

Examining the Role of Risk Perception in the Use of Obstetric Technology

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Abstract

Although it is well documented that the perinatal period is the most dangerous time of life, the last 50 years have seen dramatic falls in both perinatal and maternal mortality (Herczeg, 1997). The most significant factor behind this has been the steady increase in the amount and effectiveness of technological interventions in the management of labour. However recent years have also seen dramatic changes in the responsibilities within maternity care teams and the role of the woman in decision-making. This has resulted in a shift in the attitudes towards intervention due to a desire to return to more natural birth situations. (Changing Childbirth, 1993). This paper outlines the results of a psychometric risk perception tool distributed to consultants and midwives in a high technology maternity unit and a 'home-away-from-home' non-intervention unit in Scotland. The aim of this work is to examine how underlying risk perceptions and attitudes towards technology are linked to organisational culture and what benefit this knowledge has in order to better understand issues surrounding the acceptance and use of technology in obstetric health care.

1 Introduction

Throughout Europe, Obstetric accidents, or 'adverse events' as they are known, have led to a progressive rise in the number of litigation cases. In the UK, obstetric litigation currently costs its National Health Service (NHS) £160-200 million per year, constituting 60% of all medical litigation pay-outs (Young et al. 2001). The more obstetricians get sued, the more they intervene with birth. The result is that over the last 20 years national caesarean section (CS) rates in some countries have doubled, and in some hospitals, they have gone up four-fold. France currently has a national CS rate of 30% (Enfants, 2000), while the combined operative and instrumental delivery rate in Spain is 40% (Wagner, 2000). Surveys on maternal deaths in the UK (Hall & Bewley, 1999) show that the mortality rate for CS is six times that of vaginal birth.

Figures like these, added to a genuine desire to improve quality of care to patients, have motivated dramatic advances in safety and the re-evaluation of risk management and communication strategies throughout obstetrics. However, the success of these initiatives relies on the wide integration and support of healthcare workers at all organisational levels. This cannot be achieved without a thorough understanding of the underlying attitudes that these professionals have to the risk and hazards of their daily work (Hale & Glendon, 1987). And it is crucial that the subsequent models of risk perception and behaviour that are produced include measures of organisational culture and safety status if they are to accurately reflect the reality of the work environment (Pidgeon, 1998).

This research aims to uncover variations in how the risks of different fetal monitoring techniques are perceived, particularly in regard to obstetric care workers acceptance and use of medical technologies.

1.1 Methods of Fetal Surveillance

The use of continuous electronic fetal monitoring (C-EFM) is routine throughout Europe, with countries like Spain using it on 90% of all women in labour (Wagner, 2000). However, many empirical evaluations have shown that it is a crude way to assess fetal oxygenation and is not associated with any decrease in either fetal mortality or cerebral palsy (MacDonald, 1985). Also, C-EFM has been identified by UK obstetricians as a main factor behind the growth of CS rates, second only to fear of litigation (Francombe & Savage, 1993).

Widespread concern over the efficacy of C-EFM has prompted searches for better methods of fetal monitoring. These include a variety of invasive and non-invasive techniques, such as fetal pulse oximetry and fetal blood sampling. This work specifically examines the risk perceptions that different obstetric staff have towards existing C-EFM technology, and to newly adopted methods as well as those techniques yet to be introduced into the British NHS (such as ST-waveform analysis monitors). It also focuses on a number of existing pregnancy screening methods (such as ultrasound and amniocentesis) and other birth interventions (such as vacuum-assisted delivery) in order to evaluate

perceptions of their associated risks. All forms of medical intervention during the birth process constitute risk, and therefore require comparative investigation in this study.

2 Method

2.1 Participants

In total, 18 obstetric health care providers (6 male, 12 female) completed the questionnaire. 5 of these were *Consultants*, with an average of 13.5 years experience. 9 were *Midwives* (Grades E, F & G), with an average of 9.5 years experience. Finally 4 participants were *Registrars* (SpR), with an average of 3 years experience. The consultants were mainly based in the high technology obstetric ward, as high risk patients needing specialist care are routinely transferred there from the low intervention 'home-away-from-home' annex. The midwives and registrars work routinely in both areas, although many of the midwives stipulated on the questionnaire that they were permanently based in the annex, where low risk women are cared for with C-EFM on admission only and epidurals are provided only in cases of severe maternal exhaustion.

2.2 Questionnaire

Participants were presented with 14 adverse event scenarios, each involving a different fetal monitoring technique. Below is an example scenario focusing on fetal blood sampling, which involves measuring fetal blood pH to assess acidosis levels, a precursor of fetal hypoxia (oxygen starvation):

On finding a persistent non-reassuring fetal heart rate (FHR) the midwife called for a registrar to set up for a fetal blood sampling. As the cervix was suitably dilated the test was performed. However, there was continued fetal scalp bleeding from the puncture site, which became difficult to control and distressing to Mrs. T.

