquiries into Maternal and Child Health 'Saving Mothers' Lives' (CEMACHb 2007), have further highlighted the risks in childbirth. Similarly, the Scottish Confidential Audit of Severe Maternal Morbidity reported by the Scottish Programme for Clinical Effectiveness in Reproductive Health (SPCERH NHS Scotland 2004) details 'near miss' events such as major obstetric haemorrhage. These documents report that, in the UK, the incidence of maternal mortality and morbidity is relatively low; 14 per 100,000 maternities, with 'near miss' events in Scotland recorded as 4.7 per 1000 births respectively.

However, both CEMACH and SPCERH do recommend that midwives obstetricians and other intrapartum care givers should receive regular and updated training on the signs and symptoms of critical illness, from both obstetric and non-obstetric causes. It also recommends that all midwifery and obstetric staff should be trained in basic life support.

Considering the risk to the fetus, the Scottish Perinatal and Infant Mortality and Morbidity Report (SPIMMR, NHS Scotland, 2006) describes the perinatal mortality rate as 7.4 per 1000 whilst Perinatal Mortality (CEMACHa 2007) reports a 'preventable' perinatal mortality rate of 4.0 per 1000 in 2005. ('preventable' excludes all major malformations and infants with a birth weight of < 1000g).

Certainly, as stated earlier, of particular concern to midwives and obstetricians is the risk of the birth of an asphyxiated baby and a substantial portion of midwifery care in labour is directed at detecting fetal distress in an attempt to

prevent this. However, despite statistics reporting low maternal and perinatal mortality and morbidity; the fact remains that there is a genuine risk to the mother and baby during labour and delivery.

It is generally accepted that there is no way of completely eliminating risk during labour and delivery; that a part of clinical practice is actually taking carefully considered risks (NMC 2007; Symon, 2006). However, good clinical risk management, as part of a systematic approach evaluating the practices of the individual as well as the wider team, can be effective in reducing potential risk (Wilson & Symon 2002). This proactive approach advocates the maternity team working closely together to identify those women who are at a greater risk of a complicated pregnancy; increasing the likelihood of that risk being reduced. A very important component of effective clinical risk management is accurate record keeping. This allows those risks identified to be considered by all caregivers during pregnancy and labour. However, little is published on the way in which individual midwives perceive risk and how this might influence their decisions to refer a labouring woman to an obstetrician.

1.6 Increase in litigation

As medical science becomes increasingly sophisticated, public expectation becomes heightened and perceptions change. With this change in perception comes the belief that most perinatal deaths are preventable (Johanson et al. 2002). In the United Kingdom there is currently a high and rising rate of litigation relating to maternity services with the majority of claims resulting from care during labour and childbirth. In 2006-7 the National Health Service in England faced a bill for negligence claims in excess of £5.7bn which is double that of

2002 and four times the rate in 1997; almost 50% of claims are in relation to obstetrics and gynaecology (NHS Litigation Authority 2008). Interestingly, this dramatic rise in claims since the early 1990's followed a revision of Legal Aid funding in 1989 when state funding became available to pursue a claim on behalf of an infant. The number of claims escalated as did the rates of intervention in labour (RCM 2007b; Office of Public Sector Information 1989).

Mostly, these negligence claims cite either a delay in, or a failure to intervene during the course of labour. This suggests that, in these cases, there was an expectation of intervention which would have, in the minds of the litigant, resulted in a better outcome. Undoubtedly the perception of the need for intervention increases the possibility of defensive practice of both the midwife and the obstetrician; the need to be seen to act and to act in time. The RCM (2007b) suggests that normal birth is more difficult to defend as there is less documentation to be scrutinised; you don't document what you don't do! As a result, the judgements and decisions made by the midwife during the course of an uncomplicated labour are less likely to be documented. The RCM also suggest that the legal system favours actions and decisions, which are generally meticulously recorded, as opposed to situations where there is little documentation, with the result that 'defensive practice prioritises record keeping.' Fear of litigation is considered to be a major driver of midwifery and obstetric practice (Bassett et al. 2000).

In the United Kingdom this fear has almost certainly added to the currently high levels of intervention in labour, even in those women whose labour is considered to be normal. For example, in Scotland, up to 30% of women have epidural analgesia and the caesarean section rate is currently around 40% in

some areas, with a national average rate of 24.9% (ISD Scotland 2008). In 2005 15.4% of women underwent an emergency Caesarean section compared to 8.9% in 1990 (ISD Scotland 2008). According to Bassett et al. in 2000 fetal distress is the second most common reason for emergency caesarean section both in the UK and USA; with failure to progress in labour cited as the most common reason (NICE 2004). Similarly, there has been an increase in elective Caesarean section rates from 5.3% in 1990 compared to 9.5% in 2005 as well as an increase in Ventouse delivery from 1.2% to 4.7% over the same period. Figures from the RCM website detail the rates of normal birth, with no intervention, as 47% in England, 38% in Scotland and 39% in Northern Ireland (RCM 2007a). However, despite the rising rate of litigation and apparent defensive practice, the RCM (RCM 2007b) state that the health and safety for women and their babies has not improved; that the incidence of cerebral palsy as a result of intrauterine hypoxia remains at 2-3 per 1000 births.

1.7 A cascade of intervention

Where one intervention is initiated it is suggested that this leads to a spiral of intervention, described as a 'cascade of intervention' (Mold & Stein 1986; Hundley et al. 1994). A typical example of a 'cascade of intervention' is where labour is induced in a woman whose pregnancy is post dates (not delivered by 10-14 days after expected date of delivery). Induction of labour is a relatively common procedure in the United Kingdom with an average of 20% of deliveries induced (NICE 2007). However, in some areas in Scotland this figure is as high as 44% (ISD 2008).

Syntocinon is then used initiate and augment the labour process. For most women induction of labour is more painful than spontaneous labour so many

opt for epidural anaesthesia (NICE 2007). Women with an epidural anaesthetic have a higher incidence of instrumental or surgical delivery (Ros et al. 2007). This clearly represents a cascade effect: intervention - induction, augmentation, epidural anaesthetic, possible instrumental or surgical delivery.

As well as undertaking practice which is evidence based, good midwifery judgement and decision making is absolutely essential to avoid high levels of intervention and cascades of intervention. However, following a review of the literature, there appears to be very little research into how midwives make intrapartum decisions or what factors are involved which make them decide that that a woman's labour is moving from normal to abnormal.

Also, as stated earlier, in Scotland many women are cared for in community midwifery units where referring a woman for obstetric care means transferring her by ambulance/air ambulance to the nearest Consultant Led Unit, often a significant distance away. To avoid unnecessary transfers of women in labour from Community Midwifery Units to Consultant Led Units, which may be dangerous, is certainly costly to the service and often extremely distressing for women, midwives must be able to undertake effective decision making.

1.8 The STORK Study: rationale

Childbirth in Scotland can take place in a variety of settings, with the midwife as the lead carer. Midwifery practice is regulated by the NMC with strict guidelines clearly defining the scope of practice particularly in relation to deviations from normal; guidelines often backed up by protocols in the clinical areas. Standards of proficiency in midwifery have been informed by a globally accepted definition of a midwife; which also recognises the need for midwives to be able to detect

complications during labour and seek appropriate assistance. However, there is a paucity of literature examining how midwives decide when labour is moving from normal to abnormal and what factors influence these judgements and the subsequent decision to refer or keep; a particular concern as midwives care for over 99% of women in labour. The recognition of this gap in our knowledge of midwives' intrapartum decision making prompted the researchers to seek to explore this area.

In order to understand what these factors might be, the decision was made to examine potential internal and external characteristics of the individual midwife which may influence her/his decision making. Internal characteristics of interest included personality, as previous research (Zuckerman & Kuhlman 2000; Soane & Chmiel 2005; Nicholson et al. 2005) has highlighted the importance of personality in explaining behaviour; i.e. do certain personality traits determine how a decision is made? As risk during childbirth can never be completely eliminated, risk propensity was considered as midwives' own attitudes to risk could be an important factor in determining how they might perceive and manage risk during the intrapartum period. Might midwives who perceive the world a less risky place refer later than those who perceive the world as a more risky place? External factors to be explored included place of work; would midwives working in stand-alone community maternity units make referral decisions at different times than their colleagues working within consultant led units; after all the decision to refer also may include the decision to transfer? Years of practice; do more experienced midwives make different decisions at different times than less experienced midwives?

Midwives, with varying levels of experience providing intrapartum care in a variety of birth settings were recruited to enable an exploration of their decision making in relation to the previously identified internal and external factors. It was anticipated that this research would increase our knowledge of midwives' intrapartum decision-making and make clearer what factors are taken into consideration when judgements and decisions are being made.

Chapter 2 - The literature review

Literature review

A review of the literature was undertaken to establish what was already known about the subject of midwives' intrapartum decision making, risk perception and personality. A search of databases included Medline, CINAHL, PubMed, Psychinfo, Embase, Scottish Health on the Web e-library and the Cochrane Library. Search terms used were intrapartum, risk/risk perception, decision making, midwifery and personality. Initially, literature from the year 2000 to date was reviewed.

2.1 Decision making

Clinical decisions have been described as the art of making decisions without adequate information; suggesting that health professionals rely upon other factors to aid their clinical decision making. However, as there is little published research on the way in which midwives make decisions on the need for referral during intrapartum care, the process was unclear.

Studies have shown that, in general, people are not good at estimating the probability of rare events; that perception is altered by personal experience. It was, therefore, possible that midwives' intrapartum judgements and decision making would be influenced by their own attitude towards risk and their personal experience, possibly by how often they encountered these 'rare events'. However, little research has been undertaken which considered midwives' attitude towards risk in relation to intrapartum decision making.

2.1.1 Systemic factors and decision making

During a review of literature exploring health care professionals' decisions, Freemantle (1996) discusses issues associated with the effectiveness and cost effectiveness of particular drugs. Freemantle found that although health care professionals were aware of the added benefits and efficacy of newly developed pharmaceuticals; some continued to prescribe existing, less effective drugs. It would seem, superficially at least, that the decision to prescribe a less effective drug in the knowledge that there is a more effective intervention is irrational. However, Freemantle argues that this decision might also be considered rational since many health care professionals make decisions based on the greatest benefit to the greatest number. Fiscal constraints encountered in a publicly financed health care system may make it difficult, if not impossible, to always make decisions that appear 'rational'. Freemantle describes this as 'systemic factors that lead decision makers to take some apparently irrational decisions even if we believe ourselves to be acting rationally' (Freemantle 1996:79).

In another more relevant area of health care decision making Freemantle reviewed the use of evidenced based guidelines in Canada designed to reduce the numbers of Caesarean Sections (CS) from 72% to 61% in women with a history of previous CS and breech presentation. The majority of Canadian obstetricians were aware of, and agreed with the guidelines and reported that they adhered to them; however the reduction in the overall CS rate directly attributable to the implementation of the guidelines was 0.1%. Freemantle recommends that further experimental research is required to understand the complex nature of clinical decision making as, even with supporting evidence

such as that presented to the Canadian obstetricians; seemingly ‘wrong’ decisions are being made.

Short et al. (2003) evaluated the use of a computerised decision support system by 15 West Midlands General Practitioners (GPs) for the management of stroke patients, in particular, whether or not to prescribe aspirin as a preventative measure. A large number of patient profiles were generated (960) and included combinations of known risk factors for stroke. The GPs then had to make the decision to prescribe or not prescribe aspirin. Short et al. reported that GPs described being more certain of their decisions when they were supported by evidence readily available from the decision support system. It was also established that these decisions more closely conformed to national guidelines. The researchers do acknowledge that the number of GPs involved in the study was small and that analysis was limited, with findings merely an indication of what might be found in a larger study. As such, they recommend further research looking at large numbers of participants to effectively evaluate the usefulness of decision support tools for reducing uncertainty in clinical decision making.

Thomson et al. (2001) reported the findings of their study, which looked at which sources of information nurses found useful for reducing uncertainty when making clinical decisions (Sample n = 108). The research design included qualitative interviews, observation and audit of documentation. Although four useful sources of information in practice were identified, including written and electronic resources, these nurses reported that, in real time situations, they viewed those individuals whom they regarded as clinically credible as the most valuable resource when attempting to reduce uncertainty in decision making.

However, little is reported on which qualities these individual practitioners possessed which identified them to their colleagues as clinically credible; although, the years and level of experience with a resulting degree of 'intuitive' appraisal skills, was reported by some participants. The study concluded that it is not confidence in the knowledge or evidence itself which influences nurses' clinical decision making, but how and by whom that knowledge is conveyed. The authors suggest that further research is required into what qualities, highly regarded by nurses, identify a practitioner as 'clinically credible'.

2.1.2 Experience and decision making

A study which looked at the clinical decision making of experienced and novice nurses describes cognitive structuring as the 'use of abstract mental representations' (Tabak et al. 1996: 535), which might allow the practitioner to effectively reduce uncertainty in decision making. The authors go on to describe these mental representations as 'simplified generalisations of previous experience' (Tabak et al. 1996: 535) and that a major factor influencing the effectiveness of cognitive structuring is level of experience. They hypothesised that expert nurses would be more able to make decisions, with less uncertainty, than the novice, when presented with consistent information and that the novice nurse would experience less uncertainty when presented with inconsistent information. Each nurse participant was presented with two scenarios detailing a set of symptoms; either consistent or inconsistent with the diagnosis offered. The nurses then had to decide whether or not the patient was suffering from the diagnosed condition as well as describing how difficult (or not) it was to make their decision.

The study findings supported the hypothesis that expert nurses did experience more certainty in their clinical decision making when confronted by consistent information and that they did report increased uncertainty when confronted by inconsistent information. The authors explain this by suggesting that expert nurses apply cognitive structuring, using previous experience on which to evaluate the current scenario. I.e. they based their decisions on diagnoses/outcomes they have seen previously, in similar situations. When confronted by inconsistent information, they experienced higher levels of decision making uncertainty as they had no previous experience to draw upon; relying on less familiar thought processes to aid decision making. The authors also conclude that, in general, novice nurses tended to ignore inconsistent information and that their lack of knowledge resulted in lower levels of uncertainty. However, they do stress that although it was mostly novice nurses who did ignore information inconsistencies, over 35% of expert nurse did the same. They recommend that further work is undertaken looking at aspects of decision making developed through experience, in particular, looking at 'techniques of knowledge' disclosed by experienced practitioners (Tabak et al 1996:545).

2.1.3 Heuristics and decision making

Sox et al. (1988:17) states that clinical decisions have been described as 'the art of making decisions without adequate information'. He suggests that under such conditions, health professionals may rely upon heuristics - rapid forms of cognitive reasoning or mental shortcuts/rules of thumb - to assist in their clinical decision making. Buckingham and Adams (2000:992) go on to suggest that as the practitioner becomes more experienced, cues are then automatically

associated with particular outcomes and ‘rules become redundant’ implying that experienced practitioners use heuristics in their clinical decision making. The use of heuristics by nurses has been well documented (Cioffi & Markham 1996; Cioffi 1997b; Cioffi 2000) and widely investigated in the broader context of decision making research. In her paper from 2000, Cioffi describes the decision making experiences of nurses making the decision to call emergency assistance to their patients. They described feelings of uncertainty and often wondered if they were doing the ‘right thing’ by summoning emergency assistance even after conferring with colleagues. They reported recognising the signs of deterioration in their patients and knew that something was wrong, however, they could not vocalise exactly what it was that they recognised. Cioffi suggests that, in this case, patient knowledge and past experiences are important factors in recognising patient deterioration. She suggests that these associations further add to the argument that past experience is vitally important in the process of clinical decision making.

Tversky and Kahneman (1973; 1974) described three classic forms of heuristics (mental shortcuts); representativeness, availability and anchoring & adjustment. The ‘representativeness’ heuristic refers to the relevance of earlier incidents; relying on memories of previous experiences. In a clinical setting, these past experiences can provide information about outcomes that have been observed in similar situations and as such, Cioffi states that nurses have been shown to make use of cases that appear similar when making clinical judgements and decisions (Cioffi 1998). The availability heuristic involves assessing the likelihood of an incident occurring depending on how easily past incidents come to mind. So, memories of clinical incidents that are recent and/or dramatic can

be influential when making clinical judgements (Cioffi 1998). The anchoring & adjustment heuristic involves the establishment of an anchor point from previously acquired knowledge or experience then making adjustments from this anchor when considering further information relevant to the current situation (Kahneman & Tversky 1979).

All three types of heuristics may occur in clinical situations and all involve reliance upon the decision makers' recollections of personal past experiences and previously acquired knowledge (Cioffi & Markham 1996; Cioffi 1998; Cioffi 2000).

2.1.4 Intuition and decision making

In healthcare a decision can be defined as a choice between two or more options; e.g. in the STORK Study the choices were to 'refer' or 'keep'. It has been argued that the judgements, on which some of these healthcare decisions are based, are intuitive (Benner & Tanner 1987). Intuition has been described as a gut feeling, a hunch or a sixth sense (Cioffi 1997b). However, Cioffi suggests that little is known about this phenomenon, a particular concern as nurses have frequently reported a reliance on intuition in clinical judgement and decision making (Rew 1988; McCutcheon & Pincombe 2001; Agan 1987).

By describing intuition as a means of knowing, it becomes difficult, if not impossible, to explain clinical judgement and decisions (Lamond & Thompson 2000). This is particularly problematic for the practitioner who is accountable for those judgements and decisions. How can you defend decisions you cannot explain, using a phenomenon you cannot quantify? However Truman (2003:43) suggests that 'to denigrate the use of something merely because it cannot be

measured is inappropriate and over simplistic'.

Nevertheless, the existence of intuition as instinct or sixth sense is not well supported. For example, several nurses who reported using intuition in their clinical judgement and decision making also acknowledged that 'a lot of what we consider to be psychic knowledge is subconscious knowing' (Agan 1987:67). Furthermore, an analysis of data from a study evaluating the role of intuition when making clinical judgements concluded that intuition is 'a complex interaction of attributes, including experience expertise and knowledge' (McCutcheon & Pincombe 2001:345). The authors suggest that it is the interaction and interdependence of these attributes which create the synergy which results in the phenomenon recognised as intuition.

2.2 Midwives' decision making

Decisions by midwives can positively or adversely affect the well-being of women and their babies. If inappropriate decisions are made, there is the undeniable risk of a poor outcome, which implies that decision making and risk are inextricably linked (Raynor & Marshall 2005). Clinical decision making is also closely linked to clinical judgement; the process whereby the midwife examines the situation, recognises the salient pieces of evidence before deciding the most appropriate course of action; preferably in discussion with the woman involved. Currently, there is little published research on the way in which midwives make decisions during intrapartum care; in particular their judgements and decisions about the need to refer to medical staff for support or intervention and what factors influence these decisions. Guidelines which identify the parameters of normal labour are readily available (Scottish

Executive 2001), as are those which define abnormality and recommend appropriate action (RCOG 2001). However the process by which a midwife judges that a woman's labour is moving from normal to abnormal is unclear.

