Methodological insights from a study using video-ethnography to conduct interdisciplinary research in the study of birth unit design

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Abstract: *Little is known about how the physical design of a birthing unit can influence the experiences of labour and birth for women, their supporters and midwives. We proposed that an interdisciplinary approach (disciplines of midwifery, architecture, design, communication and public health) was likely to be the most effective way to better understand the complexities and interactions of design, behaviour, communication and experiences. In this methodological paper we aim to provide a roadmap that other researchers may find helpful when considering the use of video as a data collection technique, especially in the study of the powerful and intimate setting of childbirth. The paper also outlines our process for engaging both researchers and participants in reviewing video footage with the aim to contribute multiple perspectives to the analysis process.*

Keywords: birth unit design, interdisciplinary research, video-ethnography, video-reflexive interviewing, women's experiences of labour and birth, midwifery, intimate settings

Building design and interior space have a range of effects on human behaviour and experience. Our environment can influence how we behave, our health and wellbeing, our perception of pain and how we move our bodies (Ulrich et al., 2008). The design of the place in which women give birth (the birth space) may also influence the behaviour of women, their supporter/s and care providers (Foureur, 2008; Foureur et al., 2010). Freedom of movement and the ability to manage and work with pain and keep stress levels low are all critical aspects of facilitating normal labour and birth (Walsh, 2007). Little is known, however, about how the physical design of a birthing unit can influence a woman's experience of labour and birth (Hodnett, Downe, Walsh, & Weston, 2012).

In this paper, we describe the methodological process and some of the specific design aspects of a research project that used video-ethnography to explore and understand the complexities and interactions of design, behaviour, communication and experiences. In doing so, we aim to provide a roadmap that other researchers may use when considering the use of video as a data collection technique, especially in the study of the powerful and intimate setting of childbirth. The paper also outlines our process for engaging both researchers and participants in reviewing video footage and contributing multiple perspectives to the analysis process. In sharing our research approach we explore the challenges of working with a team of researchers from different knowledge traditions, with different questions to ask of the one dataset. The importance of a shared conceptual framework across multiple relationships will be highlighted. In the pursuit of brevity the scope of the article is limited to methodological understandings.

Background

Considering the increase in research to investigate the relationships between the design of healthcare facilities and experiences of users during the last 40 years (Ulrich, Zimring, Joseph, Quan, & Choudhary, 2004; Ulrich et al., 2008), there is strikingly little research available to inform the design of birth units. Recently an evaluation tool was developed to help assess the optimality of birth unit spaces, which has been shown to be content reliable (Sheehy, Foureur, Catling-Paull, & Homer, 2011). Other studies have revealed women's preference for hominess – a comfortably informal, inviting, cosy and home-like space (Dictionary.com, Unabridged, n.d.) – within hospital birth rooms. Hominess can be designed into the space by providing elements that increase the perception of control, as well as to increase the sense of privacy for the

woman and her family. In addition, families indicate preference for spaces which can be personalised (Shin, Maxwell, & Eshelman, 2004). These aspects of privacy, personalisation and hominess relate to the theory of Birth Territory, the physical, psycho-emotional and cultural space in which women give birth, which theorises the need for personal control and privacy with the potential increase in normal, satisfying birth experiences (Fahy, Parratt, Foureur, & Hastie, 2011).

Studies investigating birth unit design have utilised various forms of data including: survey (Albers & Savitz, 1991; Newburn & Singh, 2003); randomised intervention effects on both reported perceptions and quantified outcomes (Browning, 2000; Duncan, 2011); exploratory qualitative interviews (Hauck, Rivers, & Doherty, 2008); Likert-type ratings of line-drawings to determine room preferences (Shin et al., 2004); mixed methods such as survey, focus groups, individual interviews and on-site design evaluations (Symon, Paul, Butchart, Carr, & Dugard, 2008); and a Cochrane review (Hodnett et al., 2012). Although these studies begin to build an understanding of birth experiences in hospital birth units, there remains very limited understanding about how the physical design of a birthing unit can influence a woman's experience of labour and birth (Hodnett et al., 2012).

