The ‘Childbirth Supporter Study’: Video-ethnographic examination of the physical birth unit environment

J. Davis Harte
BA, MSc.

Thesis containing publications

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Certificate of Original Authorship

CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of Student:

Date: 31 Aug 2015

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> Insofar as we appreciate order, it is when we perceive it as being accompanied by complexity, when we feel that a variety of elements has been brought to order--that windows, doors and other details have been knitted into a scheme that manages to be at once regular and intricate.
>
> - *Alain de Botton, The Architecture of Happiness, p. 175*

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Thesis Abstract

Background

It is accepted that the physical environment of healthcare influences the perceptions and experiences of patients and staff. Research has explored how birth unit design influences the experiences of women and midwives during childbirth. However, although there is evidence that cooperative supporters are beneficial to labouring women, and that women desire such support, little attention has been paid to the impact of physical design on the experiences of a woman's chosen childbirth supporter. This thesis describes how the physical environment influences the behaviour, experiences and role navigation of birth supporters.

Aim

To gain an understanding of how physical birth environment design accommodates women's supporters and facilitates their support roles.

Study Design

This childbirth supporter study presented in this thesis, is a research *sub*study of a larger Birth Unit Design (BUD) research project. Ethics approval was obtained for the BUD video-ethnographic study where six consenting women and their 11 supporters were filmed during labour at two different Australian hospitals (February/March 2012). The 'childbirth supporter study' (CSS) presented here is a single-case study design that was selected from the larger cohort of participants from the BUD study. One woman, her four supporters and three midwives provided the foundation for the 'childbirth supporter study' described in this thesis. Video footage and video-cued interviews with all participants and observational field notes provided data for analysis. Three-phase analysis cycle for both text and video included: descriptive, interpretive and selective coding (using an approach informed by Saldaña, 2013). Phase one, the descriptive

coding cycle, consisted of identifying what would be filmed, viewing the video, reading the transcription text and interview field notes and becoming familiar with the data. Phase two, the interpretive/pattern coding cycle, consisted of condensing the data so that themes could begin to be identified, such as by selecting exemplar still images from the video footage. The third phase, the selective/codeweaving stage, consisted of data reconstruction and synthesis, to facilitate interpretation of the evidence into thematic findings. The 'AEIOU' framework (an analysis approach informed by Wasson, 2000) was utilised for the video data during the third phase of analysis. An extended, reflective cross-validation inquiry of the thematic findings, using the Birth Unit Design Spatial Evaluation Tool (BUDSET) as both criterion and building block, provided translation of the findings into practice.

Findings

The physical environments of typical birth units do not appropriately meet the needs of supporters, who may feel unsure of their role, behaviour or positioning, thus limiting the potential benefits of their support role. Key themes are: 'Unbelonging Paradox', 'Role Navigation' and 'Supporting the Supporter'. Findings are supported by illustrative video footage stills and verbatim quotes. Viewing supporters as both individuals and part of a team dyad is the basis for the design recommendations. Examples of some of the recommendations are: spaces for both privacy and togetherness; informational support zones; transition space; positive distracters; easy access food, drink and toilet facilities; and the ability to personalise and adjust the space to increase the perception of agency.

Implications and Relevance to Practice

Knowing how the design of birth units can best accommodate the needs of women's supporters may facilitate optimal birth experiences for women and increase opportunities for safe, satisfying birth. Designers and healthcare managers may benefit from understanding the birth environment's influence on supporter's behaviours.

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Chapter 1: Childbirth, Birth Unit Design and Birth Supporters

Introduction

The study described in this thesis, the childbirth supporter study (CSS), is a substudy of the Birth Unit Design Study. The CSS investigates how the physical environment of the institutional birth setting enables a woman's chosen birth supporters to fulfill their support role. Evidence from a robust systematic review suggests that women benefit from the presence of supportive companions who accompany them to a hospital or birth center for the birth of their baby, no studies examined the supporter role in home birth settings (Hodnett, Gates, Hofmeyr, & Sakala, 2013). The supporter's role includes many types of activities, such as: being the woman's advocate, providing calm reassurance by gentle touch or talk, holding her hand, being an advocate, calming her down and being present (Johansson, Fenwick, & Premberg, 2015). However, many birth supporters, fathers in particular, state that they feel unprepared for their labour support role which diminishes their experience and limits their contribution; even leaving some fathers vulnerable to post-natal depression, anxiety or post-traumatic stress disorder upon witnessing traumatic births (White, 2007). If, and how, the physical design of institutional birth settings impact the supporter role has previously received minimal research attention.