As stated earlier, several studies have suggested that the way in which clinicians generally make decisions may not always be rational and that they are influenced by a number of heuristics (Freemantle 1996; Cioffi 1997b). However, it has also been shown that social and group factors can have an impact on how decisions are made. A study by Martin & Bull in 2004 examined decisions made by junior midwives, independently, then again when making decisions in the presence of a senior midwife. This study concluded that the presence of a senior midwife had a profound effect on some midwifery decisions; that the senior midwife's presence could often influence the decision making of junior colleagues, despite the fact that care should be woman-centred. These findings were supported by a later study which found that 'bureaucratic' was the dominant mode of decision making utilised by some midwives, that decision making which involved the client was the least favoured option (Porter et al. 2007). This study suggested that personal characteristics of the midwives were important factors in their decision making processes, characteristics including lack of experience and over-reliance on more experienced members of staff, as was demonstrated by Martin & Bull (2004). In these studies a broad variation in midwifery decision making has been recognised.

Clinical decision making is complex and is informed by many aspects which appear to include experience, available evidence and the preferences of the individual (Raynor 2005). And, as has been previously discussed, childbirth is

not without risk, so it is also possible health professionals' risk-taking preferences and attitudes towards risk may explain some of the variation in midwives' decision making and referral behaviour, as well as influencing the heuristics that are being employed. A better understanding of the attitudes and behaviour of midwives in relation to decision making and risk, during the intrapartum period, may diminish the likelihood of misjudgements being made.

2.3 Risk

The Oxford Online Dictionary (2008) defines risk as a situation involving exposure to danger; the implication being that this exposure will undoubtedly have a negative impact. Level of risk could be described as the probability of an event occurring in relation to its impact. A high probability plus a high negative impact equals high risk; high probability plus low negative impact equals low to medium risk; low probability plus low negative impact equals low risk. In society there are many situations for which a level of risk might be determined. For example: risk of loss in the financial markets; risk of injury engaging in dangerous pursuits; risk of loss involving theft of property.

Clinical risk has been described as 'the chance of an adverse outcome resulting from clinical investigation, treatment or patient care' (NHS National Patient Safety Agency 2007). It has been suggested that in maternity services, unlike the situations described above, the level of risk is always high as, although there is a low probability of an adverse outcome, the negative impact is high as the adverse outcome can have a devastating effect; maternal or neonatal morbidity or mortality (Symon 2006).

Relative risk is described as a means of trying to conceptualise the probability of an event occurring (Symon 2006). For example; Symon (2006) states there is a 1:10,000 chance of dying in a road traffic accident and 1:100,000 chance of developing a spinal haematoma from an epidural anaesthetic. However, he argues that, generally, people would be just as apprehensive about having an epidural anaesthetic (if not more so) as they would be about getting into a car, despite the higher probability of being involved in a road traffic accident.

Studies have shown that people are not good at estimating probability with regards to risk and that they tend to inflate the likelihood of adverse events; even those considered rare (Hastie & Dawes 2001). Although obstetric emergencies such as postpartum haemorrhage and shoulder dystocia occur rarely, they may be perceived as more or less likely depending on the personal experience or attitude of the midwife; heuristics. For example, the midwife has several recent experiences of postpartum haemorrhage (PPH), so now perceives the risk of PPH to be higher than the recorded incidence would suggest.

This viewpoint is supported by a study which looked at midwives' risk perception (Mead & Kornbrot 2004). Midwives from eleven maternity units utilising varying models of midwifery care were shown a selection of almost 10,000 retrospective case records. The perception of risk, in view of potential interventions and actual maternal outcomes, was estimated for each midwife. Results showed that midwives working in low intervention units perceived risk to be lower than midwives working in high intervention units, a fact which supports the theory of the availability heuristic; you see it, so you expect to see it. However, both groups of midwives underestimated the capability of women to

labour without intervention. A reflection, perhaps, of the medicalisation of childbirth that still persists in some areas?

A later study by Mead, conducted in Belgium exploring midwives' perception of the intrapartum risk of healthy primigravid women in spontaneous labour, found that Belgian midwives were much more optimistic, more so in fact than their British colleagues, that women could achieve normal deliveries within 12 hours (Mead et al. in press). I.e. Belgian midwives thought that healthy women having their first child, safely delivered within 12 hours, was the most likely outcome; British midwives thought this outcome less likely. The length of time in labour is strikingly similar in both countries and so suggests that risk perception in British midwives is overly pessimistic and overly optimistic in Belgian midwives. The study also highlighted the fact that Belgian obstetricians are much more involved in the care of normal, healthy labouring women than in the United Kingdom; Belgian midwives do not assume the same level of responsibility. So this over optimism may be, in part, due to the fact that Belgian midwives are less exposed to those intrapartum events encountered by UK midwives; that, as obstetricians are conducting normal deliveries, it is they who are exposed.

2.3.1 Risk Management in Maternity Services

In childbirth it is generally accepted that exposure to risk is unavoidable (Harpwood 2001; Jones & Jenkins 2004; Wilson & Symon 2002). How this exposure to risk is managed is challenging for obstetricians, midwives and their managers. Clinical risk management aims to identify risk; establish measures to reduce risk which will, in turn, reduce the risk of adverse outcomes for mothers and babies (Symon 2006; Wilson & Symon 2002). Jones & Jenkins

(2004) suggest that this process relies on the identification of risk by both systematic assessment and self assessment. The outcomes of these assessments have obvious implications for the ongoing professional development of existing staff and the training and education of student midwives. It is also generally acknowledged that clinical risk management requires a system of self-reporting in order that 'near misses' are highlighted, discussed and used to inform strategies to reduce the probability of adverse outcomes (Jones & Jenkins 2004; Symon 2006; Wilson & Symon 2002).

In a retrospective review of 310 clinical risk reports it was suggested that hospital staff are often unwilling to report adverse incidents for fear of disciplinary action (O'Connor 1996 cited by Lakasing & Spencer 2002). The authors suggest that voluntary schemes, where staff do not fear reprisal, are more effective in encouraging clinical risk reporting. Sadly, this suggests that the culture within the clinical area is not always one of openness; that a blame culture still exists in some areas. This also implies that there is a real risk of under-reporting of adverse incidents. One study reported that 55% of potential adverse incidents were only identified retrospectively by a review of patient records (Stanhope et al. 1999 cited by Lakasing & Spencer 2002). Although reassuringly, the authors do go on to state that most of the clinical risk incidents classed as either serious or moderately serious were identified in the 45% reported.

2.4 Risk taking

It is also possible that midwives' judgement and decision making during labour will be influenced by the midwives' general attitude to risk i.e. whether they are risk averse or risk takers. Attitudes to risk can be defined on a continuum from

risk averse to risk seeking. While it has been argued that attitudes to risk are stable personality traits it has also been suggested that research has shown that people will become risk averse when they perceive themselves as successful with a lot to lose and risk seeking when they perceive themselves as having little to lose indicating that attitude to risk is changeable (Soane & Chmiel 2005).

Weber and Milliman (1997) proposed that with a degree of 'perceived risk attitude', based on the principle that choices depend on risk perceptions and risk preferences, there is a greater chance of consistency across situations and could be regarded as a measure of a stable personality trait (unlikely to change). The authors explain this theory by suggesting that it is not the individual's attitude towards risk that changes; they continue to be either attracted or repelled by risk. They propose that it is a change in how the individual perceives the riskiness of the activity; that it is the perception of risk that is variable not the attitude towards risk.

A study exploring the consistency of risk preferences of several diverse groups such as academics, fire-fighters and city traders over the domains of work, health and personal finance found that generally, people could be classified into one of two groups (Soane & Chmiel 2005). One group was categorised as those whose risk preferences were consistent across the three domains, and those who were inconsistent. Interestingly, the majority of those categorised as consistent were found to be risk averse and those who were inconsistent, categorised as risk takers. The concept of risk has received considerable attention in the world of business and economics (MacCrimmon & Wehrung 1990; Weber & Milliman 1997; Slovic et al. 2005) and in relation to individuals'

risk- taking attitudes towards their own health and wellbeing; a study looking as the relationship between attitude to risk and treatment choice found that patients who were classified as risk averse were more likely to opt for treatment compared to those who were risk seeking (Prosser et al. 2002).

Although limited, risk research in clinical settings does suggest that health professionals' attitude towards risk can lead to significant variations in the way decisions regarding patient care are made. For example, Pearson et al. (1995) examined the relationship between one particular risk-taking measure and physicians' decisions whether or not to admit patients presenting at hospital with acute chest pain. They found that physicians' risk propensity correlated significantly with admission rates and that the risk-seeking physicians admitted significantly fewer patients at low and medium risk of myocardial infarction than the low risk-seeking physicians. However, as far as we are aware, other studies have not considered health professionals' risk taking behaviour in relation to intrapartum decision making.

2.5 Risk taking behaviour and personality

The Oxford Dictionary defines personality as 'the combination of characteristics or qualities that form an individual's distinctive character' (Oxford Online Dictionary 2008). Psychologists have been studying personality for over one hundred years and as a result, numerous theories have emerged during that time. How much effect biology and life experience has on the development of personality are just some of the questions being asked. This intense scrutiny of personality has sparked several classic debates regarding the stability of personality over time, or stability when confronted with different situations (Scott & Spencer 1998). In an attempt to understand and measure personality, many

psychologists have developed tools which assess various dimensions of personality. Some of these tools will be discussed in chapter 3.

As discussed earlier, one of the continuing debates is the issue of the stability of personality over time with many theorists agreeing that personality traits are stable and unchanging (Gleitman 1995). However, Mischel (1968) had previously argued against this viewpoint suggesting that individuals' behaviour will change according to time, place and situation; a view supported by Soane & Chmiel (2005) who, when looking at attitudes to risk, did describe behaviour as changeable over time. This viewpoint is also supported by Nicholson et al. (2005). Nicholson recognised the importance of past behaviour in influencing current preferences, and included current and past risk behaviour when developing a tool to measure an individual's Risk Taking; recognising that past and present behaviour might be quite different. One theory which supports this lack of behavioural consistency has been called 'situationism', whereby behaviour is said to be determined by the current situation rather than by the characteristics of the individual (Gleitman 1995). What is agreed, though, is that much work needs to be undertaken to explore these issues further. This study will investigate personality and attitudes towards risk and test for association with clinical decision making.

2.6 The STORK Study

Although Mead & Kornbrot (2004; in press) have studied midwives' perception of risk, there was no literature found which described midwives' intrapartum judgement and decision making in relation to personality and perception of risk. As midwives are the main carers for over the majority of labouring women in Scotland; their intrapartum decisions have a huge impact on potential fetal and

maternal outcomes in over 50,000 births each year. When a midwife makes the decision that the labour is moving from normal to abnormal, many other factors come into play which may result in one or more interventions; a cascade of intervention. Therefore it is imperative that midwives' decision making processes, specifically in relation to risk perception, are better understood, particularly as labour is still considered the period during which the mother and baby are at greatest risk.

As most people do not appear to be consistently risk seeking or risk averse, and we cannot say with certainty that that attitude to risk is constant or unchanging; the same must be true of midwives. Also, as research has suggested that clinicians rely upon heuristics to aid decision making, it is possible that midwives make different decisions when working in high risk obstetric units with more opportunity to see adverse outcomes, as opposed to midwives working in low risk areas. Finally, as clinicians consider level of experience to be a factor in clinical decision making, it is possible that different decisions are made by experienced and inexperienced staff.

2.6.1 The STORK Study - aim

The STORK study aimed to explore midwives' attitudes to risk and decision making in relation to their judgements about deviations from normal; referring to medical staff or calling for assistance during the intrapartum period. It sought to discover whether midwives' decision making during the intrapartum period was affected by the midwives' own attitude towards risk; specifically whether those midwives scoring highly on risk propensity would delay referring/transferring a woman in labour, compared to those who have a lower propensity for risk, as

was found during Pearson's 1995 study of physicians referral decisions. As there is a wide range of care settings available in Scotland as well as a range of clinical experience, a secondary aim of the STORK Study was to explore whether years of clinical experience or location had an effect on midwives' decisions to refer.

2.7 The STORK Study- summary

Childbirth is considered to be a time of risk for both mothers and their babies with much of the care in labour undertaken with the aim of preventing an adverse outcome. In Scotland the majority of intrapartum care is delivered by midwives, who are accountable for the clinical judgements and decisions made during this time. However, little is known about the factors which influence these judgements and decisions, especially in relation to a labour which is moving from normal to abnormal.

It has been suggested that clinicians make judgements and decisions without adequate information and that there is a reliance on other factors when making health care decisions. These factors may include the environment in which the clinician practices i.e. urban or rural maternity units, prior experience and the use of heuristics. It also been suggested that certain personality traits influence how and when decisions are made.

In the STORK Study, midwives were invited to complete a questionnaire which assessed certain aspects of their personality, including attitudes towards risk. The questionnaire also sought personal data such as place of work and years experience. From the responses to the questionnaire, a 'risk score' was calculated. By analysing the timing of referral decisions in a series of online

vignettes, a ‘referral score’ was also calculated for each participant. Correlational analyses were undertaken to explore the relationship between the midwives’ risk scores and the timing of their decisions to refer. The following chapter will describe the development of the methods used in the STORK Study, whilst the results will be presented in Chapter 4.

Chapter 3 - Methods

Methods

This chapter will describe the development of the STORK study methods; the design, selection of sample, selection of measures of risk and the development of the tools.

3.1 The Questionnaire

A questionnaire was used to measure risk propensity, attitudes towards risk and personality. The questionnaire consisted of a validated measure of risk propensity; a validated shortened version of an attitudes towards risk questionnaire and a validated questionnaire assessing the 'Big 5'. An expert in the field of psychology had been consulted regarding the most suitable measures for use in the STORK Study. Following this consultation, the following tools were used as the expert had advised that these were valid, widely accepted and commonly used measures when assessing personality, risk propensity and attitudes towards risk.

3.1.1 The Risk Taking Index (RTI)

A new scale to assess an individual's risk propensity was developed by Nicholson et al. (2005) in order to investigate risk and performance amongst traders in London investment banks (Appendix 3). This scale explored reported frequency of risk behaviours in six specific areas (domains): recreation, health, career, finance, safety and social. Nicholson hypothesised that men would report more frequent risk taking than women; that risk propensity would be inversely related to age and that age effects would be more pronounced for

men than women. In analysing the data from trials of the questionnaire, Nicholson found that risk propensity varies across different occupations and business sectors; the traders studied by Nicholson scoring highly on risk taking compared to other occupations.

Nicholson also concluded that risk propensity is linked with age and sex and with career related risk taking. Overall, the most risk taking group were young males. In a study of five hundred business executives, MacCrimmon and Wehrung (1990) found that the most successful executives were the biggest risk takers, but were less inclined to take big risks as they matured, supporting Nicholson's hypothesis that there would be an age effect. However, Nicholson found women took greater risks in their careers and in the social domain and suggests that, in seeking equality with men, women were prepared to take greater risks in particular areas.

Nicholson determined that risk propensity is very much rooted in personality; recognising the Big 5 as significant in the assessment of risk propensity. Some individuals were found to be consistently risk taking, others consistently risk averse whilst the third group exhibited risk taking or aversion only in specific domains. E.g. Nicholson found that many individuals were prepared to take health related risks such as smoking tobacco or drinking alcohol, whilst being risk averse in the other domains such as career, finance etc.; supporting the findings of Zuckerman and Kuhlman (2000) who studied the personality and risk taking behaviours of 260 college students.

As the review of the literature had suggested that risk propensity is linked to occupation, personality, age and experience, Nicholson's Risk Taking Index

was thought to be an appropriate measure that would allow assessment of midwives' risk propensity. A systematic review in 2005 of instruments that measure risk propensity for use in the health setting included an evaluation of Nicholson's Risk Taking Index. The review reported high internal consistency (reliability) and thought that the instrument did differentiate between past and present risk taking (Harrison et al. 2005). However, the authors highlight age related bias due to the fact that there are questions relating to physical activity and/or stamina. They suggest that it would be impossible to distinguish between variations in participants' responses, i.e. is the response related to risk propensity or is it related to physical activity? But they also suggest that having the questions asked in two time contexts may overcome this to a certain degree. Finally, although the authors recommend caution when using instruments that rely on self reporting, they conclude that Nicholson's Risk Taking Index is a reliable means of measuring risk propensity over multiple domains.

3.1.2 Attitudes Towards Risk Questionnaire

Since the 1950's Zuckerman has studied human behaviour and personality, in particular the trait he calls 'sensation seeking'. He describes sensation seeking as 'the pursuit of novel, intense and complex sensations and experiences, and the willingness to take risks for the sake of such experience' (Zuckermann 2000:54). In common with other researchers exploring risk taking behaviour, Zuckerman utilised a self reporting questionnaire whilst investigating the risk taking behaviour of college students. The short form of this questionnaire developed by Zuckerman and Kuhlman in 1993 (Appendix 4) lists a series of 35 statements regarding risk taking to which the participants mark as 'true' or

'false'. From the responses to this questionnaire, it is then determined whether or not the participant is a risk taker or risk averse. Mostly, the questions relate to psychological risk taking; however, as we wanted to explore physical risk taking as well as we also looked at the questionnaire developed by Franken.

Franken et al. (1992) developed an 'Attitudes Towards Risk' questionnaire (Appendix 5). This tool consists of twenty statements regarding physical and psychological risk taking whilst shortened versions have a few as ten. Respondents are asked to score themselves on a scale from A (like me) to E (not like me). By utilising this questionnaire we can determine the respondents' attitude towards risk. Franken found that those who engage in risky behaviours/pursuits did not view the world as dangerous as those who did not. As the intention was to explore Midwives' attitude to risk as well as their risk propensity, a previously validated shortened version of the 'Attitudes Towards Risk Questionnaire' by Franken was included as part of the STORK Study questionnaire.

3.1.3 The Big 5

In 1957 Raymond Cattell, an English born American psychologist, suggested that there were sixteen primary dimensions of personality. Later work by Costa and McRae (1992) reduced this number to five factors of personality, which came to be known as the 'Big 5', which, since that time, has formed the framework of many of the tools which psychologists use to explore personality. One of the most widely used is the NEO-Personality Inventory Revised scale (NEO-PI-R) developed from earlier questionnaires by Costa and McRae. The NEO-PI-R consists of 240 statements, 48 for each of the five factors. These

factors are Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness. As with Franken's Attitudes Towards Risk questionnaire, respondents are asked to decide on a five point scale whether they 'Strongly Agree' to 'Strongly Disagree' with the statements. Analysis of the responses allow 'scoring' of each of the factors listed earlier which then can be used to determine personality. Subsequent studies have also described five factors; not dissimilar to Costa and McRae's. In the STORK Study questionnaire similar statements were included which would measure midwives' personality (part 3, Appendix 6).

3.2 Vignettes

Vignettes are simulations of real events depicting hypothetical situations (Wilks 2004). Described as 'short stories about hypothetical characters in specified circumstances, to whose situation the interviewee is invited to respond' (Finch 1987:105); vignettes can be generated from a range of sources including previous research findings and real-life case histories.

The use of vignettes to examine social judgements was pioneered by Rossi and Nock in the late 1970s and early 1980s and has principally been used by psychologists in North America. However, although the use of vignettes has been cited in psychology literature from the 1950's onwards, the historical evidence of their early use is not readily available (Richman & Mercer 2002). Nevertheless, in 1998 Hughes suggested that they a valuable stimulus when studying perceptions, attitudes and beliefs either as a stand-alone technique or as an adjunct to another approach. Latterly, their use has become more widespread within social work, social science, nursing and, most recently, midwifery; although it is still within psychology that their use is greatest (Hughes

1998). Vignettes have been used in social research for over 20 years (Giovanni & Becerra 1979 cited in Spalding 2004) and are increasingly being used to look at the quality of practice and decision making (Peabody et al. 2004). Vignettes are often used as either an independent method or supplementary to other research approaches. They can be used to interpret actions and occurrences whilst allowing exploration of context; to define judgements in relation to ethical dilemmas or to facilitate discussion of sensitive issues (Barter & Renold 1999).