To address this gap in the evidence, a study using the techniques associated with video-ethnography was designed and subsequently funded. Titled Birth Unit Design, the study aimed to observe, record and analyse the effect of the environment on communication, behaviour and experiences of women, their supporter/s and care providers within the labour and birth rooms of two maternity units in Sydney, Australia. Communication (verbal- and non-verbal), power and control and the influence of design on physical, cultural and ethnographic dimensions were the focus of analysis. The overall aim was to identify the key features of optimal birth unit design that can enhance communication and improve women's experiences of labour and birth.

The conceptual model underpinning the study was the 'safe, satisfying birth' model (see Figure 1) with roots in both architecture and neuroscience research (Foureur, 2008; Foureur et al., 2010). The model suggests that optimally designed birth units: reduce women's and staff stress; positively influence the quality of communication and care; facilitate physiological birth; and increase safety for women and their babies, reducing the likelihood of adverse events and litigation. The safe, satisfying birth model 'describes hypothesised relationships and … is offered to inform future research agendas' (Foureur et al., 2010, p. 521). The model reflects *Birth Territory* theory (Fahy, Foureur, & Hastie, 2008) that recognises the physical territory of the birth space over which jurisdiction or power is claimed and builds on the work of philosophers, including Foucault (1980). A major concept within Birth Territory is 'terrain' including the physical features and geographical area of the individual birth space. Birth territories affect how women feel and respond as embodied beings: safe and loved or unsafe, fearful and self-protective (Stenglin & Foureur, 2013). The safe, satisfying birth model formed a guiding
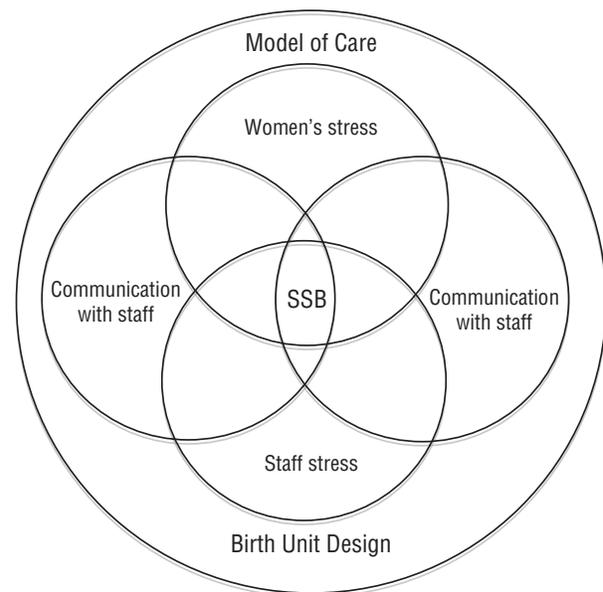

FIGURE 1: SAFE, SATISFYING BIRTH (SSB) CONCEPTUAL MODEL. REPRINTED FROM FOUREUR ET AL. (2010). COPYRIGHT (2010) WITH PERMISSION FROM ELSEVIER

framework to integrate the variety of expertise within the research team in a coherent manner and allow multiple perspectives to inform planning, data collection and analysis.

OVERARCHING METHODS & CHALLENGES

Video-ethnography was employed before, during and after six women's labours. The process consisted of videoing, as well as maintaining a field journal where observations of interactions were recorded that included documenting the attending researcher's conversations, thoughts, feelings and reflections on the events taking place. In the early postnatal period the women, their 11 birth supporter/s and the 9 midwives[1] and 1 student midwife who attended them during labour participated in an interview where the video footage was used to stimulate discussion and reflection. Ethical clearance was granted (HREC/10/HAWKE/135 and SSA/10/SG/190). See Table 1 for further participant details.

In order to optimise opportunities for a diversity of views and perspectives, an interdisciplinary team approach was chosen, with the disciplines of midwifery, interior and industrial design,

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[1] Two obstetricians were minimally involved during filming, but only the midwives who provided care took part in the video-reflexive interviews.

architecture, public health and communication studies all represented. Our challenge was to involve multiple researchers while being mindful that birth is an intensely intimate experience. Birth spaces can be experienced as 'sacred' where profound emotions and the physiology of normal birth should be respected and undisturbed (Fahy and Hastie, 2008). As Hofmeyr, Nikodem, Wolman, Chalmers, and Kramer (1991, p. 762) state: 'Labour is a time of unique sensitivity to environmental factors, and … events and interactions during labour may have far-reaching and powerful psychological consequences.' In addressing these sensitivities, the use of video enabled a small, core group of researchers to build close relationships with study participants, yet make the data available to a broader group of engaged researchers, linked through a common conceptual and methodological approach.