This chapter provides the background to and context of the research by detailing the changing nature of supporter presence during childbirth in most modern hospital settings and how supporters experience and find their role within the built birth environment. Existing literature provides important insights into the supporters' experiences and needs and draws on evidence from three decades of research into environmental design for general healthcare settings. Information about current

Australian healthcare guidelines for maternity settings continues to build contextual understanding. With this contextual understanding presented, the chapter concludes by stating the research aims and objectives to address the research question and then details the structure of the thesis document.

Background and Context

During the 1970s a revolution occurred within hospital based maternity care when the father of the baby was invited to accompany his pregnant wife into the birth room (McCullough, 2009). Previously he had been relegated to a 'waiting room' where he spent time, perhaps with other waiting fathers, while his partner laboured and gave birth in the company of professional caregivers. No accommodation was provided for him within the birth room itself. Other relatives, or indeed friends, were not allowed into the birth space, as birth was not considered to be their affair (Reed, 2005).

During the late 1960s, the psychoprophylaxis method of pain-free childbirth that originated in Russia and was later promoted by the French obstetrician, Lamaze, included the role of a *monitrice* – a hospital-provided female birth supporter (Gillespie, 1981). However, in the USA at that time, there were neither the resources to provide such attendants, nor did regulations allow others in the birth space, so fathers began to assume aspects of the *monitrice's* role (Reed, 2005). Australia's childbirth history is not the same as in the USA, as asserted by Australian sociologist Taylor (2002), who argues, Australia has "never actually had the same degree of obstetric dominance …[as the US, although Australia]…came near to it in the 1950s and 1960s" (p. 91). However, the involvement of birth supporters follows similar patterns in both places (Reiger, 1999) and arguably in many other resource-rich countries.

In the early 1970s calls were made to 'humanise' birth spaces by making them more home-like (Haire, 1972). This phase corresponds to the women's movement and

the second wave of feminism in the 60s and 70s where demands were made for greater control for women over their own bodies (Eisenberg & Ruthsdotter, 1998). Many couples began rejecting the conventional medical childbirth option and demanded a more holistic, natural and social experience (Fannin, 2003; Reed, 2005). This movement resulted in a transformation of hospital birth with the acceptance of a family presence at birth and increased domesticity in the birth space, a transformation that spread quickly throughout most parts of the industrialised world (Romito, 1986). Natural birth activists at the time promoted moving away from the non-physiological processes that had become the norm for birth (i.e. elective induction of labour and chemical stimulation to speed up the labour) and from separating the woman from her family during the birth and immediate post-partum period (Chabon, 1966; Haire, 1972; Romito, 1986). This saw the woman's husband/partner and later other supportive companions 'allowed' into the birth room to provide her with emotional support and comfort (Peterson, Mehl, & Leiderman, 1979). Eventually the 'allowing' of a companion evolved into an expectation that a support person would accompany the labouring woman throughout the birth experience, even into the operating theatre if a caesarean section was required (Hodnett & Osborn, 1989; Shearer, Shiono, & Rhoads, 1988).

This major change in hospital practice, the expectation that women would bring one or more support persons into the birth room for the duration of labour and after, was not reflected in any consideration of how supporters were to be accommodated in the space (Grad, 1979). The design of the birth unit has remained largely unchanged from that of the 70s, which saw a trend to remodel maternity labour and delivery suites into "birthing suites". This change was sometimes criticised as shallow decorating to provide families a pleasanter outlook on their childbirth experience in the aim of

making relationships between staff and families smoother (Wertz & Wertz, 1989). However "regardless of what appear to be revolutionary changes in birth, much remains the same. The move to humanize the birth experience has not disrupted medicine's fundamental program of technologically oriented birth…" (Wertz & Wertz, 1989, p. 255). The adoption of birth centres – a unit located separately or within a hospital setting that provided comprehensive care by a team of midwives – both overseas and within Australia during the late 1970s, 80s and especially during the 90s, marks the desire to move away from medicalised birthing spaces (Waldenström & Lawson, 1998). Arguably, modern birth spaces appear to have been built with little consideration of the psychological, emotional, or physical needs of the woman during labour and even less consideration of the needs of the woman's supporters. As Reed, an American anthropologist, has asserted, "[t]he new movement makes room for the father in birthing and creates a place for him on the delivery team, but it fails to provide for his needs" (2005, p. 134).