In particular vignettes are increasing in popularity within nursing research (Gould 1996) and are often used by nurse researchers exploring decisions regarding patient care, where direct observation may be deemed as inappropriate (Ludwick & Zeller 2001). Although the use of the vignette is becoming more widespread within nursing research, in midwifery research their use is very limited (Cioffi 1997a).

3.2.1 Strengths of vignettes in nursing and midwifery research

Vignettes are particularly useful to nurse and midwife researchers as they can closely simulate real life events without compromising patient care and confidentiality. Situations that would otherwise be constrained by ethical, moral or safety issues can safely be explored, even to the point of creating risky scenarios to examine how the participant might react (Hughes & Huby 2001). Indeed, in the STORK Study, vignettes presented worsening case scenarios, which would have been ethically and professionally impossible to study in real life. Vignettes also allow the participant to think out-with the limitations of personal experience (Finch 1987). In the STORK Study, midwives who had only ever worked in Consultant Led Units, with no personal experience of home

birth, would be asked to imagine how they would react in that particular situation. Other research methods employed when exploring decision making include the questionnaire, interview and observation.

Often, in observational studies, a major consideration has been the Hawthorne Effect. Industrial productivity was examined at the Hawthorne Works factory of the Western Electric Company in Cicero, Illinois, USA from 1924 to 1932. It was concluded that productivity increased in response to the presence of the researchers. These studies claimed that this phenomenon occurred in direct response to being observed – The Hawthorne Effect. This would have obvious implications for observational studies.

However, some researchers have been critical of the analysis of the original data from the Hawthorne studies; suggesting that other variables such as length of rest breaks, input from management etc. are more likely to be responsible for increased productivity (Wickstrom & Bendix 2000). Following an investigation of the Hawthorn Effect, including meeting a participant, an observer and having access to original documents, Parsons (1978) also concludes that it was not the presence of researchers which caused increased productivity; rather that it was the effect of performance related pay and that the participants themselves were setting ever higher goals; competing against their own and others targets. A study by Rosen and Sales (1966) examined work performance of factory employees. They found that, although the research effect on average productivity was statistically significant, it was negligible, thus failing to replicate the results of the earlier studies at the Hawthorne Works.

Despite the fact that it has been called controversial and often poorly understood (Franke 1979), the Hawthorne Effect is still considered to be a major problem in observational studies (Gould 1996). As such, the use of vignettes can help to eliminate perceived Hawthorne and observer effects and can be a feasible alternative or adjunct to observational methods.

As vignettes are most often presented to participants in a written form, they can often prove less expensive and less time-consuming to administer than other research methods such as interview or observational studies (Ludwick & Zeller 2001). Other common methods of presenting vignettes are through the media of audio or videotape. Another positive aspect of using vignettes is that all participants are responding to same stimulus, thereby affording the researchers a degree of consistency and control comparable to that when using experimental designs (Alexander & Becker 1978). In the STORK Study each midwife would be presented with the same cases and have access to exactly the same information, to guarantee consistency and control.

3.2.2 Weaknesses of vignettes in nursing and midwifery research

Although vignettes do have many strengths there are also weaknesses which must be addressed. One area of concern is the credibility of the scenarios. The characters depicted must be believable in situations that are plausible (Finch 1987; Barter & Renold 1999). If scenarios and characters are depicted as too extreme they may be completely out-with the scope of experience of the study participants. Conversely, if the scenarios are oversimplified the complex nature of reality is lost (Ludwick & Zeller 2001). So it is vital that the content of the vignettes are extensively piloted to ensure face and content validity. Ideally,

vignettes should be constructed drawing upon existing literature, research or experience and be scrutinized by a panel with specialist knowledge of the topic under review. Midwifery case records, midwifery texts, interviews and extensive piloting were resources utilised to ensure face and content validity of the five proposed vignettes for the STORK Study.

However, regardless of how authentic the scenarios appear, vignettes cannot ever completely capture reality. This can affect the data collected in that participants may process the information with less care and attention than in a 'real' situation (Stolte 1994). The responses are merely hypothetical; there are no guarantees that those made in a theoretical situation would be the response in reality (Ludwick & Zeller 2001).

Vignettes also do not afford participants the opportunity for the feedback that one experiences in reality, therefore, it could also be argued that the results are not necessarily realistic (Hughes 1998). Nonetheless, despite these weaknesses, the use of vignettes in nursing and midwifery research continues to be an invaluable, alternative methodology to observational studies and a significant tool in exploring practitioner decision making.

In order to address these weaknesses the following measures were taken. Five common labour care scenarios were developed following careful scrutiny of maternity case records and current literature. All were situations that midwives encountered on a daily basis. None were extreme and certainly not out-with the experience of most, if not all, midwives. The exception to this was the scenario which depicted home birth, however although the individual midwives may not have been present at a home birth, each of the participating maternity units

provided a home birth service and all of the midwives had experience of caring for a labouring woman. The information in the vignettes were presented in the same format, language and detail as seen in actual case records, so were no more complex or simple than midwives were used to seeing. Finally, they were extensively piloted with midwives who had a wide range of knowledge and experience to ensure content validity.

Regarding the issue of 'reality', it was anticipated that, as the participants' anonymity was guaranteed, the responses would be a reasonably accurate reflection of midwives' decision making; there was no reason to be less than candid. In addition, although feedback was not immediate, participating midwives were given contact details for the study team. This, along with the fact that midwives could log on and exit the study at any time (this facility will be discussed more fully later) meant that if the participant felt the need for clarification before continuing, it was readily available as they could contact the Research Midwife.

3.3 The Pilot Study

The main aim of the STORK Study was to explore whether midwives' decision making during the intrapartum period is affected by the midwives' own attitude towards risk; specifically whether those midwives scoring highly on risk propensity will delay the decision to call for assistance, compared to those who have a lower propensity for risk. A secondary aim was to explore whether transfer decisions were related to the experience of the midwife or the type of maternity unit in which she practised.

The research tools for the study were fictitious case scenarios (vignettes) and a questionnaire. Midwives were asked to complete the study questionnaire which was compiled from validated measures assessing everyday risk-taking, personal attitudes and preferences (Nicholson et al. 2005; Franken et al. 1992). Although a questionnaire had already been developed prior to the pilot study utilising both Nicholson's and Franken's attitudes towards risk measures and the Big 5, no other re-pilot developmental work had been carried out. Vignettes were developed specifically for this study, to represent a range of labour care situations. The content of the vignettes was reviewed by clinical staff, including a Consultant Midwife, to ensure that the scenarios represented events experienced routinely by most midwives.

A pilot study was undertaken to test the face and content validity of the tools of the study; the questionnaire (Appendix 6) and the five vignettes (example: Appendix 7). It was vitally important that these research tools were extensively tested prior to study implementation as, although the use of vignettes in research is not uncommon, in midwifery research their use was innovative. Over fifty nurses and midwives took part in the pilot study, either by completing the questionnaire, the vignettes or both; ranging from student and consultant midwives to university lecturers. It was anticipated that this wide range of expertise would prove invaluable as each participant had a differing practice based experience and IT expertise.

Although the development of the study and how it might be presented had initially seemed simple and straightforward, it ultimately took five months to completely develop the entire vignette and questionnaire package, averaging seventy five hours per month. And although this part of the process had been

expected to be the most complex, it proved to be even more challenging than initially thought. This was due to several factors including design, content and security which will be discussed fully later.

3.3.1 Questionnaire design

The questionnaire was developed from the existing validated measures discussed earlier. During the pilot study these paper based questionnaires were sent out to a convenience sample of thirty one nurses and midwives to test for ease of completion and acceptability of format. All but two were female.

The response rate was excellent; thirty out of thirty one questionnaires were returned. All participants agreed that the questionnaire was easy to complete and easily understood. However, several respondents suggested that, from an aesthetic point of view, the questionnaire would benefit from two changes.

Firstly, each of the two original, validated measures of risk attitude (Nicholson's & Franken's) used to compile the questionnaire was presented in a slightly different format. Both were incorporated into the questionnaire. It was suggested that, by using one format only, the questionnaire would read more easily.

Secondly, part one asked respondents to state whether or not each of the risks detailed would apply now or would have applied in the past; the appropriate boxes would then be ticked. It was felt that by visually highlighting the difference between '*now*' and '*in the past'* by means of shading one group of the boxes, the distinction between past and present would be much clearer, and so might assist completion.

Indeed, when data from all questionnaires was entered onto an SSPS database, it was discovered that 6 (20%) of respondents had incorrectly completed part one of the questionnaire. They had completed one section only. I.e. Whether or not each activity had been undertaken now *OR* in the past. However, as we were attempting to understand past and present behaviours, it was decided to apply shading to part one of the questionnaire to visually highlight the difference between '*now*' and in the '*past'*. The written instructions were also modified to emphasize that we were looking for a response for both.

It was also decided to unify the format and layout of the questionnaire. The three separate parts were combined to make one questionnaire; with questions ranging from 1 to 66. At this time an additional page was incorporated seeking social and demographic information such as age, sex, area of clinical practice and years of clinical midwifery experience. This modified questionnaire was then piloted with several midwifery colleagues to ensure its clarity and ease of completion. This version of the questionnaire proved to be the final version as no further problems were identified.

3.3.2 Vignette design

At the outset it was not clear what form the vignettes should take. The Research Midwife would not be present when the vignettes and questionnaire package was accessed by the participants, so this had a huge influence on the design. As suggested in the literature, it was important that they should be presented to the midwives in an appropriate and familiar format (Barter & Renold 1999).

All documents accessed by midwives in the labour suite (the target group for this study) were reviewed to establish which were most commonly used. It

quickly became apparent that case-notes were the documents most accessed by midwives during the course of intrapartum care. It was determined that vignettes presented to midwives in the form of case-notes would be in a very familiar format; therefore appropriate for this study. During the piloting phase of the STORK Study, the form in which the vignettes were presented to the midwives was found to be acceptable, so no changes were made to the actual 'case-note' layout.

Each case was given a fictitious name, date of birth and expected date of delivery. Approximately five antenatal visits were detailed; recordings conforming to what are generally accepted as being within normal limits in pregnancy (Fraser & Cooper 2003). As in actual case-notes, the vignettes detailed the booking appointment of each woman, her obstetric and medical history, antenatal care and, except for the woman booked for home delivery, her labour suite admission.

Each vignette then went on to specify a fixed point in time leading on from the labour suite admission. In the case of the woman booked for home birth, a fixed point in time leading on from the midwife being in attendance at the woman's home was specified. An entry was made in the case-notes detailing the progress of labour and a record of the midwife's observation on the well-being of the woman and the fetus. This is in keeping with normal practice in the labour suite.

The midwives were then shown a CTG image (Appendix 8) and the partogram. In the case of the home birth, electronic monitoring was unavailable as this is

the case in reality. Observations were carried out using a hand held Doppler, a battery operated hand-held device which allows auscultation of the fetal heart.

With this information, midwives were then asked to make the decision of whether or not they would call for assistance/refer the woman to the obstetrician, or if they would continue to provide midwifery care. If the decision to refer was made, the midwife would move onto the next vignette. If the decision was made to continue providing midwifery care, access to the next stage of the unfolding scenario was permitted. This process continued until all the vignettes were completed. If the midwife completed a vignette without making a referral, this was recorded as the decision not to refer at all and scored appropriately. Once made, all decisions were final.

Midwives were prevented from seeing the next stage of the vignette (or the next vignette) until a decision had been made. The vignettes were presented in a random order to each participant to reduce the possibility of bias due to the order of presentation of the vignettes. Half of the participants were directed to complete the questionnaire first and half were directed to assess the vignettes first. Again, it was anticipated that this would minimize the risk of bias due to order effects.

3.3.3 Vignette content

Five labour care vignettes were designed to meet the criteria recommended by the literature; that the vignettes should appear plausible and real to the participants; should avoid depicting disastrous events; and should reflect everyday events (Finch 1987; Barter & Renold 1999). For the purposes of this study however, these vignettes had to first reflect normal labour before slowly

moving towards abnormality as each labour care scenario progressed through the five stages.

The vignette development phase of the process proved to be most demanding as it was difficult to keep this progression subtle. Five relatively common labour care scenarios were selected which most midwives would have knowledge, if not experience of. None depicted conditions that were rarely encountered, e.g. one scenario depicted the case of a woman with pre-eclampsia; a potentially life-threatening condition characterised by rising blood pressure along with several other salient clinical signs. The blood pressure had to be documented as rising a little at a time; as well as introducing some of the other clinical signs of pre-eclampsia as the scenario progressed. If this deterioration in the woman's condition was too obvious, most midwives might refer at the same stage. However, as the vignettes were to be extensively piloted it was anticipated that any problem areas would be quickly recognised, amended and re-piloted.

As vignettes should be simulations of real events depicting hypothetical situations (Wilks 2004) five common labour care scenarios were identified along with a fictitious name for each 'woman'.

Anne - Pre eclampsia – Pre eclampsia is a hypertensive disorder of pregnancy characterised by rising blood pressure and protein in the urine which affects up to 8% of UK pregnancies (BMJ Clinical Evidence 2008). Symptoms of pre eclampsia include headache, visual disturbances, abdominal pain and changes in the biochemistry of the blood. If undetected and left untreated the woman may experience convulsions which can result in maternal and fetal death.

However, early detection and intervention can greatly reduced the severity of the condition. As midwives are the lead carers for the majority of women, it is they who have the greatest responsibility to recognise the early signs and symptoms and take action.

Jane - Home birth – A woman giving birth at home accounts for only 1.3% of all deliveries in Scotland (Birthchoice 2008) and latest figures suggest that of these, 40% of primiparous women and 10% of multiparous women are transferred in labour to the nearest hospital either a result of complications in the mother or fetus or because of a request for epidural anaesthesia. As the decision to refer also means a decision to transfer, the midwife must ensure that transfer time is taken into consideration.

Linda - Induction of Labour (IOL) – In Scotland, an average of 24% of women will have their labour induced (ISD 2008), i.e. labour is initiated by the use of prostaglandins, artificial rupture of membranes and the administration of oxytocin. The most common indication for IOL is where a pregnancy is prolonged. IOL is regarded as an obstetric intervention which requires careful monitoring of the mother and, in particular, the fetus. The main complication of IOL is over-stimulation of the uterus which can result in fetal distress and, on rare occasions, rupture of the uterus with a resulting fetal death. So, although the intervention is not uncommon, it is certainly not without risk and, as such, requires vigilance from the attending midwife.

Rachel - Malposition of the occiput – The occiput (the back of the fetal head) normally occupies the anterior part of the maternal pelvis and, as such, smaller diameters present as the head is well flexed, facilitating good progress in

labour. In 10% of cases there is a malposition of the occiput which means the back of the fetal head occupies the posterior part of the maternal pelvis. Consequently, the fetal head is deflexed and larger diameters present, with the result that labour can become prolonged and more painful with incoordinate uterine activity. Although diagnosis of a malposition of the occiput can be diagnosed prior to onset of labour, often it is not recognised until labour is not progressing well or the woman complains of unremitting backache (Fraser & Cooper 2003). Again, it is the alertness of the midwife to the pattern of uterine activity and her assessment of the woman's progress in labour that are vitally important.

Sarah - Slow progress in labour – According to the NICE guidelines discussed earlier in chapter one, progress in labour is regarded as satisfactory if the cervix has dilated at least two centimetres in a four hour period; with many midwives and obstetricians still regarding one centimetre per hour as the preferred standard. If the cervix fails to dilate at this rate, the labour is said to be prolonged with the result that there is often an intervention such as artificial rupture of membranes and/or augmentation with oxytocin. The midwife responsible for delivering care should be aware of the rate of progress in labour, in conjunction with maternal and fetal condition, to facilitate referral to an obstetrician if necessary.

Following discussions with expert midwives, five vignettes were generated. Each of the vignettes had five stages at which the midwives had to make the decision to 'refer' or 'keep' the woman. The decision to 'refer' meant that the midwife had sought medical assistance, whilst the decision to 'keep' meant that she would continue to provide midwifery care.

The piloting of the vignettes showed that, in two of the five cases, most of the participants referred at point 3. It was determined that progression through the stages, from normal to abnormal, was not sufficiently subtle in these two cases as almost all of the midwives had referred at the same point. This was problematic as the aim was to explore a wide range of referral decisions. These vignettes were amended by taking some of the signs and symptoms of the worsening scenario from points three and redistributing them to points two and four. It was anticipated that this would make the progression more subtle.

Also, at the request of several midwives, a few modifications were made to the language used in the vignettes; not all midwives used the same expressions or terminology. Abbreviations and acronyms were kept to a minimum to minimise potential confusion over meanings. When the package was re-piloted among several midwives a wide range of referrals were made in all five of the vignettes; no further major problems were highlighted. The vignettes were then ready for use in the STORK study.

3.3.4 Integrity of study

During the pilot study it became obvious that the integrity of the study regarding the reliability of the timing of the midwives' decisions to refer could be compromised. Having the vignettes presented on paper meant that there was nothing to prevent midwives from looking ahead at later stages in each scenario and delaying the point at which they might refer.

Even though each case progressively worsened, the next stage was only subtly different from that previously presented. It was theoretically possible that midwives could delay their decision to refer until after they reviewed the next

stage, thus rendering the study data unreliable. Paper mock-ups of the vignettes were viewed, reviewed and discussed by the Research Team and the form and layout agreed.

Although it was thought that it would be secure and acceptable to midwives to complete a paper based questionnaire, it was agreed that it would be more problematic to present the vignettes in a similar paper based format for several reasons. In the STORK Study, the validity of the results relied heavily on the quality of the data gathered. Means of sealing the edges of the vignettes were explored, which would allow us to know if future stages had been viewed, but again this was thought to be highly unsatisfactory. As the research midwife would not be present when midwives would be participating in the study, complete confidence in data gathered under these conditions could not be guaranteed. The decision was made that the vignettes could not be paper based.

A method of presenting the vignettes to midwives had to be devised that prevented access to the next stage, thus preserving the integrity of the study. At the suggestion of the Research Midwife, the Research Team made the decision to explore an alternative, but substantially more secure method of administering the vignettes, i.e. computer-based.

3.3.5 A computer-based study

The use of laptop computers was discussed as it was thought that security could be much more easily managed. IT functions could be utilised that would not allow future stages to be inappropriately accessed. It also allowed responses to the vignettes to be stored on to a database which would negate

the need for manual data entry. Several key features could be installed which would allow participants to ‘pause’ or ‘exit’ from the study and return to that exit point at a time more convenient. Furthermore, participants could be given a unique study number which they could use, in conjunction with a password chosen by and only known to them, to securely access the study package. These solutions suggested that the use of computers might solve many of the problems of access and security. It was also decided to explore the possibility of presenting the entire study, both questionnaire and vignettes, as a computer package.