Video and health care research

Video-based research in healthcare is widely accepted as a research method (Carroll, 2009; Forsyth, 2009; Iedema et al., 2009; Mackenzie, Xiao, & Horst, 2004) and valued for the density and permanence of the data when studying detailed or complex 'everyday' situations (Holm, 2008). Video can 'examine decontextualised sequencing of minute behaviours, concurrent

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TABLE 1: PARTICIPANTS' BIRTHING STATUS, LOCATION, MODEL OF CARE AND SUPPORT TEAM

Birthing women (N = 6)	'RED' woman 1	'ORANGE' woman 2	'YELLOW' woman 3	'GREEN' woman 4	'BLUE' woman 5	'PURPLE' woman 6
Parity[2]	Primip[3]	Multip[4]	Multip	Primip	Multip	Multip
Location of birth	Site 1	Site 2	Site 2	Site 2	Site 1	Site 1
Model of care	Shared care with general practitioner	Midwifery clinic	Midwifery group practice	Midwifery group practice and continuity of care programme	Midwifery clinic	Midwifery group practice
Setting	Birth centre	Labour ward	Birth centre	Labour ward	Labour ward	Birth centre
Maternity staff present (N = 11)	2 midwives	1 midwife	1 midwife	1 midwife	2 midwives; 1 registrar	2 midwives; 1 student midwife
Supporter/s (N = 11)	Husband	Mother	Husband; mother; sister	Friend	Husband	Mother; husband; 2 sisters

[2] Number of times a woman has given birth.
[3] Primip – having first birth.
[4] Multip – having second or subsequent birth.

behaviours, and non-verbal behaviours that are difficult to observe in real time' (Paterson, Bottorff, & Hewat, 2003, p. 31). Video data has become simple and cost effective to collect (Xiao & Mackenzie, 2004), although there are challenges in birth spaces, where an unobtrusive approach is required given the intimate nature of the experience.

The use of video research in birth settings is less common than in other healthcare domains; although video footage of birth abounds in the public domain, notably on the Internet and in reality television programmes (Morris & McInerney, 2010; Sears & Godderis, 2011). Videos of birth experiences have been used in various studies including: an examination of the interactions between birthing couples and midwives in Sweden (Hallgren, Kihlgren, & Olsson, 2005); Australian midwives' interactions with bodily and birth fluids (Callaghan, 2007); and American women's responses to care received during labour (McKay & Smith, 1993). Such studies support the use of video as a research tool in birth spaces for a variety of research questions, although significant challenges often exist with data collection.

Taking an interdisciplinary approach

A range of disciplines and research styles in health care research is both an important strength, as well as a challenge. Researchers from different disciplines approach research from their own perspectives, which allows for diverse thinking about problem conceptualisation, data collection and analysis. Diversity also creates challenges because of differences in team members' individual 'perspectives, priorities, models of theorising and language' (Byles, Dobson, Bryson, & Brown, 2007, p. 81).

A British study identified the value of developing video clips for use in interdisciplinary workshops to promote normal birth and safe, satisfying experiences; the research highlighted the value of an interdisciplinary approach to analysing video footage as well as the potential vulnerability of participants who agree to be filmed in childbirth settings (Leap, Sandall, Grant, Bastos, & Armstrong, 2009). Similar findings emerged from a study in

The Netherlands on the perceptions of women, nurses, midwives and doctors regarding the use of video during labour for quality improvement purposes. Participants highlighted the potential for improvements in safety, communication and practitioner self-awareness, while noting the ethical issues of privacy intrusion (van Lonkhuijzen et al., 2011).