The participants were then asked to rate each of the scenarios on nine characteristics of risk similar to those found to be important in prior studies by Slovic, Fischhoff et al. (1985) and Kraus and Slovic (1988). The nine characteristics were:

1. *Anticipatory knowledge* of risks by *risk managers*
2. *Anticipatory knowledge* by those involved in adverse event i.e. *obstetric care workers*
3. *Severity* of the consequences (to both woman and fetus)
4. *Dread* of the entire range of potential consequences
5. *Confidence* in future use of the technology (or in performance of the activity)
6. The overall *Riskiness* of the technology or activity (to both woman and fetus)

7. Ability to *Control* the risks involved with the technology or activity
8. Ability to *Observe* the risks at the near miss stage prior to development of an adverse event
9. Future *Effort* needed for Risk Reduction

3 Results

The mean perceived risk of the various fetal monitoring techniques varied greatly, from 1.7 to 8.0 on the 10-point likert scales. The two techniques judged to be most risky were amniocentesis and the intrauterine pressure catheter (IUPC). The two techniques judged to be least risky were intermittent auscultation, with both the pinard stethoscope and doppler ultrasound. Intermittent auscultation (IA) is a minimal intervention method involving traditional listening of the fetal heart rate (FHR). Table 1 presents the techniques whose mean ratings were extreme on each of the nine judgment scales. Participants also made Invasiveness ratings for each technique and these are presented next to the mean ratings as *Invasive* (In), *Non-Invasive* (NI) and a *Mixture* (Mix). Techniques, such as amniocentesis, fetal pulse oximetry (FPO) and the intrauterine pressure catheter (IUPC) are repeatedly the most negatively rated on all characteristics. Techniques such as intermittent auscultation and fetal blood sampling (FBS) were consistently rated toward the less serious pole of each scale.

Table 1 Extreme Scenarios for 9 characteristics

Risk Scale	Highest Methods	Invas. Scale	Lowest Methods	Invas. Scale
1 Knowledge	IA-Pin 6.0 C-EFM 4.1	NI Mix	Epid 1.7 Amnio 1.8	In In
2 Knowledge	IA-Pin 4.7 Ultra 4.3	NI NI	Epid 1.8 FPO 2.3	In In
3 Severity	Amnio 6.8 I-EFM 6.0	In Mix	FBS 2.4 FSS 2.7	In In
4 Dread	FPO 6.1 IUPC 5.9	In In	FBS 3.2 C-EFM 3.4	In Mix
5 Confidence	IUPC 6.9 FPO 6.3	In In	IA-Dop 2.8 IA-Pin 2.9	NI NI
6 Riskiness	Amnio 6.3 IUPC 6.3	In In	IA-Pin 2.6 IA-Dop 3.2	NI NI
7 Controllability	Amnio 7.7 Vac 6.0	In In	IA-Pin 2.6 IA-Dop 2.6	NI NI
8 Observability	I-EFM 8.0 Ultra 7.8	Mix NI	Epid 2.2 STAN 4.0	In In
9 Effort	IUPC 6.9 C-EFM	In Mix	IA-Pin 3.8 FBS 4.1	NI In

Results of the intercorrelations among the nine judgment scales, and the subsequent principle component analysis that five of the characteristics were subjected will be presented and discussed in the presentation accompanying this work.

4 Discussion

These results showed that those techniques viewed

as invasive were generally judged to be highly dreaded and risky, and displaying poor confidence, controllability and observability. Conversely, it was the non-invasive techniques that scored low on dread, severity, and riskiness and high on knowledge and confidence. However, some invasive techniques such as fetal blood sampling (FBS) and epidurals were judged as not being of particular cause for concern. This was due mainly to the fact that they are established techniques within maternity care and as a result, obstetric care workers appear to have adapted well to controlling their associated risks.

The invasive and non-invasive categorisation sits well with a *technology* and *non-technology* split. It also reflects the novelty of the risks, as new techniques such as fetal pulse oximetry (FPO) and the STAN monitor are both highly dreaded and poorly observable, compared to the commonplace fetal blood sampling (FBS) and fetal scalp stimulation (FSS).

Separate means for medical and midwifery workers perceived risk judgments were also calculated. Considerable differences were found in their ratings for intermittent auscultation (IA) and continuous electronic fetal monitoring (C-EFM). Midwives consistently rated IA more positively and C-EFM more negatively than the consultants and registrars. This reflects differences in the responsibilities of their roles and also the environments where they provide care.

5 Conclusion

This study has two main findings. The first is that variations occur in the risk perceptions of invasive (high tech, novel) compared to non-invasive (low tech, commonplace) fetal monitoring techniques. The second is that variations occur in the risk perceptions of midwives compared to medical staff.

The value of uncovering these technological and cultural variations in how the risks of fetal monitoring techniques are perceived is that it gives insight into obstetric professionals ultimate decisions surrounding their acceptance and use of technological devices. If risk information can be presented more sensitively to cultural groups who are weary of technology, then this will filter down to patients and hopefully improve their own acceptance of advantageous technologies during their labour. Many seemingly intrusive forms of technology designed for intrapartum care, actually decrease the "medicalisation" of labour through reduction in CS and other interventions, rather than increasing it, as is the common assumption about technology (Henney, 2000). This conclusion has a direct impact on the development of risk management policy, highlighting the need for more attention to be given

to the presentation of risk information regarding new technologies.

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