Following a telephone discussion with an Information Technology Systems Administrator, several issues were highlighted that might adversely affect the decision to use a computer package. There was concern that developing a computer package would be cost prohibitive; however, this cost can often be offset by the reduction of printing costs and the improved quality of data compared to that when using a paper based system. Another potential problem was that of the cost and accessibility of hardware i.e. computers. One way of reducing the hardware costs would be to use the existing hardware of participating units; following discussions with potential participating maternity units it was established that desktop computers are available in most labour suites and that midwives have access.

As decisions made by participating midwives would be stored in a database, data collection software would have to be loaded onto this hardware. This software can be stored on the Hard Disk, Floppy Disk or on a remote computer. However, these methods are generally not permitted for security reasons by the

owners/managers of the hardware. Again, in discussion with potential participating units, this was found to be the case.

Ideally, the computer programme and data collection software would be accessed on Laptop Computers independent of the unit hardware. The use of the Research Team's Laptop Computers was preferred as the security, operation and management of the study would be controlled by them. Several laptop computers could be made available for use during the study should an appropriate computer package be developed.

An approach was made to the IT Department of the University, and a meeting set up with a Project Manager who would consider the requirements of the study and develop the programme. Prior to this meeting the Research Team agreed the requirements for the software package.

3.3.6 A computer-based study – requirements

- In order to maintain participant confidentiality, the programme should be accessed only by entering a unique user number issued by the Research Midwife and a password selected by the participant.
- The programme should have the appearance of case-notes.
- CTG and partogram images, where appropriate, should be on each page as in the paper based prototype.
- Midwives should, at all times, be able to view the booking, antenatal and labour suite admission information as this information would be readily available to them in actual case-notes.

- Midwives should only be able to access one stage at any time to prevent looking ahead with the possibility of deferring the decision to refer.

- Buttons with ‘refer’ and ‘continue/keep’ would be placed at the top of the page at each of the five stages. The appropriate button would then be selected and pressed when the decision is made with the decision then stored on a database.

- Most importantly, midwives must only have access to the next stage when the decision to continue is made; this decision must be irreversible.

- The programme should have a pause facility to allow midwives to exit the programme. This was to enable midwives to complete the vignettes at a convenient time.

- When returning to the programme, access should be at the point at which the programme was exited.

- Finally, the vignettes should be presented in a random order to each participant to reduce the possibility of bias due to the order of presentation of vignettes.

With these requirements clearly defined, the meeting took place between the Research Midwife and the Project Manager. Equipped with this information the Project Manager recommended that the software package known as 'e-prime' (http://www.pstnet.com/products/e-prime/) would be the most appropriate tool for the development of the package. It is a commonly used software package in psychology research.

A time-scale was agreed upon for the first version of the computer package to be available for piloting (four weeks). It was also agreed at this time that the questionnaire should be administered as part of the same package. All responses to the questionnaire and decisions made by participating midwives would be automatically stored onto two databases. This would eliminate the need for data entry and would, therefore, save time. These databases would be accessed only by the Research Team, safeguarding the identity of the participants and ensuring the security of the responses

3.3.7 A computer-based study - problems

Several problems were highlighted during the piloting of the vignettes as a computer package, not least security. By using the ‘back’ button, some midwives returned to the previous stage and could, if desired, have changed their point of referral. When the programme was halted by ‘closing’ the screen rather than by using the ‘pause’ facility, again midwives could, in effect, change their point of referral as the last decision would not have been entered onto the database.

It was also found by merely having the cursor roll over the ‘refer’ or ‘continue/keep’ button the decision was recorded as having been made, and entered on the database. During the very early piloting of the use of laptop computers it was noted that midwives were able to make changes to the point at which they referred by simply using several of the available computer functions, e.g. utilising the backspace function to go back to the previous screen or by closing down the computer without saving responses. Solutions were discussed to solve the highlighted problems.

3.3.8 A computer-based study - solutions

Safeguards were built into the programme to ensure the security of the study. These included disabling the many computer functions which were not required during study administration, as well as inserting prompts when an irreversible decision was about to be made. E.g. ‘Are you sure you want to continue to the next step? Confirm or Cancel’

The solution to the midwives ability to use the ‘back’ button was very simple; this facility was disabled. In addition, the programme was modified in order that decisions, once made, were immediately stored onto the database. This meant that, regardless of how the programme was halted or exited, the midwives’ decisions were stored and unchangeable. To allow midwives to access the study at the last point of exit, the ability to do so was included as one of the few functions enabled. The rollover facility for the cursor was also disabled to further reduce the scope for error. During the pilot study, modifications to the programme were ongoing, eventually resulting in a programme that was very tightly controlled with limited functions accessible by the participants.

3.3.9 Administering a computer-based study

At the outset, it was thought that the best method of administering the questionnaire and vignette study was to provide laptop computers to each participating labour suite. However, it soon became apparent that the administration of the study through the use of the four available laptop computers was not a feasible option for several reasons.

The intention was to recruit approximately 100 midwives to the study over a period of 6 months. This meant that the Research Unit laptop computers would

be utilized elsewhere for that period of time and, so, not available for other unit staff. It also meant that a nominated midwife in each area would be expected to take responsibility for the security of the laptop, which seemed unreasonable over such a long period of time, particularly as the implementation of the 12 hour shift pattern in many units effectively means that midwives are on duty only 2-3 days per week.

Another concern was the problem of availability and accessibility. As only one laptop computer would be available in each area, midwives might not always be able to work through the package when the laptop computer was available. And, that the laptop computer might not be available when the midwife had time to participate in the study. Furthermore, as most labour suites are extremely busy clinical areas, it was thought it would be unlikely that midwives would have sufficient time to become familiar with and complete the vignettes package when on duty, even with access to a 'pause' function.

As 'e-prime' can be used both off and online, the Research Midwife looked at the use of the internet by midwives and at developing a website exclusively for the study; accessible to midwives on and off duty. Following discussion with heads of midwifery at participating sites, it was determined that most potential participating midwives have internet access in clinical areas and, from a review of current literature, that many also have access from home (Loy 2001). With the easy accessibility and widespread availability of the internet, the problem of the utility and security of the laptop computers was solved by the decision to have the programme accessed online at www.thestorkstudy.stir.ac.uk; the website is now closed down.

This adaptation was straightforward as the software package used (e-prime) was designed to create on and offline programmes. This meant that midwives could take part in the study at a time most convenient to them; and no Research Unit laptop computers would be required. Following an application to the University IT department space was made available to host the STORK study website which would be tested during the pilot study. It was thought unlikely that there would be major security concerns as the website would be managed and protected by the university IT Department. However, this was an area that would be monitored by the Research Midwife to ensure the security and integrity of the website.

3.4 Online surveys

With the advent of the internet and its widespread use, it is now becoming increasingly popular as an innovative medium for conducting research.

3.4.1 Traditional survey methods

Traditionally, survey and questionnaire designs have used postal mail or the telephone to communicate with participants; response rates recognised as being one of the main challenges of this research method. Response rates of questionnaires mailed to the general population are likely to be less than 50% although response rates to recent postal questionnaires and surveys to midwives do vary (Edwards et al. 2002). Alexander et al. (2002), for example, reported a 100% response rate to their small survey. However, all participants (n=18) had previously completed a course at the university and were well known to the researchers. A larger postal questionnaire study (n=189) to all German midwives in one State reported response rate of 77% (Thyrian et al.

2006). Whilst a national survey through the Australian College of Midwives (n=1105) had a 32% response rate (Cantrill et al. 2003). Participant response rate, therefore, is variable and vulnerable to a variety of factors. Techniques such as personalised cover letters, attractive stationery and follow-up contacts can all lead to increased response rates (Edwards et al. 2002). Being known by the participants and having direct contact with them, instead of through a third party, can improve recruitment as shown by Alexander in 2002, though this may introduce an element of bias.

3.4.2 Internet access

Despite the ever increasing availability of the Internet, not everyone can access it or has the ability to use it. It is estimated that the number of internet users is only 20.3% (Internet World Stats 2008). Not surprisingly, it is the more developed European and North American countries that have the greatest Internet availability and accessibility. For example, in Europe, 46.8% of the population are estimated to use the Internet and in North America approximately 72.2% of the population access the Internet.

These rates are considerably higher than other parts of the world such as Africa, Asia, the Middle East and Latin America where Internet usage is 4.7%, 13.6%, 17.1% and 22.1% respectively (Internet World Stats 2008). Consideration of the geographical spread of potential participants is therefore vital when considering the utility of the Internet as a potential data collection tool. In 2001 Loy reported that over 77% of midwives in the UK had Internet access at home, whilst 55% had access at work. The majority of midwives questioned without Internet access at that time, planned to get connected within

a year (Loy 2001). As well as having access to the Internet, Wickham and Stewart (2001) reported that 75% of midwives in the UK regularly use it. With the development of Internet use in everyday life, the potential use of electronic methods as a research tool has grown significantly (Shannon et al. 2001).

There are three main ways in which electronic methods can be used as a research tool: sending a disk by postal mail; attaching a questionnaire to an email and using the World Wide Web (Internet) for on-line data inputting.

3.4.3 Electronic methods as a research tool

Disk by postal mail – This is the only method not relying on the use of the Internet. A computer disk containing the study questionnaire is sent by post to participants who then load the programme onto their own computer, complete the questionnaire and save the findings onto the disk which is then posted back to the researcher.

The advantages of this method are that the participant can be easily guided by the programme through the questionnaire and that it can include automatic skip patterns, so that depending on previous responses, participants can be automatically sent to the next relevant section. However, it is difficult to be sure of the participant's computer compatibility and technological capacity. Additionally, participants may be reluctant to load files from unknown sources (Bowers 1999); running the risk of downloading a 'computer virus'.

Survey via email - The increasing use of email has enabled the development of e-mail surveys. Typically, such surveys are either sent as an attachment, or contained in the body of the message (Duncan et al. 2004; Bradley 1999). Email surveys can be sent faster than their disk-post counterpart. They are

easy to complete and require little technical knowledge and skill. Some participants, however, may experience difficulty opening attachments, or be reluctant to do so again, for fear of receiving a computer virus. Email surveys have also raised concerns about their level of privacy, as the respondents' names are generally included, or identifiable in their email address (Shannon et al. 2001).

Survey via internet - To participate in an on-line study, participants are usually sent an email, or letter containing a link to the relevant URL address. Internet studies are advantageous as they can be anonymous and designed to include various methods of responding (check boxes, drop down lists, Likert scales), have a flexible design, guiding participants through the completion process and can include increased media options such as pictures, video and sound. Another distinct advantage of internet based studies is that the data can be automatically downloaded onto an electronic database. However, of each of the three methods discussed in this section, internet data collection requires the greatest degree of knowledge and technical ability to develop although its use by participants requires no greater lever of expertise than email survey.

Whilst free software packages exist for simple Internet surveys, a computer software consultant may need to be employed for more complex Internet site designs, with resulting cost implications. Participants may have anxieties regarding the confidentiality and security of inputting data using this method; although the security of the data, particularly if held on a university hard drive, is high. Technical difficulties, including web-browser operating systems incompatibilities and network errors can also cause difficulties (Kypri et al. 2004).

3.4.4 Methodological issues concerning electronic survey methods

Although the decision to present the STORK Study online had been considered earlier, several areas were examined closely prior to this decision being made final.

Data consistency and security - Medlin and Whitten (2001) found no significant differences between the consistency of data retrieved from both mail and Internet methods. However, electronic studies have a slight advantage as controls can be placed on them to ensure question completion. For example, in the STORK Study, every question in the questionnaire had to be answered before it could be submitted by the participant. If a response was omitted, the participant was prompted to answer the missing question, which was displayed on the screen.

A great deal of consideration was given to maintaining the security of the data stored on the Internet site. The data from the STORK study was held on a University website which was extremely secure. However, feedback from website monitors stated that, even though the STORK study was innocuous and of minimal value, several attempts were made to hack into the website and study databases, all of which were unsuccessful. Such practices highlight the importance of having appropriate Internet security.

Recruitment rates and response times - When Medlin and Whitten (2001) compared email and postal mail surveys, a higher rate of response for postal mail was discovered. The response rate for email surveys was 24.53% compared to 30.11% for mail surveys. Interestingly, Kypri et al. (2004) carried out an Internet based survey of college students and closely followed up

potential participants, resulting in a final response rate of 82%. However, such a high response rate is unusual.

Eun-ok & Wonshik (2004) reported on the recruitment experiences of three separate nursing Internet studies and found that recruitment of participants in Internet studies was as low as 2%; however their use of publicly accessible email addresses, as a recruitment strategy, and their specific target populations (international oncology nurses, Asian midlife women and cancer patients) probably adversely affected their recruitment.

Of note, however, was the high rate of completion of Internet surveys following the participants' initial log on to the research website (95%) (Eun-ok & Wonshik 2004). Such a completion rate suggests that it is vital that potential participants are encouraged to log onto the study website and consideration should be given to developing an appropriate incentive (Eun-ok & Wonshik 2004). Finally, avoidance of major holiday periods appears advantageous in maintaining recruitment and completion of Internet studies (Eun-ok & Wonshik 2004).

Medlin and Whitten (2001) found that electronic methods elicited a faster response from participants. Email participants responded in an average time of 2.54 days while it took postal mail respondents an average of 11.85 days to respond. This is an important issue to consider if the period of data collection/recruitment is limited.

Cost - Although the initial set-up costs of an online study can seem expensive because of the cost of software packages and IT support, these costs can often be offset by the reduction in printing costs. Whilst free and low cost Internet survey packages do exist for very basic needs (e.g. www.surveymonkey.com),

more sophisticated studies such as the STORK study require expert assistance to design, develop and manage. Such expertise requires cost expenditure, but this initial outlay should be offset against the savings the use of Internet surveys bring through the significantly decreased use of stationary, postage and researcher time used for administration and data entry.

3.4.5 Conclusion

Collecting data via the Internet provided the STORK study with a greater degree of control of the data collection process, a factor that was crucial in the design of the study. Examples of this included controlling the levels of access that participants had to the survey, specifically that participants were not able to move through the vignettes until they had completed each stage and that, once completed, participants could not go back to amend or review previous responses. Such control of data collection is not achievable using traditional paper survey methods. Another example of greater control is the immediate entry of data from participants' responses to a background database which automatically stores and backs up data. This both saves valuable time spent by researchers in data entry and ensures the accuracy of the entered data by removing the potential for data miss-entry and reducing the time and necessity of cleaning manually entered data by researchers.

And, although initially expensive to employ an IT professional, this cost was easily offset by the use of the internet as there was very little financial outlay for stationery and postage and no time budgeted for data entry. The use of an online survey is clearly indicated when the population has readily available Internet access and where controlling the process of data collection is required;

as such control cannot be achieved in through traditional survey and questionnaire implementation.

3.5 Implementation

Following successful piloting of the questionnaire and vignettes as a computer package, the STORK study was implemented.

3.5.1 The sample and setting

The target group for the STORK Study were midwives practising in urban and rural settings in Scotland, from experienced midwives to inexperienced. A purposive sample of 100 midwives in total would be required to be recruited to the study (see statistical analysis section). As the study was exploring midwives' intrapartum decision making, only those midwives currently working within the labour suite were eligible for participation. Midwives currently working in other areas were not eligible for participation so did not receive study information and were not recruited. Monitoring of recruitment was undertaken through scrutiny of demographic data requested on the questionnaire. This analysis was to ensure that adequate numbers of midwives were being recruited from both urban & rural areas with a range of experience.

Although a strategy to include additional health board areas if the overall number of midwives recruited to the study fall short of the 100 required, no strategy was in place prior to study implementation if the numbers recruited were found to be biased towards urban or rural settings, experienced or inexperienced midwives. Recruitment issues will be discussed in chapter 5.

The setting for this study was the labour suite in the maternity units of four Scottish Health Board areas. Initially, it was anticipated that sufficient numbers of midwives would be recruited from two Health Board Areas. However, as is detailed in Chapter 4.1 an additional two Health Board areas were approached and invited to participate. Each of the Health Board areas had one or more Consultant Led Units, CLUs, and at least one associated Community Midwifery Unit, CMU. The CLUs were either teaching hospitals in large urban areas or district general hospitals in semi rural areas. The CMUs all provided midwife managed care and were all stand-alone (i.e. geographically distant from their associated CLU), located in small towns or island settings.

3.5.2 Ethical approval and site access

The study had MREC approval (Ref No. 05/S1401/44). Prior to implementation of the STORK Study, Heads of Midwifery in suitable Health Board areas in Scotland were approached to determine those who were willing to participate in the study. Each area had the required CMU and CLU. The response to the invitation to participate was very positive, all agreeing at the outset to future involvement. Permission for access was granted by the Head of Midwifery of each participating site. Initially meetings were arranged with the Heads of Midwifery in two Scottish Health Board areas to discuss the STORK Study. A presentation by the Research Midwife provided a detailed explanation of the study whilst copies of the letter of invitation, midwives information leaflet and consent form were made available (appendices 9, 10 & 11). Following this opportunity to examine the study documentation, the Heads of Midwifery were given time to discuss the practicalities of implementing the study locally, as well as given time to discuss any concerns. No objections were raised and each

Head of Midwifery consented to participation in the STORK Study. Following successful applications to the R&D Departments the Heads of Midwifery were again approached to plan a strategy for recruitment of midwives to the study.

Arrangements were made for the Research Midwife to attend meetings of senior midwives in each participating area; presenting and promoting the study. Early organisational plans were then made, taking into account the particular needs of each area. Broadly speaking however, study implementation was very similar across all maternity units. Each senior midwife agreed to distribute the study packs containing a letter of invitation, study information, consent form and prepaid envelope, to the midwives in their particular area.

3.5.3 The process of recruitment

Study packs were to be made available for all midwives providing intrapartum care in the participating sites; 200 packs were distributed between all labour suites, enough for every midwife to participate if they wished. Additional packs were available if required. Posters designed specifically for the STORK Study were posted in each of the clinical areas inviting midwives' participation, detailing the location of the study packs and giving contact details of the Research Midwife.

Each midwife had the opportunity to pick up a study pack from the labour suite. If, having read the study information, she wished to participate she signed the consent form and returned it to the Research Midwife in the pre-paid envelope provided. On receipt of the signed consent form, the Research Midwife issued a unique study number and website navigation instructions (Appendix 12); this was posted to the participant. When the participating midwife logged onto the

STORK Study website, the Research Midwife could track the progress of her participation by monitoring the databases storing the midwives' responses. By using this information it was possible to monitor how many of the midwives, who had consented to participation, had logged onto the website and completed the questionnaire, the vignettes or both. The confidentiality of the participants was maintained as each midwife could only be identified by her unique study number. The details of who had been allocated each number was known only to the Research Midwife and stored in a securely locked cabinet with no general access. The study was implemented in the participating maternity units for a period of seven months.

3.5.4 Statistical analysis

The main aim of the STORK Study was to explore whether midwives' decision making during labour care was affected by the midwives' own attitude to risk. Specifically, whether midwives who scored highly on risk propensity would delay making a referral for medical assistance compared to those who scored lower. A secondary aim was to explore whether years of clinical experience or location of practice had an effect on midwives' timing of decision to refer.

A sample size of 100 was required. This would allow the detection of a small to medium effect size (0.25) with a power of 0.80 and alpha set at 0.05. A correlational analysis will be carried out between total risk scores (as assessed by the questionnaire) and midwives' referral scores (as assessed by the timing of referral in the vignettes). An analysis of variance will be conducted between groups for experienced versus inexperienced midwives and midwives practising in Consultant versus CMU settings.