Within the context of birth spaces an interdisciplinary approach creates a dichotomy, *many* are motivated to better understand birth space experiences, yet birth spaces are by necessity *intimate* spaces that require privacy. We suggest that not all researchers need to be present to engage fully with the experience of childbirth. Video-based research allows an interdisciplinary team to engage with video footage and data gathered by a small number of researchers known to the woman and her supporter/s, thus protecting the intimacy and privacy that are fundamental to the birth experience.

THE APPROACH
Video-ethnography

Video-ethnography, generally speaking, means that a researcher or team of researchers creates a relationship with participants before, during and, in the case of video-reflexive research, after the actual event(s) that are filmed. Video is considered a reliable method of enabling interdisciplinary analyses of complex environments and behaviours (van Nieuw-Amerongen, Kremers, de Vries, & Kok, 2011), such as those that occur within a birth space. Video and companion data (for example, transcribed interviews, the recording of observations and field notes) are fine-grained methods of creating a rich and detailed picture of the authentic experiences that occur in quick-paced, private or otherwise challenging settings (Farrington-Darby & Wilson, 2009). This includes being able to notice patterns of behaviours that develop over extended time periods, which would otherwise be difficult to capture, notice or bring to awareness. This was true in the case of at least one participant in the birth unit design study, whose length of filmed labour was 15 hours.

Our video ethnographic approach was similar to those described elsewhere, such as the

work of triage clinicians in Australian intensive care settings (Carroll, 2009). Ethnography, specifically video-ethnography, is simultaneously a relationship-building activity to develop rapport and trust with the informants, as well as a dynamic give and take of observing and being part of a research project. The use of this video collection research method and the rich and extended paradigmatic approach of all types of ethnography are evolving and complementary (Fetterman, 2010; Geertz, 1988). That said, we caution that it is relatively easy to allow the data collection technique to absorb the theoretical underpinnings of a true ethnography. In our research we did much to become 'alongsiders' with the birthing woman and her supporter/s and midwives, outside of just filming them (Carroll, 2009). We took detailed field notes during the women's labours and video-reflexive interviews and kept a written record of correspondence with all the participants. Individual journals and regular team meetings, to confer on the interactions, also occurred as a way to document the relationships and the project.

Reflexivity of the research
The core group of researchers involved in collecting data sustained a level of reflexivity within the research setting. Reflexivity is a term difficult to define (Lipp, 2007) and it is often misconstrued, as argued by Lynch (2000). 'Reflexivity in one or other of its forms occupies a central place in action research, case studies, ethnography, hermeneutics, and feminist research' (Freshwater & Rolfe, 2001, p. 534). Reflexivity, as we understand it, is a patterned research approach that involves being engaged in the data while systematically alternating between the various interpretive layers in an aware and enquiring manner so as to realise on-going appreciation of the participants' experiences, the placement of the phenomenon within larger sociological contexts and the researchers' involvement (Alvesson & Sköldberg, 2000).

The use of 'reflexive' as a primary term for our research was not taken lightly. Some aspects of the data collection were 'reflective,' such as watching the video as a trigger or video-cued reflection method for the women and supporter/s, while for the researchers and midwives involved in

the study, reflexivity is a more appropriate term. Midwifery practice and the design–culture of the birth unit began to shift as soon as the study began (for example, the default set up of the birth room changed from bed at centre of room to mat at centre of room and bed pushed to side wall).

This patterned process maintains a self-conscious awareness of how our presence as researchers can never truly be objective, as well as the participants' awareness of the research process and how these intersect to reflect the phenomenon under study.

Preparation for the birth unit design study
Identifying the study sites
The first phase of the research commenced in early 2012. Two large, university-affiliated, public hospital maternity units located within metropolitan Sydney were chosen for this study. One site, a tertiary referral centre (with the ability to care for women having normal, moderate and high risk births), had almost 2500 births per year; 8 labour and birth rooms with en suite shower and toilet facilities; plus 2 rooms classified as 'birth centre rooms,' on the basis that they were larger than the other rooms in the birthing unit and had large baths in the en suite facilities. The other was a secondary level referral centre (admitting women more than 34 weeks pregnant). With approximately 2700 births per year, it had 7 birth rooms, each with en suite shower and toilet facilities, plus 2 rooms in a co-located birth centre, each with birthing pools, double beds and 'home-like' furniture. Besides providing maternity care for pregnant women with different levels of complexity, the two sites offered a different demographic and ethnic mix of women and their supporter/s. This enabled the potential for a heterogeneous sample of participants.