3.6 Research hypotheses

1. Midwives will vary in their general risk propensity, attitudes towards risk and personality traits as assessed by scores on a questionnaire developed to measure risk propensity, attitudes towards risk and personality.

2. Midwives risk propensity scores will be related to the timing of their decisions to seek medical assistance or transfer women to medical care during labour (transfer decisions).

3. ‘Referral/transfer’ decisions will be related to the experience of the midwife and the type of maternity unit in which she practices.

Chapter 4 - Results

Results

During the STORK Study, it was hypothesised that midwives would vary in their general risk propensity, as assessed by scores on a standardised measure of risk propensity. We also hypothesised that midwives' risk propensity scores would be related to the timing of their decisions to seek medical assistance or transfer women to medical care during labour and that these referral decisions would be related to the experience of the midwife and/or the type of maternity unit in which she practices.

Data from the questionnaire were analysed and, from that analysis, a 'risk score' was calculated for each participant. A 'referral score' was then calculated for each participant following analysis of the timing of the midwives' referral decisions. Correlational analyses were undertaken to examine the relationship between the midwives' risk scores and the timing of their decisions to refer.

4.1 Recruitment

Analysis of the numbers of midwives recruited from each hospital was undertaken by examining signed consent forms. This scrutiny confirmed that there was a relatively equal representation from each of the participating Health Board areas. Analysis of midwives demographic data confirmed that there were almost equal numbers of midwives recruited from urban and rural settings consenting to participation. It was noted, however, that more experienced midwives than inexperienced (by STORK Study definition) had been recruited.

Early in the recruitment process, it became apparent that, although many of the midwives who had consented to participation from the two Health Board areas initially approached were completing the study, the overall number returning signed consent forms were falling short of the sample required. It was decided that additional units would be invited to participate in order to recruit 100 midwives. The Heads of Midwifery in another two Health Board areas with CLU and CMU were approached to discuss study participation; both readily agreed and the STORK Study was implemented as before with another 200 study packs being issued. In all, 18 maternity units in four Health Board Areas in Scotland participated in the study.

Various strategies were employed by the Research Midwife to improve completion rates. Each signed consent form was dated upon receipt and filed chronologically. If the study was completed within two weeks, no contact with the midwife was made. As most participants had provided email addresses, the Research Midwife contacted those midwives who had consented but not completed within this two week period; thanking them for consenting to participate and urging them to complete the study. Two weeks after the 1st reminder email, another was sent to those who had yet to complete. If there was no response to the 2nd email, a letter was posted to the midwife at the contact address she had provided.

This two-weekly reminder continued throughout the recruitment phase; ultimately proving quite successful. However, as it was noted early in the process that there was a more favourable response to the written reminders as opposed to those sent by email, it was decided to send written reminders after only one email had been sent. Written reminders were also sent to those

midwives who had completed either the questionnaire or the vignettes but not both. These reminders again thanked the midwives for their participation and detailed which part of the study remained to be completed. As before, these reminders were sent two-weekly during the recruitment phase.

Two weeks before the study website closed, as a final measure to encourage recruitment, a letter was sent to all midwives who had consented to, but had not completed the study; informing them that this was their last opportunity to take part.

4.2 Response rates

Recruitment continued for seven months. In that time, 147 midwives consented to participation. 112 (76.19%) of these midwives logged onto the website and commenced the study. 102 (69.39%) midwives completed both the questionnaire and the vignettes, whilst 7 (4.76%) completed one or other. 3 (2.04%) midwives withdrew their consent and 35 (23.81%) midwives did not access the website at all (Table 1).

Of the three midwives who withdrew their consent, only one midwife discussed her reason for doing so. The reason cited was her concern regarding the implications of making a 'wrong' decision; would there be repercussions from her manager if a mistake/wrong decision was made? Despite reassurances that no 'wrong' decisions could be made in this study, and that the participants' responses were completely confidential, this midwife declined to participate. Implications of wrong clinical decisions being made will be explored in the discussion.

During the analysis of the respondents' characteristics it became apparent that many more experienced midwives, determined by the study definition (> 2 years in practice) were being recruited compared to inexperienced midwives. As stated earlier, a strategy had been planned and implemented when an insufficient number of midwives consented to participation (a further two Health Board areas were included), however no such strategy had been considered in relation to the numbers of experienced and inexperienced midwives. The issue of the experience will be reviewed further in the discussion in chapter 5.

The sample that was available for analysis consisted of 102 midwives, 49 from urban settings and 53 from rural settings. Experienced midwives constituted 89% of the sample.

Table 1 - Response rates

Midwives	**n**	**% of 147**
Consented	**147**	**n/a**
Logged on	112	76.19
Complete	102	69.39
Incomplete	7	4.76
Withdrawn	3	2.04
Not logged on	35	23.81

4.2.1 Timing of response

42 (41.18%) of the participating midwives completed the study within one week and a significant number (66 = 64.72%) had completed by three weeks. Study completion times by the rest of the midwives ranged from 4 weeks to 27 weeks

(Table 2). As expected, the midwives who took longer to complete the study were the midwives who were sent most reminder letters. Two midwives responded to the final reminder letter sent two weeks before the conclusion of data collection giving a total sample of 102 participants.

Table 2 - Timing of response

Weeks to completion	n (midwives)	%
1	42	41.18
2	12	11.77
3	12	11.77
4	7	6.86
5	7	6.86
6	5	4.90
7	2	1.96
8	2	1.96
9	4	3.92
11	1	0.98
12	2	1.96
13	1	0.98
15	1	0.98
16	1	0.98
18	1	0.98
27	2	1.96
	102	100%

A final recruitment rate of 69.39% was achieved

4.3 Data Analysis

All data were checked for underlying assumptions of normality; as data were not normally distributed non–parametric tests were used. A referral score was calculated for each midwife by calculating total and mean of the referral point (1-6) for each midwife (a score of 1 would be awarded if the midwife referred at point 1; a score of 6 if she chose not to refer at all). The minimum possible referral score was 5 if the participant referred at point 1 for each vignette, and a maximum possible score would be 30 if the participant chose not to refer at all. Midwives also responded to a questionnaire; developed from two existing validated measures assessing risk propensity and attitudes towards risk; a questionnaire which also included the Big 5, a tool used by psychologists to explore domains of personality. From analysis of the data, a risk score was calculated for each participant.

A correlational analysis was carried out between total risk scores and midwives' referral scores using Spearman's Rho. An analysis of variance was conducted using Mann-Whitney U test between groups for experienced versus inexperienced midwives and midwives practising in consultant versus CMU settings. As only 11 midwives were ultimately classed as inexperienced using the study definition (≤ 2years), a correlational analysis was also conducted between years of experience and referral score.

4.4 Characteristics of participants

Maternity units in four Health Board areas agreed to participate in the study. Within these Health Boards there were five CLUs and 13 CMUs. Overall 400 study information leaflets were distributed across the four Health Board areas. One hundred and forty seven midwives returned study consent forms and were sent study website access details and a personal study number, 112 midwives (76%) logged on to the study web site. Three midwives subsequently withdrew, and a further seven only completed part of the study. Overall 102 midwives completed all parts of the study. Table three describes the characteristics of the 102 midwives who participated.

Table 3 - Characteristics of participants

Characteristic	Median	Range
Age	42	*18-57
Years in practice	16	<1-35
Area of Practice	n	%
Consultant led unit	49	48
CMU	53	52

* One 18 year old student midwife requested study information and expressed a desire to participate in the STORK Study. This request was granted. This decision will be discussed in Chapter 5.

4.5 Midwives' referral point

Analysis of data on referral point of midwives for each vignette demonstrated that midwives chose to make a referral at a range of different points across each of the vignettes (Table 4). In addition, analysis of the midwives' total

referral scores (Table 5) demonstrated that a range of scores were obtained. A very small minority of participants referred consistently early (4%), referring at time points one or two of each vignette (referral scores ≤10), and an equally small minority participants referred consistently late (referral scores 26-30). The majority of participants (92%) made variable referral decisions with no obvious consistencies. The median total referral score was 20 (range 6-28).

Table 4 - Range of referral points for vignettes

	Referral point n (%)											
Vignette	1		2		3		4		5		6	
1 (n=102)	12	(12)	12	(12)	13	(13)	9	(9)	36	(35)	20	(19)
2 (n=101)	1	(1)	2	(2)	34	(34)	20	(20)	24	(24)	20	(20)
3 (n=101)	10	(10)	4	(4)	43	(42)	37	(37)	7	(7)	0	
4 (n=103)	4	(4)	8	(8)	30	(29)	14	(14)	40	(39)	7	(7)
5 (n=103)	12	(12)	3	(3)	2	(2)	9	(9)	62	(60)	15	(14)

Table 5 – Midwives' total referral scores*

Total score	n =102	%
≤10	4	4
11-15	12	12
16-20	36	35
21-25	46	45
26-30	4	4

*Although we opted to use the sum score rather than the mean, it is defensible to use either for subsequent analysis as the correlation between the mean and the sum score is almost perfect ($r = p<0.995$)

4.6 Midwives' risk scores

A wide range of risk scores were obtained. The median score for the Nicholson Risk Taking Index was 18 (range 12-39); and 15.50 (range 10-32) for the Franken Attitudes Towards Risk Questionnaire. These scores were highly correlated ($r = 0.61$ $n = 102$ $p<0.000$) and there was some association with conscientiousness and intellect. The midwives studied do appear to score mostly at the lower range of risk propensity compared to the sample studied in the risk scales used in this study (students and a diverse sample including finance, general management, sales & marketing and IT professionals) indicating that midwives appeared to be more cautious compared to workers in these groups. However, there was no significant correlation between midwives' referral scores and either scores on the Nicholson or Franken scales ($r = 0.100$ $p = 0.317$; $r = 0.100$ $p = 0.319$) (Table 6); demonstrating that, in the STORK Study, midwives' referral decisions are not significantly associated to their risk propensity.

Considering the Big 5 personality factors (extraversion, intellect, agreeableness, conscientiousness and stability), a significant negative correlation was found between the Franken risk scale and conscientiousness ($r = -0.316$, $p = 0.001$); and a significant correlation between the Nicholson scale and intellect ($r = 0.298$, $p = 0.002$). Conversely, there was no correlation between any of the Big 5 personality factors and midwives' total referral score (Table 6).

Table 6 - Referral scores and the Big 5

	Median	Range	Correlation with tot ref score	p
Nicholson	18	12-39	0.100	0.317
Franken	15.50	10-32	0.100	0.319
Big 5				
extraversion	33	19-49	0.015	0.878
intellect	33	21-47	-0.184	0.064
agreeableness	31	14-38	-0.066	0.509
conscientiousness	39	16-50	-0.179	0.072
stability	33	13-50	-0.014	0.889

4.7 Location and experience

There was no statistically significant difference between the referral scores of midwives working in Consultant Led Units or Community Midwifery Units (U = 1042.00 p = 0.085) and no correlation with years of experience and referral score (-0.083 p = 0.408) (Table 7). This finding indicates that in the STORK Study the setting in which a midwife practices, regardless of years experience, was not related to the timing of the decision to refer.

Table 7 - Summary data

Area of Practice	Median	Range
Consultant Led Unit	21	11-26
Community Midwifery Unit	20	6-28

From the outset of the STORK Study, although the differences in the timing of referral decisions of midwives practising in CMU and CLU were to be examined; exploring differences between Health Board areas was not a stated aim of the study. However, upon further analysis of the data, a highly significant difference did emerge between the Health Board areas, with midwives from one Health Board area making referrals for assistance at a significantly earlier stage that the other three areas, which were similar in their help seeking behaviour – (Chi square r = 15.57 P = 0.001) (Table 8). This was not explained by inexperience as midwives from this Health Board had significantly more years of experience than those from the other three areas. The significant group ANOVA was followed up by pair-wise post hoc Mann-Whitney U test which confirmed that the range of referral decision in Health Board 2 was significantly lower than the other three Health Boards.

Table 8 - Differences in Health Board areas

Health Board	1	2	3	4
Median	22	17	22	20
Range	15-28	6-25	10-25	16-26

Other factors, not examined in the STORK Study, must have influenced the timing of the referral decisions of the midwives in Health Board area 2. Possible influences will be explored in Chapter 5.

4.8 Conclusion

Midwives made a range of referral decisions although they were given the same case information in a series of vignettes. Referral scores were determined by the timing of the midwives' decisions to refer in a series of vignettes compiled from common intrapartum scenarios. A small minority of midwives referred consistently early or late, the majority made variable referral decisions. The timing of these referral decisions was not related to risk propensity or personality factors as assessed by validated measures. The timing of the referral decisions was not related to years of experience in practice or location of the maternity unit – urban or rural. As yet unknown local factors may influence individual decision making choices, as was suggested by midwives in one Health Board area referring at a significantly earlier stage. One major and worrying conclusion of establishing that a wide variation exists in the timing of midwives' referral decisions is that some of these decisions must be wrong. There is a real risk of a high negative impact for women and their babies; unnecessary intervention if the referral is too soon, potential maternal and neonatal morbidity or mortality if the referral is made too late or not at all.

Further research is urgently required to inform the current body of evidence.

Chapter 5 - Discussion

The STORK Study: discussion

The STORK Study aimed to explore midwives' attitudes towards risk, their decisions in relation to their judgements about deviations from normal during the course of a woman's labour and the timing of referral to medical staff. It sought to discover whether midwives' own attitude towards risk had an effect on their intrapartum decision making. It specifically sought information on whether those who scored highly on risk propensity would delay referral compared to those midwives who scored lower. It also aimed to explore whether years of clinical experience or location of practice affected the timing of the decision to refer.

Tools were designed specifically for the STORK Study; a questionnaire, which was developed from existing validated measures, which would give a risk and personality score and vignettes which presented five worsening case scenarios detailing the course of labour, which would give a referral score. Following extensive piloting of the tools the decision was made to present the STORK Study as an online survey, which allowed the data to be securely stored on the University server. The STORK study was presented as an original model in the use of the Internet as a medium for data collection and online survey method with midwives in Scotland. The use of vignettes was a new and innovative approach in midwifery research and proved to be a valuable method of eliciting midwives' responses in relation to intrapartum decision making and personality. In addition, many participants in the pilot study, as well as the main study remarked that they had enjoyed participating as it was such a novel approach.

Correlational analyses were carried out to identify the relationship between total risk and personality scores and total referral scores. An analysis of variance was conducted between groups for experienced versus inexperienced midwives practising in CLUs versus CMUs and further correlational analysis was conducted between years of experience and referral scores.

The results of the STORK Study showed that, despite being presented with the same information, midwives made a wide range of referral decisions. There was no correlation between referral scores and measures of risk, personality or years of experience. No statistically significant difference between the referral scores of midwives working in CLUs or CMUs was found. However, a significant difference did emerge between the Health Board areas, with midwives from one area making referrals at a significantly earlier stage. It is interesting that maternity services in this area had experienced several high profile adverse events prior to this study; possibly impacting on the midwives' timing of referrals.

5.1 Sample

A sample size of 100 was required in order to detect a small to medium effect. Recruitment to the STORK Study was good with 102 midwives competing both questionnaire and vignettes package online. Three midwives withdrew their consent prior to participating; with one midwife expressing great concern over the implications of making a wrong decision. Despite reassurances that confidentiality would be maintained, this particular midwife could not be reassured that there would not be repercussions with her local hospital management, if her (wrong) decisions were made known. Interestingly, this

midwife was from the Health Board area which referred significantly earlier; this finding will be discussed later.

5.1.1 Experience vs. inexperience

Following consultation with midwives with varying levels of experience (up to and including consultant level midwives); it was agreed that midwives practising for 2 years are generally regarded as experienced. A model of practice development currently employed in many maternity units involves newly qualified midwives undertaking a period of practice in several clinical areas; usually involving placements in the antenatal/postnatal wards, labour suite and, in some cases, the neonatal unit. This period of consolidation allows the newly qualified midwife to develop the necessary skills and experience to become a competent and confident practitioner. The length of time spent in each clinical area is dependent on the skills and knowledge displayed by the newly qualified practitioner.

In Scotland, this period of consolidation by newly qualified midwives is supported and encouraged by participation in the formal NHS development programme known as 'Flying Start' (www.flyingstart.scot.nhs.uk). This is a twelve month programme whereby newly qualified nurses, midwives and allied health professionals, supported by a mentor, are encouraged to develop the necessary skills to 'make the transition from student to a qualified, confident and competent practitioner in NHS Scotland' (Flying Start 2008).

As the NHS anticipate that the newly qualified midwife will have become a confident and competent practitioner by the end of Flying Start, using two years or less as the definition of 'inexperienced' in the STORK Study does appear to

be an appropriate cut off point. This time allows the practitioner to complete the Flying Start Programme and to gain additional clinical experience in a variety of settings.

In the STORK Study, however, although the definition of experience and inexperience was determined at the outset, the actual detail of how much experience of intrapartum care each participant has was unknown; the criteria stated that the participant should be a midwife currently providing intrapartum care but did not specify how much intrapartum experience was required. For example, although the midwife has three years midwifery experience, she might only have six months labour ward experience.

5.1.2 The sample characteristics

Although the intention was to recruit an equal number of experienced and inexperienced midwives to the STORK Study, the majority of midwives recruited were experienced (over 90%) as determined by the STORK Study criteria; a midwife qualified for two or more years currently providing intrapartum care. And, although a strategy was in place to address the situation if the overall numbers recruited fell short of the sample required, no such strategy existed if more experienced than inexperienced midwives were recruited.

However, the sample actually recruited to the STORK Study was fairly representative of the current midwifery population. Over 81% of midwives currently practising in Scotland are over 35 years old (ISD 2008), with the average age of a new student midwife now 29 years. In effect this means that, in Scotland, the majority of midwives are older than 35 years and are likely to have at least 3 years experience. In the STORK Study the median age of the

participants was 42 with 16 years midwifery experience. ISD workforce statistics suggest that a sample of 100 midwives would have included 81 ‘experienced’ midwives with 19 midwives meeting the criteria of ‘inexperienced’ using the study definition. This emphasises the fact that, unless specific measures were in place to ensure equal numbers of experienced and inexperienced midwives were recruited, it was unlikely that the desired sample would be achieved.

Whilst the age and experience of the STORK Study sample resemble that of the wider population, in future studies, strategies to monitor recruitment must be considered prior to study implementation if a stratified sample of experienced and inexperienced midwives is required.

In the STORK Study, although an analysis of variance was conducted between groups for experienced versus inexperienced midwives and midwives practising in consultant versus CMU settings; only 11 midwives were ultimately classed as inexperienced using the study definition (≤ 2 years). As such, we must be cautious when reporting the results as conclusions regarding similarities or differences between experienced and inexperienced midwives cannot be drawn from the STORK Study sample.

5.1.3 Including a student

During the recruitment phase of the STORK Study, one student midwife asked to participate. She was issued with a study number and instructions on how to navigate the STORK Study website. When the data were analysed, with and without the student’s responses, the difference in the results was negligible. For example, with or without the inclusion of the student’s data, the median age of the midwife remained unchanged at 42 years and the median number of

years in practice remained at 16. The median point of referral for all five vignettes was unaffected by the student's inclusion. This pattern continued as other data were being analysed. The decision was made to include the student's data. In retrospect, the decision should have been to exclude the data, as she clearly did not meet the criteria for participation; a qualified practitioner providing intrapartum care.

5.1.4 Recruitment

Recruitment to the STORK study compares well with another similarly sized midwifery survey (Thyrian et al. 2006) and it was also higher than a previously reported midwifery Internet study (Eun-ok & Wonshik 2004) 77% and 3% respectively. The majority of the STORK Study participants completed the study within two weeks of returning their consent to participate. A minority of participants took over four weeks to complete the study tasks; however, their participation was supported and encouraged by us sending regular reminder letters. Such persistence was worthwhile as a final recruitment rate of 69.39% was achieved. The use of the internet as a medium for research proved most beneficial, as midwives from maternity units in more distant settings were able to participate in the study. This obviously has cost implications as many more studies could be undertaken without the need for extensive travel, accommodation and consumables and the possibility of a wider population reached. Many midwives from the more rural locations were some of the most enthusiastic participants, with many taking the time to give very positive feedback. They felt that, as they were further away from urban centres, that they were largely an 'untapped resource'.

Although most of the participants indicated widespread satisfaction with the internet as a research medium, it was the least favoured option when it came to reminder letters. Anecdotal evidence from the participants suggests that this might be for one of two reasons. Many of the midwives complained that email inboxes were full of junk emails, and that sometimes the STORK Study reminder letters got 'lost' or simply forgotten, whilst others said they preferred getting an actual letter through the post; that it was a more tangible reminder. The potential cost re stationery and postage should be considered and perhaps factored in to future internet studies as this finding might be common to web-based studies.

5.2 Methods

The methods used in the STORK Study were a questionnaire developed from existing validated measures of attitudes towards risk and the Big 5 questionnaire, and a series of vignettes depicting worsening scenarios of women in labour.

5.2.1 The questionnaire

The choice of the measures used in the development of the questionnaire was largely influenced by the advice of a psychology expert. However, the existing tools used to compile the questionnaire are widely used and generally accepted as valid measures of personality and attitudes towards risk. Although many measures of assessing personality exist, many are based on the 'Big 5'; informing the decision to include it in the STORK Study. In their review of instruments that measure risk propensity Harrison et al. (2005) describe and discuss fourteen for use in the health setting. Several of these measures may

have been equally appropriate, as they are very similar to what was used in the STORK Study.

As the two measures of attitudes towards risk are widely used to assess the aspects of risk preferences the STORK Study was exploring, their inclusion would also seem to be appropriate. Again, as with the Big 5, other measures do exist which assess attitudes towards risk (Zuckerman 2000; Zuckerman & Kuhlman 2000; Costa & McCrae 1992). Some of these are very similar in format to the measures used in the STORK Study, using similar statements and scoring systems. However, there is little evidence to suggest that these would have been more appropriate then the measures used.

One area which must be addressed in relation to the use of the questionnaire is the issue of confidence in a measure which relies on self reporting. There is no way to guarantee that the responses of the participants are accurate or candid. However, as confidentiality and anonymity are guaranteed, there is no reason to believe that the participants made invalid responses.

5.2.2 The vignettes

Although widely used in other disciplines (Wilks 2004; Lanza & Carifo 1990; Barter & Renold 1999) the use of vignettes in the STORK Study was innovative in midwifery research. Vignettes appear to be an appropriate means of exploring areas of midwifery practice that would be impossible to study by other means. For example, it would be unethical for the researcher to observe a worsening case of pre-eclampsia without intervening if the midwife failed to make a timely referral to medical staff.

As the researcher was not present during administration of the vignettes in the STORK Study, several issues must be acknowledged. Firstly, there is no way of knowing who completed the vignettes. However as the midwives were issued with a unique study number and had to choose a password known only to them, there would have had to be a deliberate decision to allow participation by another individual. As with the questionnaire, confidentiality and anonymity was guaranteed, so there would appear to be little value in the participants misrepresenting the timing of their decisions to refer.

There is also no way of knowing how long the participants took to complete the vignettes package. In the labour ward, judgements and decisions are often made very quickly, in response to the condition of the woman or fetus. In the STORK Study, the participants could take any length of time to consider their decision. The pause and exit functions also allowed midwives to participate and complete the vignettes when it was convenient for them to do so. So participants were afforded a length of time to make their judgements and decisions which may not have existed in a real intrapartum situation.

In reality, individuals have the opportunity to look back at their decisions, consider the outcomes and are able to reflect on the appropriateness of the decisions made. In the STORK Study decisions, once made, were unchangeable and the outcome of those decisions unknown. There was also no way that the STORK Study participants could know the consequences of the timing of their referral decisions. The issue of the validity of the vignettes should be considered when reporting the results.

Conversely, a major strength of the vignettes in the STORK Study was that the participants were all reacting to identical case factors, something that could not be engineered in reality as, even in what seem like identical cases, there are always subtle differences.

5.3 STORK Study hypotheses

In chapter two three hypotheses were made regarding general risk propensity and decision making behaviours of the participating midwives. Each hypothesis will be discussed in the following sections.

5.3.1 Hypothesis 1

Midwives will vary in their general risk propensity, as assessed by scores on a standardised measure of risk propensity.

Analysis of the data supported the hypothesis that midwives will vary in their general risk propensity. However, compared to other occupations such as the Investment Bank traders studied by Nicholson et al. (2005), midwives scored at the lower end of the risk propensity scales (midwives' risk scores ranged from 12 to 39 with a mean score of 19.6; the range of the traders' risk scores was 12 to 56 with a mean score of 27.53; minimum score possible 12 maximum score 60). Nicholson concluded that risk propensity is closely linked with age and sex and with career related risk taking; determining that the most risk taking group were young males (Nicholson et al. 2005). He describes an age effect, suggesting that individuals become more risk averse as they become older, a finding supported by MacCrimmon and Wehrung (1990). It is perhaps unsurprising that, as the midwives recruited to the STORK Study were older

and female, their risk propensity scores would be at the lower end of the scale considering the effect of age and sex.

That midwives are more risk averse is, possibly, a reassuring finding, as it would be of concern if midwives were found to be extreme risk takers considering their level of responsibility. Much has been published regarding the personality and career choice and career success, and it is suggested that particular personality types are drawn to particular professions (Gelissen & Graaf, 2006; Hartung et al, 2005; Rogers et al, in press; Rosenbloom et al, in press). With the average new student midwife now a 29 year old woman, it is possible that the midwifery profession attracts individuals with particular attributes; female, mature and generally risk averse.

It would be interesting to conduct future personality assessments of midwives in relation to other areas of midwifery practice to gain further insight into 'who' midwives are.

5.3.2 Hypothesis 2

Midwives' risk propensity scores will be related to their decisions when to seek medical assistance or transfer women to medical care during labour (transfer decisions).

There was a wide range in risk propensity across the midwives who participated. A small minority of midwives tended to be early or late referrers, however there was no significant correlation between the midwives' total referral scores and their score on the risk taking scales, thus indicating that the decision to refer was not related to personal propensity for risk. The two risk scores did

correlate highly with each other and there was some association with conscientiousness and intellect. However, although the midwives were presented with identical case factors, it was interesting that there was such a wide range of referral decisions. If this is not explained by personal propensity for risk, other significant factor(s) must come into play.

A striking finding was the difference which emerged between the referral decisions of midwives in one Health Board area compared to midwives in the three other Health Board areas (whose decisions did not significantly differ), with midwives from this Health Board making referral decisions at a significantly earlier stage. This was not accounted for by years of clinical experience or personal risk propensity or personality factors, and suggests that local factors may explain much of the variance in timing of decisions to refer than intrinsic personality factors or specific case factors. Maternity services in this particular area had experienced a number of high profile adverse events in the time prior to this study and it is possible that this may have impacted on the midwives' decision-making choices; i.e. the availability heuristic.

As we saw earlier, the availability heuristic involves assessing the likelihood of an incident occurring depending on how easily past incidents come to mind. So, memories of clinical incidents that are recent and/or dramatic can be influential when making clinical judgements. It is possible that memories of recent adverse events had a significant impact on these midwives' intrapartum decision-making. Research, which would allow a deeper understanding of the thought processes of midwives when making referral decisions, is needed to add to what is already known regarding the use of the availability heuristic.

5.3.3 Hypothesis 3

'Referral/transfer' decisions will be related to the experience of the midwife and the type of maternity unit in which she practices.

There was no significant relationship between midwives' decisions about timing of referral for medical assistance and years of clinical experience, indicating that more experienced midwives did not consistently refer later. There was no difference between the midwives' decisions about timing of referral and clinical practice location. As was discussed earlier, midwives from one Health Board area, which included urban and rural maternity units referred significantly earlier than the others.

Interestingly, this contrasts with the finding of another study (Tucker et al, 2003), also using vignettes, which found that clinicians from more rural locations referred more frequently than those from less rural locations. However, in that study, the midwives and GPs were not caring for 'women' in labour. These vignettes described several common antenatal conditions for which the midwife and GPs had to make a diagnosis; with or without referral to a specialist hospital. It concluded that most midwives and GPs over-diagnosed the scenario; referring more than was necessary.

Midwives in the STORK Study were confronted by scenarios where timely decisions had to be made regarding women in labour, rather than whether or not a woman had a mild hypertension or urinary tract infection. It would be interesting to present the STORK Study vignettes to a similar population as the Tucker sample, to enable a closer comparison of the results.

5.4 Intrapartum decisions

In the STORK Study the midwives made a wide range of referral decisions. Although these decisions were made in a series of vignettes, it does raise some interesting issues. If such a wide range of referral decisions are made it must be assumed that some of these decisions are wrong; it cannot be both right to intervene early and to not intervene at all. Either there has been a wrong early intervention or a failure to intervene in time. This may result in a women being subjected to a series of unnecessary interventions or of being at an increased risk of a poor outcome if a required intervention is not made. In the STORK Study we do not know why the midwives made a wide range of referral decisions. It is possible that although the midwives' judgements on the unfolding scenarios may be similar, the threshold for action was lower in the midwives from the Health Board area which referred significant earlier. Midwives with a low threshold for action may intervene much sooner then her colleague with a much higher threshold (Dalgleish 2003). This model of decision making assumes that the midwife makes a judgement of the current clinical situation. If the assessment of the situation is above her threshold, she will take appropriate action; for example, make a referral to an obstetrician. If the assessment of the situation is below her threshold for action a referral would not be made.

Worryingly, it has also been suggested that midwives' decision making may be influenced by who is in a position of authority (Martin & Bull 2004). Although this is an issue requiring further study, it was not an issue considered during the course of the STORK Study as the external influences of the midwife in charge was not a factor. The implications of each these possibilities requires

consideration in relation to the mother and fetus, the midwife and the profession.

5.4.1 The mother and fetus

If the decision to intervene is made too early in the course of a woman's labour, there is the risk of the 'cascade of intervention' discussed earlier in Chapter 1. That is, if the midwife has decided to make too early a referral to the obstetrician, the woman may possibly be subjected to a series of unnecessary interventions. The decision to make an early referral is more difficult to question in retrospect as the outcome of the labour without the intervention is unknown. However, if there is a documented record of why the midwife decided to make the referral; the decisions may be identified and discussed. But, if the outcome is good for mother and baby, the decisions of the midwife may never be questioned; generally, only those cases with poor outcomes come under any detailed scrutiny.

On the other hand, if the midwife makes too late a referral (or fails to intervene), the woman and fetus are then at an increased risk of morbidity and mortality. This decision may be easier to question as the outcome is known. However, as was discussed in Chapter 1, we don't normally document what we don't do; therefore it is possible that the midwife's judgements informing the decision not to refer will also remain unknown.

In the STORK Study a wide range of referral decisions were made for each of the cases, however it is impossible to know which factors the midwives judged to be anomalous. If we do not understand why and how we make our decisions, how can we defend them? The STORK Study has allowed us to

dispel some of the existing myths regarding midwives intrapartum decision making; that place of work or years experience are strong influences on the timing of referrals to medical staff.

However, the STORK Study results do not allow us to examine the judgements which informed the timing of referral decisions. Further detailed research is needed to uncover and understand the judgement and decision making processes of midwives providing intrapartum care in order to ensure the best possible outcomes for labouring women and their babies.

5.4.2 The midwife and the profession

Although not an aim of the STORK Study, some interesting issues surrounding the culture of the labour suite in relation to midwives' decision making were uncovered during the literature review. Martin and Bull (2004) Chapter 2, suggest that midwives' decision making can be altered by the presence of a more senior midwife, that the authority of a senior midwife has more influence on the decision making process than either the judgement of the junior midwife or the wants and wishes of the women in her care. The results of their research also suggest that it is not the perceived knowledge of the senior midwife that influences the junior midwife's decision making, but her position of authority. This is concerning for several reasons.

As professionals, midwives should be providing care that is evidenced based; the same evidence which should be shared with the women in their care, to enable them to make informed decisions. If midwives are influenced by the authority of the midwife in charge, irrespective of her knowledge base, it is

possible that decisions will be based on the personal preferences of the midwife in charge rather than best evidence.

All midwives are professionally accountable to the NMC for the decisions they make; they have to be able to justify particular courses of action. They are also accountable to their employers for these decisions, as well as being held accountable in law. For a midwife to state events dictated a particular course of action, but that her judgement was influenced by the authority of the midwife in charge is quite unacceptable and indefensible, if the source of that authority was hierarchical and not evidential.

It was also suggested earlier in Chapter 2 that many midwives favour a type of decision making described as 'bureaucratic' (Porter et al. 2007). This describes a situation where there is a reliance on external sources of knowledge, e.g. guidelines, protocols and the traditions of experienced midwives. The least favoured option in this analysis of midwives decision making was described as 'collaboration with clients' (Porter et al. 2007:525). Porter's conclusions call into question the issue of advocacy, if the midwife is found to be basing her decisions on the authority of the senior midwife or protocols, which may not always meet the needs of the of the women in her care. If midwives are unable or unwilling to act as an advocate for the woman they are failing to meet the standards required by the NMC, employers and clients. Again, further research is urgently required to examine the influences and processes considered by midwives when making decisions on the care of the labouring woman. Only by careful examination of these processes and influences, will a deeper understanding of the complex nature of decision making be made known. Until

we can understand and discuss, with a degree of certainty, how clinical judgements and decisions are made we cannot facilitate, in either student or experienced midwife, the development of the clinical reasoning skills necessary to make effective decisions.

5.5 Limitations

The STORK Study was in effect, a laboratory based study. It sought to discover the relationship between the timing of midwives' referral decisions and their attitudes towards risk.

Vignettes cannot truly capture reality; there is no way of knowing if the midwives in the STORK Study would react or refer at the same time in the clinical area. However, we can know with certainty that the participants were presented with identical case factors; a situation that could not be manufactured in the labour ward.

There is also no way of knowing if the decisions were made with as much care and attention as those in reality. And there is no way of knowing how long the midwives took to make their referral decisions as the programme was designed to allow the participants to pause or exit at will. In the clinical area judgements and decisions are often made simultaneously, whilst in the STORK Study the participants were able to consider their referral decisions for an unspecified time.

As the researcher was not present when the midwives were participating in the STORK Study, there was no opportunity to ask why referral decisions were

being made; on which case factors were the midwives basing their judgements? As a result we cannot say that all midwives referring at the same stage in a particular vignette were prompted by the same case factors.

As the questionnaire sought information on a specific aspect of behaviour, attitudes towards risk; we can only say that, in the STORK Study, there was no relationship between risk propensity and timing of referral decisions. It is quite possible that other traits exert more influence on judgement and decisions than attitudes towards risk. Future studies, exploring other aspects of personality, might find that there are as yet unknown personality traits which impact on judgement and decision making.

5.6 Conclusion

Midwives did make a range of referral decisions although they were given the same case information; this was not due to risk propensity, personality factors, experience or location. Local factors may influence individual decision making choices as was suggested by the key finding that the midwives in one Health Board area referring at a significantly earlier stage. Further research is required to inform the current body of evidence.

5.7 Recommendations for future research

In the STORK Study one important finding was that midwives made a wide range of referral decisions. This is of great concern as some of these decisions must be wrong. As was discussed earlier, the decision to refer early and the decision to not refer at all, for the same case, cannot both be the correct decision. As a result many women and their babies may be at risk of unnecessary intervention and/or have an increased risk of morbidity and

mortality.

Another important finding in the STORK Study was that midwives from one Health Board area, which had been experiencing several adverse clinical events, made significantly earlier referral decisions. It is possible likely that these events impacted on the timings of the decisions to refer. This is perhaps, an example of the use of the availability heuristic; recent dramatic events having an impact on present judgements and decisions. It is also possible that the midwives threshold for action has been lowered by recent adverse events; they are less prepared to 'wait and see' and so make an earlier referral decision.

The results of the STORK Study suggest that decisions are influenced by previous experiences, that perhaps the availability heuristic is employed when attempting to understand and make sense of the current situation.; the midwives' threshold for action altered by past events. Further research using a 'think aloud' technique would allow a deeper understanding of the thought processes which come into play when the midwife is faced with making a decision regarding referral to medical staff. A series of vignettes, as in the STORK Study, could be presented to the participant with the researcher present. As the midwife is making the decision to refer or keep, she can describe her reasons for doing do. By disclosing the judgements that inform the decision to refer or not, it would enable the process to be more fully understood.

5.8 Importance to NHS (a clinical view)

The importance of the study is that it questions assumptions about midwives' decision making being influenced by intra-personal 'riskiness', place of work or length of service and suggests that the timing of referral decisions may be

influenced by previous experience of similar events. However the link between local organisational culture and decision making is important and highly relevant for NHS and service managers and warrants further research. This study identified inconsistency between midwives in their referral decisions and this is of clinical importance. This study did not address the issue of whether midwives made ‘correct’ decisions, however, inconsistent decisions must be wrong at least some of the time. Referring unnecessarily to obstetric care may result in harm due to unnecessary medical intervention; the possible cascade of intervention will have an impact on women's health and that of their baby's/families, as well as financial costs.