Planning
A detailed research plan was developed using an interdisciplinary iterative process, drawing on the knowledge base within the team and a review of relevant literature. A research coordinator was recruited, equipment for filming was purchased and strategies were devised for filming and editing techniques. Besides a brochure, information

sheets and consent forms, a number of other documents were created to assist the research process, including: a participant mapping form; a checklist for gathering information about sites; a chart for recording observations and decision making during filming; a copyright release form identifying the potential use of video and audio recordings for education and presentation purposes; and documentation related to analysis of video footage, interviews and field notes.

Training in filming and editing techniques

Members of the research team who had previous experience of filming and editing techniques provided informal training and advice sessions for those who were new to these methods. This was backed up by individual one-to-one training sessions throughout the life of the project.

Preparing to film: Context mapping

In each site, the midwifery researchers who would be filming were already known to staff – due to their previous roles in those maternity units. This had practical benefits in terms of gathering information about the sites but it also enabled the study to build on existing trusting relationships during negotiations and recruitment.

The researchers who would film women's labours visited each site to familiarise themselves with the physical features of all rooms and spaces in the birthing units and the systems and activities that were taking place in those spaces. This involved: sitting quietly in the corridor; observing and mapping activity at the central desk; counting the number of times members of staff entered the labour and birth rooms; noting how long they spent in the various spaces; and observing systems of communication between staff. The physical features of the spaces women and their supporter/s would negotiate on their way from the entrance to the hospital to the room/s in the birthing unit were identified and described.

Information sharing and recruitment of staff participants

The researchers who would do the filming held eight information sessions in the two sites, consisting of a slide presentation followed by discussion about the research and the processes that would occur. The aim was to encourage a co-productive frame of mind and facilitate confidence about videoing in the birthing units, particularly amongst members of staff who might be in birthing areas when filming would be taking place.

As we presented the research project, the interdisciplinary nature of the research team was emphasised, but we were clear that only the people presenting the education session would be present for the filming. Those willing to participate were asked to sign consent forms at this time, but the majority decided to wait and see if they would be attending women enrolled in the study before signing. A sealed box was left in the birthing area of each site, alongside packages containing: a brochure, information sheet, bibliography, 'Frequently Asked Questions' sheet, samples of relevant research papers, and consent forms.

Recruitment of women and their support people

Information packages were placed in areas where women were attending for antenatal care. Midwifery researchers approached women waiting for antenatal care appointments and asked them if they would like to hear about the research and consider participating. They explained how women and their supporter/s would experience the process (for example, a midwife-researcher would be in the room filming, but would not be involved in providing care for them; nothing was expected of them except to go about their labour 'as they normally would' and agree to a follow-up interview). The researchers also explained how the women's involvement would help shape the wider knowledge base for future birth unit design. As a potential incentive, participants were offered the 'gift' of a DVD showing them greeting their baby soon after the birth (footage that would not be part of the research). Subsequent follow-up conversations were offered to further clarify all of the steps involved in the filming process.

After women agreed to participate, members of the research team who were on call for filming and observing the women's labours, followed up with telephone calls and a face-to-face visit with each woman either at her next antenatal appointment or in her home. This visit facilitated rapport

building and relationship development and also allowed the women another opportunity to discuss the research process.

At every stage of recruitment it was made clear to potential participants that the focus of the filming was on participants' interactions and the use of objects within the environment itself, rather than the woman's labouring body. We assured them that if they wanted videoing to be stopped at any time, they simply had to use a hand gesture or state, 'stop.' We also reiterated that they would be given the option for us to pixelate the footage to conceal their identity. As promoted by O'Reilly, Parker, and Hutchby (2011), we made it clear that the consent process when video-recording would be an on-going process of collaboration.

Filming and observing women in labour
One small, hand held video camera was used for digital visual and audio recording. A tripod was not used and we determined that a shotgun microphone was not necessary. The choice to use a hand held camera rather than several fixed position cameras was due to both the ethnographic nature of the research and funding constraints. We desired to be unobtrusive and maintain the focus on the woman in the space with the immediacy of interacting with the researcher always present, such as in the regular check-in that filming was still desired by the participants. The camera was able to record wide-angle shots of interactions and the use of objects as well as the view seen by the woman as she entered and negotiated the birthing unit and rooms. Two Canon high-definition digital video camera recorders (Legria HF G10 and Vixia HV40) were accessible to the filming team, which allowed one always to be available. Both cameras had the ability to take still photographs during filming. Footage and still photographs identified the layout of the space, including which objects and spaces were used within the room and how they were used during labour.

Two researchers attended each of the labours and shared responsibility for filming, observation, taking field notes and decision making about when to turn the camera on and off. The same two researchers (both midwives) attended all of the labours, with one exception: the project coordinator also filmed one birth, with a midwife team member recording field notes.[5] The filming team organised being on call through a system similar to that employed in midwifery group practices, where midwives adopt a caseload approach and are 'on call' for the women in their care (Homer, Brodie, & Leap, 2008).

Each woman had the mobile number of a researcher whom she had met and who would be on call as the main contact person for her. The arrangement was that she would alert the researcher, by telephone or text message, immediately after she had organised her admission to the birth unit for labour. Stickers were placed on the woman's maternity record to alert staff to the fact that she was in the study and that researchers needed to be called if the woman or her supporter/s had not had an opportunity to do so before arriving at the birthing unit.

On arrival at the birthing unit, the two midwives in the filming team confirmed consent with the woman, so that she would have a chance to change her mind if she wished. They also confirmed that the midwives who were caring for the woman had given written consent to participate in the study and if not, whether they were prepared to give this consent. This process was repeated whenever there was a changeover of staff attending the woman before continuing the process of observation and videoing.

The researchers recorded video in short blocks (approximately 5 minutes duration or less) during and after the admission process, during and after 'handover' by staff, and at any other times when there was a change in the way the woman was using the birth space. We were aware throughout the filming that each time we chose to turn on or off the video camera, we were already stepping into the analysis of the behaviours as we implemented some degree of decision making 'authority' on the event. Decisions about what was and what was not filmed represented the first level of analysis. We therefore discussed in great detail, prior to the

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5   The project coordinator is an environment-behaviour researcher with a lay-midwifery educational background.

video-recording, what our practice would be so as to maintain rigour. Any time an activity occurred for a long period (for example, holding onto a supporter while rocking back and forth, massaging, sitting in the birth tub), we would video record the first few minutes and then stop recording when it was apparent that that same activity would be repeated for longer than 3 or 4 minutes. See Box 1 for summary of when camera was turned on.

To trace the decision making process one researcher filmed while the other kept detailed field notes. These provided a record of when the camera was turned on and off and contextual information of what was being observed throughout the woman's labour.

Organising and editing the video footage

The raw video footage was downloaded and backed up onto hard drives. There was no need to clean this complete footage, as there were very few distortions or filming errors; the team decided that these could be removed in the editing process.

We developed a labelling system using the participants' initials and the date of her baby's birth (for example, 'SM_2012_02_05') and differentiated the data associated with each woman by assigning the information one of six 'colours'. This method was well received by our team, as the data package they received had colour-labels attached to all video and textual data (see Table 1).

Since the length of video footage for each woman ranged from 45 minutes to 3 hours, it was important to reduce the amount of footage without losing any important data. Two researchers handled the footage during the initial editing process and checked with each other regularly about the decisions they made (see Box 2 for editing procedure).

The essential next step was to gain validation from team members regarding the editing process. Everyone received the first participant's data package on a DVD, containing two film segments: the entire unedited version and the edited version. Team members were invited to view both versions and document their thoughts, feelings and observations while watching the footage, with particular regard to the editing process that had taken place. There was agreement amongst the team that nothing deemed important from the unedited version was removed during the editing process, by careful comparison between versions. No events were cut that the research team felt should have been included. The only issue that was raised by a few of the team members was the challenge of assessing how much time had passed when an activity was underway; this was resolved by discussing the field notes to understand timing.