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Appendices

Appendix 1 - Example of emergency protocol

FORTH VALLEY ACUTE OPERATING DIVISION
WOMEN & CHILDREN'S UNIT

1

RUPTURE MAY OCCUR WITH NO

Uterine Rupture may occur without any predisposing factors – virtually unknown in prims

SIGNS & SYMPTOMS OF UTERINE RUPTURE

The most common scenario in which uterine rupture may arise is previous caesarean section in labour

- **Fetal heart rate abnormalities**
- **Sudden onset of severe abdominal pain- epidural analgesia does not usually mask the pain of uterine rupture**
- **Sudden cessation of uterine activity**
- **Maternal tachycardia, hypotension**
- **Vaginal bleeding and/or haematuria**
- **Presenting part no longer in the pelvis, may be confirmed on VE**

TRANSFER PATIENT TO THEATRE URGENTLY

There is likely to be major obstetric haemorrhage so mobilise the Massive

Obstetric Haemorrhage Protocol

5.8.1.1.1.1 FOLLOW ACUTE DIVISION MASSIVE HAEMORRHAGE PROTOCOL

Laminated action cards in theatre, emergency trolleys in labour ward & ward 19

MOBILISE ACUTE DIVISION MASSIVE HAEMORRHAGE PROTOCOL

5.8.1.1.1.2

5.8.1.1.1.3 EMERGENCY CALL FOR HELP

☑ **Call switchboard on 4444 informing them there is an major obstetric haemorrhage (use these words). Give them exact location of the patient, contact telephone number and a contact name for the named contact who will be the single point of contact responsible for liaison between switch board and all staff involved in clinical incident**

SWITCH BOARD WILL CALL

☑ **Obstetric Emergency Team, ask them to also contact Consultant Obstetrician and Consultant Anaesthetist**

☑ **Transfusion – biomedical scientist and consultant haematologist**

☑ **Porter to collect specimens and deliver blood**

RESUSCITATE

AIRWAY
BREATHING
CIRCULATION

5.8.1.1.1.4 RESUSCITATE

5.8.1.2

5.8.1.2.1.1 AIRWAY

☑ **Secure airway**

5.8.1.2.1.2 BREATHING

☑ **Oxygen by mask 15 litre/min by non-rebreathing**
☑ **Commence Pulse Oximetry**

5.8.1.2.1.3 CIRCULATION

☑ **IV access cannula x 2 (16G-grey) or as large a cannula as possible**
☑ **Obtain Bloods - Label correctly & send immediately**
☑ **Cross Match 6 units - pink tube**
☑ **Full Blood Count – purple tube**
☑ **Clotting Screen – blue tube**
☑ **Until blood available, infuse in turn (as rapidly as required): Hartmanns maximum 2 litres**

TRANSFER TO THEATRE URGENTLY

5.8.1.2.1.3.1.1.1 Gelofusine maximum 1.5 litres

☑ **If X-matched blood still unavailable once 3.5 litres of Crystalloid / Colloid infused:**

GIVE UN CROSS MATCHED BLOOD OWN GROUP as available OR if unavailable GIVE O NEG BLOOD – Ensure the patient does not have Significant Anti-Rh c

☑ **Obtain consent for caesarean section +/- hysterectomy**
☑ **Bleep 246 - General Theatre Co-ordinator to inform them that scrub nurse may be required, they will try to accommodate**
☑ **A urology / vascular surgeon may be required and can be called via switch board**

5.8.1.2.1.4 TRANSFER PATIENT TO THEATRE URGENTLY

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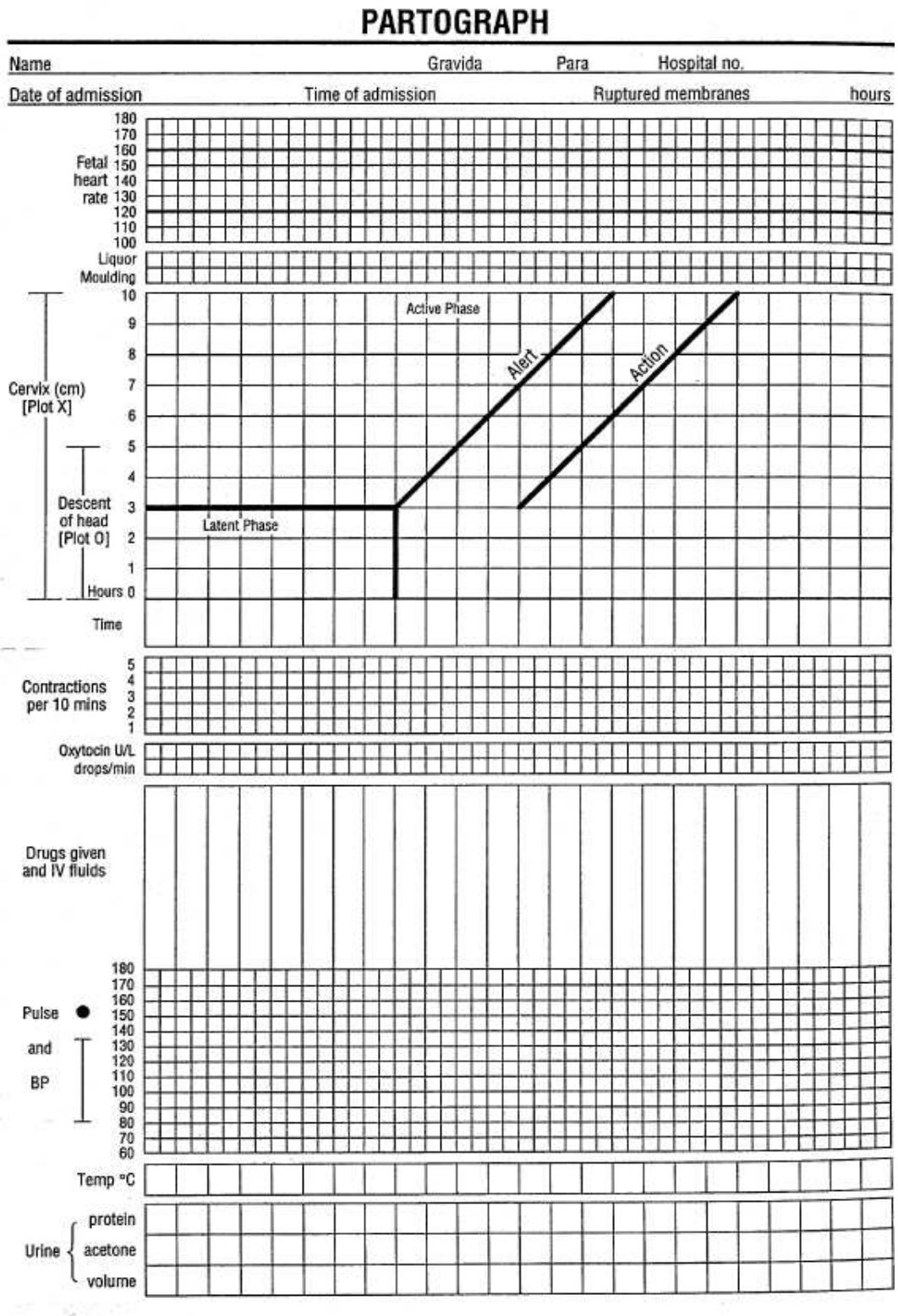
[redacted]

Appendix 2 - Partogram/graph



Appendix 3 – Nicholson's Risk Taking Index

Please could you tell us if any of the following have ever applied to you as an adult. Please answer both sections, 'Now' and 'In the Past'.

Please use the scales as follows:

1= never, 2=rarely, 3= quite often, 4= often, 5=very often

		Now					*In the Past*				
1.	recreational risks (*e.g. rock-climbing, scuba diving)*	1	2	3	4	5	1	2	3	4	5
2.	health risks (*e.g. smoking, poor diet, high alcohol consumption)*	1	2	3	4	5	1	2	3	4	5
3.	career risks (*e.g. quitting a job without another to go to)*	1	2	3	4	5	1	2	3	4	5
4.	financial risks *(e.g. gambling, risky investments)*	1	2	3	4	5	1	2	3	4	5
5.	safety risks *(e.g. fast driving, city cycling without a helmet)*	1	2	3	4	5	1	2	3	4	5
6.	social risks *(e.g. standing for election, publicly challenging a rule or decision)*	1	2	3	4	5	1	2	3	4	5

Appendix 4 - Zuckermann & Kuhlman questionnaire (short version)

Read each statement. If it is true or mostly true circle the 'T' and if it is false or mostly false circle the 'F'. It is important you respond to *all* of the questions, even if you are uncertain of your answer.

1.	**T**	**F**	I am an impulsive person.
2.	**T**	**F**	I often feel unsure of myself.
3.	**T**	**F**	I can't help by being a little rude to people I don't like.
4.	**T**	**F**	I like to keep busy all of the time.
5.	**T**	**F**	I am a very sociable person.
6.	**T**	**F**	I enjoy getting into new situations where you can't predict how things will turn out.
7.	**T**	**F**	I frequently get emotionally upset.
8.	**T**	**F**	When I get mad I say ugly things.
9.	**T**	**F**	I like to wear myself out with hard work or exercise.
10.	**T**	**F**	I tend to be uncomfortable at big parties.
11.	**T**	**F**	I prefer friends who are excitingly unpredictable.
12.	**T**	**F**	I tend to be oversensitive & easily hurt by thoughtless remarks & actions of others
13.	**T**	**F**	I have a very strong temper.
14.	**T**	**F**	When I do things I do them with a lot of energy.
15.	**T**	**F**	I tend to start conversations at parties.
16.	**T**	**F**	I often get so carried away by new & exciting things that I don't think of the consequences.
17.	**T**	**F**	I often think people are better than I am.
18.	**T**	**F**	If people annoy me I do not hesitate to tell them so.
19.	**T**	**F**	I like to be doing things all the time.
20.	**T**	**F**	At parties I enjoy mingling with people whether I already know them or not.
21.	**T**	**F**	I like 'wild' and uninhibited parties.
22.	**T**	**F**	I often worry about things that other people think are unimportant.
23.	**T**	**F**	I am always patient with others, even when they are irritating.
24.	**T**	**F**	I lead a busier life than most people.
25.	**T**	**F**	Generally, I like to be alone so I can do things I want without distractions.
26.	**T**	**F**	I would like to live a life on the move, with lots of change & excitement.
27.	**T**	**F**	I don't let a lot of trivial things irritate me.
28.	**T**	**F**	When people shout at me I shout back.
29.	**T**	**F**	I like complicated jobs that require a lot of effort and concentration.
30.	**T**	**F**	I probably spend more time than I should socializing with friends**.**
31.	**T**	**F**	I often do things on impulse.
32.	**T**	**F**	I often feel uncomfortable and ill at ease for no reason.
33.	**T**	**F**	When I am angry with people I do not try to hide it from them**.**
34.	**T**	**F**	I do not feel the need to be doing things all the time.
35.	**T**	**F**	I usually prefer doing things alone.

Appendix 5 - Franken's 'attitudes towards risk questionnaire'

Instructions: Indicate, using a 5 point scale, the degree to which each of the following statements describes you. Use the letter A if the statement is a very good description of you (like me) and the letter E to indicate it does not describe you at all (not like me). Use the remaining letters to indicate the varying degrees that the statement is like you or not like you.

Like me A……..B……..……C……..…..D…….……E Not like me

1. I like the feeling that comes with taking physical risks.
2. I like the feeling that comes with taking psychological or social risks.
3. While I don't deliberately seek out situations or activities that involve physical risk, I often end up doing things that involve physical risk.
4. I often seek out situations or activities that society disapproves of.
5. While I don't deliberately seek out situations or activities that society disapproves of, I often end up doing things that society disapproves of.
6. I often do things that I know my parents would disapprove of.
7. I often do things that I know some of my friends would disapprove of.
8. I often find that I am anxious or even scared of things I am about to do.
9. I often do things that would hurt my reputation.
10. I often do things that would jeopardize my reputation.
11. I often do things that could jeopardize my friendships.
12. I never let fear get in the way of my doing things.
13. I like the feeling that comes from entering a new situation.
14. I don't let what other people think prevent me from doing new things.
15. I like to risk large sums of money.
16. I would be willing to risk my life in order to receive 10 million dollars.
17. I consider myself a risk-taker.
18. Being afraid of something new often makes it more fun in the end.
19. The greater the risk the more fun the activity.
20. I like to do things that almost paralyze me with fear.
21. I really don't care what people think of what I say and do.
22. I do not let the fact that something is illegal stop me from doing it.
23. I do not let the fact that something is considered immoral stop me from doing it.

Some people don't actually take risks but think about them. The following questions pertain to how much you think about risks.

24. I often think about doing activities that involve physical risk
25. I often think about doing things that involve social risk.
26. I often think about doing things that might jeopardize my health.
27. I often think about doing things I know my friends would disapprove of.
28. I often think about doing things I know my parents would disapprove of.
29. I often think about doing things would arouse a great deal of fear and anxiety in me.
30. I often think about doing things that I know society would disapprove of.
31. I often think about doing things that are illegal.
32. I often think about doing things that are considered immoral.
33. I often think about doing things that would make me a lot of money.
34. I often think about doing things that would make me famous or notorious.

Appendix 6 - STORK Study questionnaire (final version)

Midwives Intrapartum Decision Making

Attitudes and Preferences Measure

This questionnaire asks about your attitudes and preferences. In the first part we are interested in everyday risk-taking. In the second and third parts we are interested in your personal attitudes and preferences.

Please take the time to answer all the questions. There are no correct or wrong answers. All information will be kept strictly confidential.

Once you have completed the questionnaire please seal and return it in the envelope provided.

Thank you for your co-operation.
Could you please take time to answer the following questions:

Age:	
Sex:	
Year of qualification as a midwife:	
Length of time in practice:	

PART ONE

Please could you tell us if any of the following have ever applied to you as an adult. Please answer both sections, 'Now' and 'In the Past'.

Please use the scales as follows:

1= never, 2=rarely, 3= quite often, 4= often, 5=very often

		Now					*In the Past*				
1.	recreational risks (*e.g. rock-climbing, scuba diving)*	1	2	3	4	5	1	2	3	4	5
2.	health risks (*e.g. smoking, poor diet, high alcohol consumption)*	1	2	3	4	5	1	2	3	4	5
3.	career risks (*e.g. quitting a job without another to go to)*	1	2	3	4	5	1	2	3	4	5
4.	financial risks *(e.g. gambling, risky investments)*	1	2	3	4	5	1	2	3	4	5
5.	safety risks *(e.g. fast driving, city cycling without a helmet)*	1	2	3	4	5	1	2	3	4	5
6.	social risks *(e.g. standing for election, publicly challenging a rule or decision)*	1	2	3	4	5	1	2	3	4	5

PART 2

Please indicate, using the 5-point scale, the degree to which each of the following statements describes you. Indicate 1 if the statement does not describe you at all (not like me) and 5 if it is a very good description of you (like me). Use remaining numbers to indicate the varying degrees that the statement is like you or not like you.

		Not like me				Like me
7.	While I don't deliberately seek out situations or activities that society disapproves of, I find that I often end up doing things that society disapproves of.	1	2	3	4	5
8.	I like the feeling that comes with taking physical risks.	1	2	3	4	5
9.	I often do things that I know my parents would disapprove of.	1	2	3	4	5
10.	I consider myself a risk-taker.	1	2	3	4	5
11.	I often think about doing things that are illegal.	1	2	3	4	5
12.	Being afraid of doing something new often makes it more fun in the end.	1	2	3	4	5
13.	I do not let the fact that something is considered immoral stop me from doing it.	1	2	3	4	5
14.	The greater the risk the more fun the activity.	1	2	3	4	5
15.	I often think about doing things that I know my friends would disapprove of.	1	2	3	4	5
16.	I like to do things that almost paralyze me with fear.	1	2	3	4	5

PART THREE

Please read the following instructions carefully

On the following pages, there are phrases describing people's behaviours. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. **Please read each statement carefully, and then circle the number that corresponds with how accurately the statement describes you.**

Response Options

1: Very Inaccurate **2**: Moderately Inaccurate **3**: Neither Inaccurate nor Accurate **4**: Moderately Accurate **5**: Very Accurate

17.	Am I the life of the party.	1	2	3	4	5
18.	Feel little concern for others.	1	2	3	4	5
19.	Am always prepared.	1	2	3	4	5
20.	Get stressed out easily.	1	2	3	4	5
21.	Have a rich vocabulary.	1	2	3	4	5
22.	Don’t talk a lot.	1	2	3	4	5
23.	Am interested in people.	1	2	3	4	5
24.	Leave my belongings around.	1	2	3	4	5
25.	Am relaxed most of the time.	1	2	3	4	5
26.	Have difficulty understanding abstract ideas.	1	2	3	4	5

Response Options

1: Very Inaccurate **2**: Moderately Inaccurate **3**: Neither Inaccurate nor Accurate **4**: Moderately Accurate **5**: Very Accurate

27.	Feel comfortable around people.	1	2	3	4	5
28.	Insult people.	1	2	3	4	5
29.	Pay attention to details.	1	2	3	4	5
30.	Worry about things.	1	2	3	4	5
31.	Have a vivid imagination.	1	2	3	4	5
32.	Keep in the background.	1	2	3	4	5
33.	Sympathise with other's feelings.	1	2	3	4	5
34.	Make a mess of things.	1	2	3	4	5
35.	Seldom feel sad.	1	2	3	4	5
36.	Am not interested in abstract ideas.	1	2	3	4	5
37.	Start conversations.	1	2	3	4	5
38.	Am not interested in other people's problems.	1	2	3	4	5
39.	Get jobs done right away.	1	2	3	4	5
40.	Am easily disturbed.	1	2	3	4	5

Response Options

1: Very Inaccurate **2**: Moderately Inaccurate **3**: Neither Inaccurate nor Accurate **4**: Moderately Accurate **5**: Very Accurate

41.	Have excellent ideas.	1	2	3	4	5
42.	Have little to say.	1	2	3	4	5
43.	Have a soft heart.	1	2	3	4	5
44.	Often forget to put things back in their proper place.	1	2	3	4	5
45.	Get upset easily.	1	2	3	4	5
46.	Do not have a good imagination.	1	2	3	4	5
47.	Talk to a lot of different people at parties.	1	2	3	4	5
48.	Am not really interested in others.	1	2	3	4	5
49.	Like order.	1	2	3	4	5
50.	Change my mood a lot.	1	2	3	4	5
51.	Am quick to understand things.	1	2	3	4	5
52.	Don’t like to draw attention to myself.	1	2	3	4	5
53.	Take time out for others.	1	2	3	4	5
54.	Shirk my duties.	1	2	3	4	5

Response Options

1: Very Inaccurate **2**: Moderately Inaccurate **3**: Neither Inaccurate nor Accurate **4**: Moderately Accurate **5**: Very Accurate

55.	Have frequent mood swings.	1	2	3	4	5
56.	Use difficult words.	1	2	3	4	5
57.	Don’t mind being the centre of attention.	1	2	3	4	5
58.	Feel others’ emotions.	1	2	3	4	5
59.	Follow a schedule.	1	2	3	4	5
60.	Get irritated easily.	1	2	3	4	5
61.	Spend time reflecting on things.	1	2	3	4	5
62.	Am quiet around strangers.	1	2	3	4	5
63.	Make people feel at ease.	1	2	3	4	5
64.	Am exacting in my work.	1	2	3	4	5
65.	Often feel sad.	1	2	3	4	5
66.	Am full of ideas.	1	2	3	4	5

Appendix 7 - Example of a vignette as case notes

BOOKING ARRANGEMENTS			SURNAME **Brown**	UNIT NUMBER **00145610**
ANTENATAL CARE	Tick	Note		
Specialist Hospital Clinic			FIRST NAMES A**nne**	
Consultant				
Other Clinic			DATE OF BIRTH	
Shared Care	**X**		**15/12/87**	
General Practitioner			HOSPITAL	
Consultation Only			MATERNITY UNIT	
DELIVERY			CONSULTANT Dr Anderson	
Specialist Hospital			WARD ……....	
Consultant Only	**X**			
Other Hospital				
Domiciliary				
Early Discharge				
Previous Booking				
POST NATAL EXAMINATION				
Specialist Hospital				
Other Clinic				
General Practitioner	**X**			

ADMISSION AND DISCHARGE

MOTHER ADMITTED			DISCHARGED			TO ATTEND	
Date	From	To	Date	From	To	Clinic	Date
INFANT							

SUMMARY OF PRESENT PREGNANCY

		LABOUR AND DELIVERY				INFANT			
Date	Place	Gest.	Onset Sp/ind	Dur. Hrs	Mode of Delivery	Sex	Weight	LB/SB 1st week Death	Name and Unit No.