With consensus on the efficacy of the edits reached, the remaining footage was edited without further validation, as the same editing guidelines were practised for all (see Box 2). The edited versions averaged 20–30 minutes long and were used to facilitate discussion during the follow-up video-reflexive interview process with participants.

Video-reflective interviews with women and supporters

As explained previously in the 'Reflexivity of the Research' section, we have termed our overarching research method 'video-reflexive.' However, we are aware that portions of our the research (for example, the video-cued interviews described in this section) are more aptly termed 'video-reflective.'

Box 1: Filming occurred during these situations

- Setting the scene (whenever there was time) – footage of the surroundings, the entrance to the birthing suite and rooms, etcetera

- Before and following (not during) any procedures (for example taking blood pressure, abdominal palpation, vaginal examination, etcetera)

- Whenever there was a new use of the space by the labouring woman, her supporter/s or the attending midwife (for example walking, standing, sitting, leaning, kneeling, in shower, in bath, etcetera)

- Whenever the woman changed position

- When dialogue occurred between the woman and her midwife and or supporter

- Patterns of behaviour by staff coming in and out of the room

- Positioning of support people within the environment and use of features

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Box 2: Editing procedure

- The whole raw footage was viewed several times to become familiar with the material and sequence of events
- Significant clips were identified and marked up for further editing in the Project space of iMovie
- Decisions about what to leave in the final version of the interview film mirrored those used during the filming: Listed in Box 1
- The gift DVDs of 5–15 minutes long were put together using iMovie and iDVD features, including music, photos and movie footage and a menu

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We recognise the differences between these two, often considered synonymous, terms, and ask the reader to indulge us in using both terms as they suit each particular aspect of the research.

Six- to 8-weeks after birth women and their supporters participated in an audio-recorder in-depth, semi-structured interview. The interviews took place in the women's homes. Discussion and reflection was encouraged while watching video footage of their experience, together with the research midwives who filmed. Taking this approach facilitated contextual knowledge to be shared. We aimed to create a space for participants to express their perceptions, feelings and thoughts and develop a dynamic understanding of the women's and supporter/s experiences. This included perceptions of how the design of the birth unit may have affected communication and the use of objects and the space. There were frequent examples of watching the video during the interviews, when participants' were able to discuss their experience in terms of how the space facilitated their birth experiences. Footage was often paused at moments where the woman had not previously thought to mention an important detail or perception (for example, 'I think I might have moved something, actually. I might have moved something. It might have been *that* or something. I remember moving some equipment out of the way. Away from the bed' – 'mum' supporter). The verbatim interview transcripts, as well as the interview field notes, permitted the unravelling another layer of understanding of the participants' experiences.

Haw and Hadfield (2011) have previously explored the advantages of this approach, arguing that it allows participants to unpack their experiences by 'encouraging individuals to speak unguardedly in response to what they are seeing … (so as to) explore and gain a better understanding of how a phenomenon or set of issues is being constructed' (Haw & Hadfield, 2011, p. 71). Box 3 describes the interview process.

Video-reflexive interviews with midwives

Nine midwives who had attended the six births also participated in a video-cued, open-ended, in-depth interview. Once again, both the midwife and the researcher viewed the edited video footage, reflecting on the situations in which the midwife had participated, with a similar design-focus. On numerous occasions, the midwife provided reflexive comments on practice change (for example, 'Ooh! I should have taken that out!' – midwife 2) or reported design-related changes that had commenced in the unit (for example, 'It was something that was introduced soon after you guys came to video that some of those rooms are set up already … so the bed's against the wall and there's a mat on the floor' – student midwife).

The act of viewing the events during labour together permitted the participants and researchers to pause and reflect on the aspects that may not have been visible or in their conscious awareness during the labour. The footage was a catalyst for reflection and stimulated substantial conversations about how the physical environment facilitated or inhibited experiences.

Working with the dataset

Data collection resulted in a dataset consisting of six videos averaging 90 minutes (range 42 minutes to 3 hours). These were edited to six videos of an average length of 35 minutes (range 15 minutes to 1 hour) with associated field notes and 17, 1-hour video-reflexive interviews that were audiotaped and then fully transcribed, also with associated field notes.

In this study data analysis is multi-layered and remains on-going as different team members work with the data in a variety of ways. To begin the analysis process, however, researchers

Box 3: The interview process

- We offered participants the choice of coming to their homes or finding an alternative venue to carry out the interviews
- Setting up interviews with women and their supporters often involved numerous emails and/or text messages
- One researcher took extensive field notes, the other placed the laptop in the centre of the group and mutually decided when to stop and start the DVD, depending on the sort of discussion each section stimulated
- Participants were invited to comment on what their experience was, as they watched the clips and anything else they would like to comment on, including their first impressions of the environment
- Sometimes the researcher summarised what was going on in the clips that had just been viewed in order to open the discussion
- The movie was stopped and started according to obvious breaks, but also if the viewing had clearly sparked interest
- Following the interview the copyright release form was explained and participants were asked to sign it
- Participants were invited to think of a pseudonym for use – or permission to use their name if this is what they preferred

met for a 2-day data analysis retreat. Using a large screen television, in a theatre style environment, the team watched, reviewed and commented on each of the six videos with reference to the interview data as well as the field note data. The video was regularly stopped, discussed and restarted as we asked questions of the data. Each researcher took their own notes jotting down their thoughts, feelings and reflections. The researchers who had undertaken the filming and interviews were present to provide clarification of any issues related to the data collection and/or raised by the team when asking questions of the data.

Initially we focussed on the verbal- and non-verbal communication patterns of the occupants of the space and the interplay with the tangible elements of the space. As a group we explored: who was speaking to whom and where in the space; whether interactions with women differed from those between clinicians; what formality was inscribed into the speaking; and how the dynamics of what was being said connected with the unpredictable nature of care and the environment. We explored communication effects, for example, whether clinicians and women communicated in ways that provided evidence of dynamic negotiation, and

resolution of issues, problems, risk and plans (Carroll, Iedema, & Kerridge, 2008). We asked specific questions, such as: How does the woman use the birth space and how does the staff facilitate this use? We sought to identify how the woman coped with pain in labour and how this was influenced by the birth environment and interactions and communication within this space. In addition, we started to ask questions about the semiotics of the birth space and as a group discussed the messages communicated in the symbols and artefacts of different birth spaces (Kress & van Leeuwen, 2001; Stichler & Hamilton, 2008). We also started to identify factors of the birth environment such as: spatial arrangements; environmental conditions; product and furniture designs that we felt impacted on health professionals and the labouring and birthing woman and her supporter/s, in terms of clinical risk, stress reduction and clear communication.

This intensive review of the data during the retreat allowed the interdisciplinary team to become immersed in the data and discuss initial responses and other reflexive impressions of the data. Using our common theoretical framework of the 'safe, satisfying birth' model we subsequently developed a number of specific questions that each group of researchers could start to work on, such as: 'Was the space perceived as home-like or institutional?' (midwife research question); 'How does the birth space design facilitate the role of the woman's birth supporter?' (environment-behaviour researcher question); and 'How can we redesign the birth tub to facilitate a safe, satisfying birth?' (industrial designer research question). The combination of interviews, videos and field notes created a broad and deep datum field to support a wide-array of research questions across disciplines.

From here the team split into working groups to move the analysis forward depending on their

own questions and theoretical perspectives. Basic thematic coding process commenced, as this allowed enough structure to inform the complex process of working with a wide range of data, while still allowing the academic freedom for each disciplinary expert to hone in on their own research interest. This work remains on-going and a metasynthesis of results from different perspectives is planned.

CONCLUSION

The use of video-ethnography and video-reflexive interviews created a rich body of data to assess multiple research questions from interdisciplinary researchers. Working in a broad, collaborative and systematic manner allowed for a powerful method of data collection and analysis that has cut through potentially overwhelming research complexity.

Using our approach, an interdisciplinary team of researchers from a variety of fields can work with participants who are aware and accepting of the 'research team' in the abstract, but who only need to develop rapport with two or three individuals; thus reducing the intrusion of the research team on the birth space, while respecting the intimacy and privacy of the birth experience. Using the combination of video-ethnography and video-reflexive interviews is a unique and effective method of researching such intimate settings as birth spaces and may also be an effective blend of methods for other intimate or challenging settings.

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