SUMMARY & COMPLICATIONS	FEEDING
	CLINICO PATHOLOGICAL CLASSIFICATION OF PERINATAL DEATH

NAME **Anne Brown**		ANTENATAL	
UNIT NO.**00145610**		SPECIAL FEATURES	RECOMMENDATIONS
AGE **16**	HEIGHT **1.60**		
PARITY **0+0**	LIVE CHILDREN		
Yrs MARRIED	BLOOD GROUP **A Rh Pos**		
E.D.D. **25/08/04**			

Last Menstrual Period **18/11/03**

		Loss	Duration	Onset
Certain	☐ Normal	☒ Normal	☒ Normal	☐
Uncertain	☒ Light	☐ Shorter	☐ Late	☐
Approx	☐ Heavy	☐ Longer	☐ Early	☐

Usual Cycle **26-28 days**

Bleeding since L.M.P. **No**

For Sterilisation

PPS ☐

Interval ☐ Signature

Vasectomy ☐

FAMILY HISTORY		RELATIVE
Hypertension	**No**	**Gran – late onset**
Diabetes in 1º relative	**Yes**	
TB contact	**No**	
Genetic disorder	**No**	
Other/comment		
Twins in 1º relative	**No**	

PREVIOUS MEDICAL HISTORY

Operations	Date
N/A	

Anaesthetic difficulties **Never had one**

Blood Transfusion **No**

Allergy **None Known**

Steroid Therapy **No**

Rheumatic Fever **No**

Heart Disease **No**

T.B **No**

Diabetes **No**

Disease of urinary tract **No**.

……

Psychiatric disorder **No**

Thromboembolism **No**

Other Asthma **No**

Other……..

Smear Results	Date
Never Had One	

ROUTINE PHYSICAL EXAMINATION

Smoking History ☐ Never - 0

Never 0 Current 1

Former 2 N/K 9

Smokes…….. per day

Stopped at……(date)

Dyspnoea **No**

Cough **No**

Vomiting **No**

Other

General Examination

Breasts **Normal**

Varicose Veins **No**

Teeth **Visits Dentist Regularly**

CVS Pulse Resp Breath Sounds

Murmurs Adventitiae

Abdomen

P/V Uterine Size in Weeks

Other

Intention for Infant feeding

Breast ☐

Bottle ☐

Undecided ☒

DRUGS (Other than In-patient)	Dose, Frequency and Route	Dose, Frequency and Route			From	To
		Clinic	G.P.	Patient		

INVESTIGATIONS INITIATED AT FIRST VISIT

Hb ☒ A.F.P ☐ Other

Blood Group ☒ Smear ☐

VDRL ☒ Scan ☒

Rubella ☒ MSSU ☒

HUSBANDS' GENOTYPE

Date Blood taken

Result

DATE	WEIGHT	B.P.	Urine		Oedema	Wks. Preg.	Fundal Height	Date when F.M. first felt	
			Alb.	Sug.				Position & Level	F.M./F.H.
18/2/04	50kg	95/61	C	C	Nil	14	14		USS
3/3/04		96/60	C	C	Nil	16	16		-/+ve
26/5/04		95/58	C	C	Nil	28	28	Cephalic	+ve/+ve
28/5/04									
21/7/04		99/70	Tr	Tr	-/sl	36	36	+ve/+ve	

Comment on General Health etc.	Return weeks	Examined by	Investigation and Results
Unplanned pregnancy. Has good home support. Accompanied by mother.	2	SM	Booking Bloods, USS. Will return in 2 weeks for AFP
For AFP No problems. Will attend GP/Midwives clinic – shared care	12	SM	AFP
Has had several dizzy spells over last few weeks. Note BP, for FBC today	8	SM	FBC
Anne contacted at home. Hb 9.8g/dl Advised to see GP re triple iron therapy.			
Continuing with triple iron. No other problems noted.	4	SM	FBC

LABOUR WARD ADMISSION RECORD — PLANNED ADMISSION/IN LABOUR

Gestation wks 38+1	Date	Time	Abdominal Examination: Abdomen soft, non-tender,
Admitted	12/8/04	04.00	Fundus=dates. Long. lie, cephalic presentation
Contractions Began	12/8/04	01.30	VX 3/5th palpable

SPONTANEOUS LABOUR Spont. Rupt. Memb. ☐ A.R.M. in labour ☐ Augment ☐ Oxytocic drug ……

ASSESSMENT on First V.E./Priming/Induction Date Time hrs.

Cervical Score						
Dilation (cm)	0	1	2	3		Yes ☐
	<1	1-2	**2-4**	4+	2	Pre-induction priming
Length (cm)	>4	2-4	**1-2**	<1	2	No ☐
Consistency	Firm	Average	**Soft**		2	Method & Dosage
Position	Post	**Mid Anterior**			1	
Level	**0-3**	0-2	0-10	0+		
				Total	7	

SURGICAL INDUCTION Date Time hrs.

Operator:	Indications:
Ordered by:	

Operator: Forewater Rupture ☐

Foetal Heart Rate	
Before	After

Liquor: Clear ☐ Meconium Fresh ☐ Bloodstained ☐ Meconium Old ☐

Oxytocic Drugs: Dosage & Instructions

……

MONITORING Contractions: External ☒ Internal ☐ Foetal Heart: External ☒ Scalp Electrode ☐ Ambulatory ☐ In Bed ☐

Date	Time	Progress Notes
12/8/04	04.00	P0+0 @ 38+1 Admitted in spontaneous labour. O/A
		BP 100/75, P85 T36.8 On palpation abdomen soft, non
		Tender. Fundus=dates FMF, FHH with doptone. CTG
		Commenced. Uterine activity – contracting 2:10 mins, mod
		Nil PV
		IMP in labour – admit

Stage 1

Date	Time	Progress Notes
12/8/04	04.00	16 year old P0+0 admitted to labour suite in ? established
		labour.
		PMH – Nil of Note
		DH – On ferrous sulphate, ascorbic acid & folic acid
		Note last HB 9.8g/dl
		On admission – BP 100/75, P 85, T 36.8
		200mls urine passed, urinalysis NAD
		O/P abdomen soft, non-tender. Fundus=dates. Long lie
		Cephalic presentation. CTG continues - reactive
		Contracting 2:10 mins mild to mod in strength, nil PV
		Vaginal examination
		Cervix 2cms dilated,
		50% effaced.
		Mid position
		Vertex 0-3
		Requesting analgesia. Diamorphine 10mg &
		Stemetil 12.5mg IM as prescribed.

Stage 2

Date	Time	Progress Notes
12/8/04	06.00	Anne complaining of a headache.
		BP 110/80, T 78, Temp 36.9
		Paracetamol 1g as prescribed
		Coping well with contractions.
		CTG continues
		Fetal heart satisfactory.
		Uterine activity – contracting 3:10 mins moderate
		Nil PV at present

Stage 3

Date	Time	Progress Notes
12/8/04	08.00	BP 112/84, P80, T37.1.
		Passed 50mls urine, trace of protein, + ketones noted
		Anne encouraged to increase oral fluid intake.
		Slight headache persists.
		Becoming distressed with painful contractions.
		Requesting further analgesia. CTG commenced prior to administration of opiates
		Diamorphine 7.5mg as prescribed. Epidural discussed, declined at present
		Uterine activity – contracting 3-4:10 mins moderate to strong.
		Vaginal examination
		Cervix 4cms dilated
		Fully effaced
		Vertex 0-2
		Membranes felt

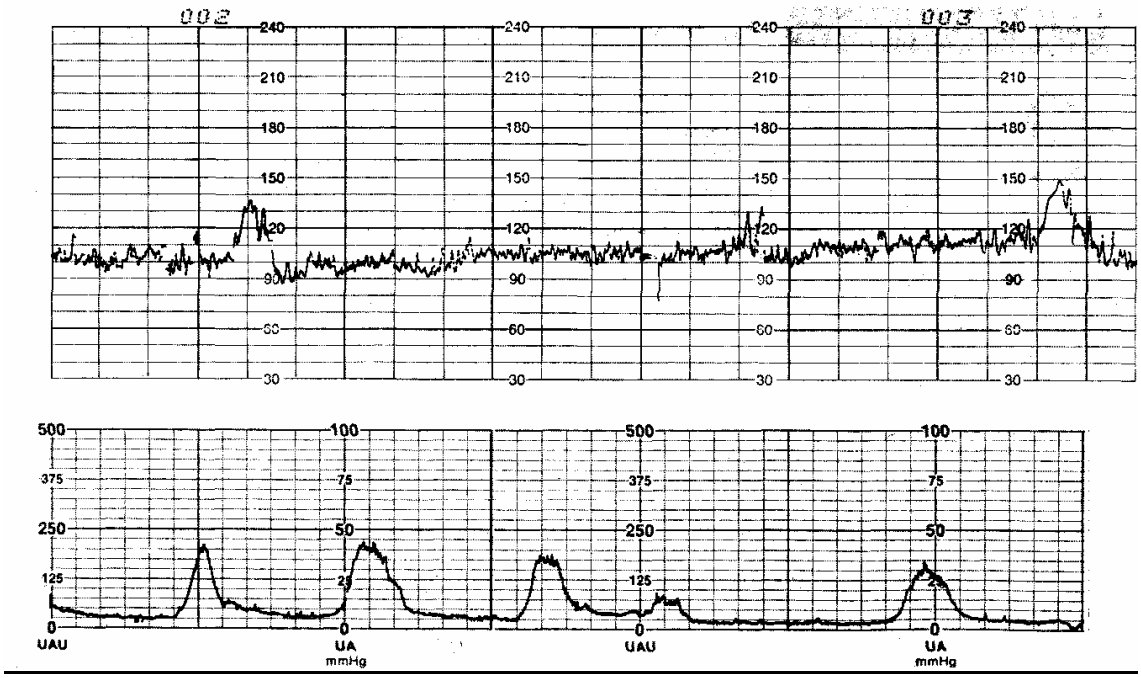
Stage 4

Date	Time	Progress Notes
12/8/04	10.00	SROM, clear liquor draining.
		Uterine activity – contracting 4:10 mins strongly.
		Requesting epidural anaesthetic. Anaesthetist contacted. Will review ASAP
		Anne using entonox meanwhile.
		Epidural sited – continuous infusion.
		IV Hartmann's 500ml commenced @ 125ml/hr.
		BP 115/85
		CTG reactive.
		Further 1g Paracetamol given to relieve headache.

Stage 5

Date	Time	Progress Notes
12/8/04	12.00	Anne comfortable at present, epidural effective.
		IV fluids continue.
		BP 125/88, P76, T 36.9
		50mls urine passed. Urinalysis ++ protein.
		Headache persisting despite analgesia X 2
		Vaginal examination
		cervix 8cms dilated
		Vertex at spines
		Clear liquor draining, show PV
		Contracting 4:10 mins strong
		Reactive CTG

Appendix 8 - A CTG image



Appendix 9 – Letter to Midwives

Dear Colleague

A research group from The Nursing, Midwifery and Allied Health Professions Research Unit and the University of Stirling Department of Psychology are carrying out a series of studies which aim to explore various aspects of midwives decision making during labour.

The first of these studies explores midwives attitudes and preferences. We would like to invite you to take part in this study. This study is supported by NHS Quality Improvement Scotland and NMAHP RU.

I enclose an information leaflet about the study and a consent form to be completed by midwives who volunteer to take part. If, having read the information leaflet, you are willing to take part in this study, please complete and return the consent form in the envelope provided. We will then send you a unique study number and instruction leaflet on how to navigate the STORK study website. In addition we will return to you, a copy of your signed consent form for your personal records. If you wish any further information please contact Maggie Styles (research midwife) at Tel: 01786 466101 email: maggie.styles@stir.ac.uk

Thank you for taking the time to read the enclosed information sheet.

Yours sincerely

Helen Cheyne
Programme Co-ordinator

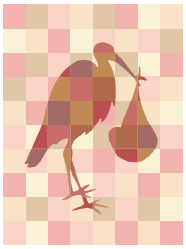
The STORK Study

Midwives Intrapartum Decision Making

Midwives study information (vers 2 Mar 2005)

Appendix 10 - Study information sheet

THE STORK STUDY



MIDWIVES INTRAPARTUM DECISION MAKING

A research group from The Nursing, Midwifery and Allied Health Professions Research Unit (NMAHP RU) and University of Stirling Department of Psychology are carrying out a series of studies, which aim to explore various aspects of midwives decision making during labour. The first of these studies is the STORK Study (the Scottish Trial Of Refer or Keep), which explores midwives attitudes and preferences and intrapartum decision making. We would like to invite you to take part in this study. Please take time to read the following information and contact us at the address below if you have any questions.

Background
Currently most births in Scotland (over 99%) take place in Hospital (Scottish Executive, 2002) with midwives as the main care providers. Recent government policy has endorsed midwife-managed care in normal labour and supports the development of community maternity units where midwives will be the main carers for women throughout labour and delivery. There is however little research on the way in which midwives make decisions during intrapartum care; in particular their judgement and decisions about the need to refer to medical staff for support or intervention and what factors influence these decisions. A better understanding of the attitudes and behaviour of midwives, in particular, during the intrapartum period, may diminish the likelihood of misjudgments being made.

Aim
The aim of this study is to explore whether midwives decision making during the intrapartum period is affected by the midwives own attitudes and preferences and whether this is affected by the setting in which the midwife works.

Who will be taking part?
This study aims to include approximately 200 midwives who work in either labour ward or midwives birth units in urban or rural settings. You are being invited to participate because you work within one of the maternity units which have agreed to take part. Your participation in this research is entirely voluntary.

If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason.

What is involved?
This is an online study. If you are willing to participate, you will be asked to complete a consent sheet and provide contact details. We will provide you with a unique study number and instructions for accessing and navigating the STORK study website. You can then access the computer-based questionnaire & vignettes package where you

should enter your study number. Before you complete the vignettes, you will be asked to choose a password. This password ensures your security and confidentiality. The questionnaire will ask about your own attitudes and preferences. It will take no longer than about ten minutes to complete. Following this you will have access a set of five vignettes; these are fictitious scenarios of intrapartum case histories. At various stages in each you will be asked to decide whether you would *keep* providing midwifery care or if you would *refer* the woman for medical care. To complete all the vignettes should take no longer than one hour. It is not necessary that the vignettes are completed at one time. The package has a 'pause' facility which allows you to leave and return to the study at a time convenient to you. It is important to remember that these are made up cases and there are no right or wrong answers.

How is the data collected & stored?
When the questionnaire and vignettes are complete the answers you have given and the decisions you have made will be automatically stored in a database which may only be accessed by the study researchers.

Will taking part in this study be of benefit to me?
Although taking part in this study will be of no personal benefit to you we hope that it will help us to understand more about the way in which midwives make decisions during intrapartum care. We hope that this may contribute to the development of better systems of support for midwives working in different settings.

Confidentiality
All information, which you provide during the course of the research, will be kept strictly confidential. No personally identifying information will be entered on the vignettes or questionnaires. No one outside the research team will have access to data collected for this study. The results of this study may be submitted for publication in professional journals and may be presented at research conferences however neither individual participants nor participating hospitals will be identified.

Other information
This study is supported by NHS Quality Improvement Scotland and NMAHP RU. The study has been approved by the Research Ethics Committee of the Department of Nursing and Midwifery, University of Stirling and the Local Research Ethics Committee of Tayside. The study has also been registered with the appropriate R & D Dept. for each NHS area.

Further information
If you would like further information about this study, or have any questions please contact Maggie Styles, Research Midwife, NMAHP RU

Thank you for taking part in this study

Version 4 Jan 2005

Appendix 11- Midwives Consent Form

The STORK Study

MIDWIVES INTRAPARTUM DECISION MAKING

MIDWIVES CONSENT FORM (vers 2 Mar 2005)

Please initial box

1. I confirm that I have read and understand the information sheet dated Jan 2005 (version 4) for the above study. ☐

2. I understand the nature and purpose of the study ☐

3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason ☐

4. I agree to take part in the above study. ☐

_____	_____	_____
Name of Midwife	Date	Signature
_____	_____	_____
Researcher	Date	Signature

_____
Name of Maternity Unit

Address:_____
Tel:_____
email:_____

Thank you for taking part in this study

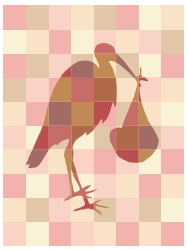
Please tick box if you would like to receive information about the results of this study ☐

Appendix 12- Midwives Instruction Leaflet

THE STORK STUDY

PLEASE COMPLETE

FIRST



UNIQUE STUDY NUMBER

ST

MIDWIVES INTRAPARTUM DECISION MAKING

Thank you for agreeing to take part in the STORK Study (the Scottish Trial Of Refer or Keep) This study aims to look at midwives' decision making during intrapartum care & at your own attitudes and preferences. The study is in the form of a computer package accessed online and is made up of two parts.

One part of the study is a questionnaire which looks at your attitudes and preferences. Read the questions carefully then indicate your answer by 'clicking' on the appropriate point on your screen.

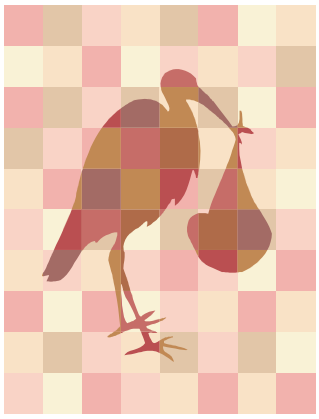
The other part of the study is a series of 5 vignettes (fictional cases studies). We would like you to imagine that you are the midwife caring for these women. Please read the case-notes for each woman, which details her antenatal care and labour ward admission, then proceed to the section detailing the course of the woman's labour. You will be asked, at various points, to make a decision as to whether you would keep providing midwifery care or whether you would refer this woman for medical care. You will note your decision by 'clicking' on the appropriate response at the top of your screen. Your decision, when made, is final. Remember, there is no right or wrong answer.

Getting started

Online, you can access the study at www.thestorkstudy.stir.ac.uk Here you will find the computer-based questionnaire & vignettes package. Click on either the 'questionnaire' or 'the cases' option. You will be instructed on which part to complete first. At the next screen you will be prompted to enter your study number. Before completing the vignettes you will be asked to choose a password. This password ensures your security and confidentiality. The questionnaire will ask about your own attitudes and preferences. It will take no longer than about ten minutes to complete. You will also have access a set of five vignettes or case studies; these are made up scenarios of intrapartum case studies. At various stages in each you will be asked to decide whether you would *keep/continue* providing midwifery care or if you would *refer* the woman for medical care. To complete all the vignettes should take no longer than one hour. It is not necessary that the vignettes are completed at one time. The package has a 'pause' facility which allows you to leave and return to the study at a time convenient to you. Also, at any time, you may press alt/f4 to return to the STORK study's main screen. When the questionnaire and vignettes are complete the answers you have given and the decisions you have made will be automatically stored on a secure database. If you wish any further information contact Maggie Styles(research midwife) at Tel: 01786 466101 or email: maggie.styles@stir.ac.uk. Thank you for your participation and co-operation.

Appendix 13- STORK Study Poster

The STORK Study



Midwives Intrapartum Decision Making

If you have returned your consent form, please remember to go online and take part in the study at www.thestorkstudy.stir.ac.uk

If you would like to take part and have not yet received information or a study number contact me on 01786 466101

or e-mail me at

maggie.styles@stir.ac.uk

I will send you details

NMAHP Research Unit, University of Stirling RG Bomont Building, Stirling FK9 4LA