A study by Peterson et al. (1979) investigating fathers' parenting behaviours based on home or hospital setting, confirmed the need for research on the topic of supporters in birth environments. While they did not define supporter behaviour in relation to any specific design elements within the birth environment they hypothesised "paternal attachment can be enhanced by provision of a birth environment that will help to overcome the father's inhibitions about being involved in the birth process" (Peterson et al., 1979, p. 337).

The substudy presented in this thesis therefore focusses on a dichotomy in the birth environment: although a support person, who might be the father, family member, friend or other person of the woman's choosing, is expected to accompany the woman and be present throughout her labour and birth experience with recognised benefits for

both mother and baby (Hodnett et al., 2013), the supporter may not be well accommodated in the birth space (Longworth & Kingdon, 2011; Premberg, Carlsson, Hellstrom, & Berg, 2011; Reed, 2005) and subsequently may be unable to function effectively in his/her supportive role.

The role of the woman's supporter includes many types of activities, such as: "sponging, wiping [her] forehead, running a bath, walking with her, and bringing food or drink" (Dellmann, 2004, p. 21). Equally important as these physical comfort activities, is the ability for the supporter to provide overall psychological and especially emotional support, such as: verbal encouragement; eye-to-eye contact; listening to any negative expressions of pain or fear the woman may need to vent; and sharing empathy (Coffman, Levitt, & Brown, 1994). These activities suggest a range of different types of accommodation may be required to enable the supporter to participate actively and with confidence in assisting at the birth of their child.

As fathers themselves say, the experience of being at their child's birth can range from the highest point in their lives to the most traumatic (Dellmann, 2004). Trauma can arise in part due to feeling a lack of control and to concern for the wellbeing of their partner and baby (Persson, Fridlund, Kvist, & Dykes, 2012; Steen, Downe, Bamford, & Edozien, 2012). In addition, phenomenological interviews and narrative research suggests that the presence of fathers who feel emotionally unsupported, anxious or stressed during childbirth may negatively contribute to the childbirth experience (Longworth & Kingdon, 2011; White, 2007). In interviewing Australian fathers about their role in childbirth, Vernon (2006) revealed many negative accounts of experiences by fathers who felt stressed and were potentially unsupported themselves. As one described:

> I…felt completely helpless and almost like the second wheel on a unicycle. I could not ease my wife's pain or seem to comfort her in any way. I was rejected...I became confused (p. 73).

And another father, related his traumatic feelings:

> I knew my stuff, but that didn't make it easy. With Amanda now heavily affected by the gas, I was doing all the talking with the medical staff and making the decisions virtually on my own. The sheer weight of responsibility in making huge but fast decisions on behalf of my wife and unborn child left me completely exhausted and emotionally traumatised for some time. I was capable of spontaneously bursting into tears up to a fortnight after the birth (Vernon, 2006, p. 122).

While a reflection from another father expresses his appreciation for having been useful and able to actively help his partner:

> I made an intervention that was useful…it's a demonstration that an attentive partner can act as an 'agent' of the birthing mother in their interaction with the system at a time when everyone else is busy doing something else (Vernon, 2006, p. 130-131).

Vernon also states:

> If men are not well supported to prepare for labour and birth their presence can have a deleterious effect on the labour…where the man is overly anxious about the birth, both he and his partner may well be better off if he is not present (2006, p. 203).

Other research suggests that birth supporters need different types of assistance during labour to be effective at their role. A literature review of the experiences of

fathers during childbirth published in 1999, found that: "it is essential that, in addition to the mother, the father's needs are assessed throughout labour and delivery" (Bartels, 1999, p. 683), with similar findings persisting (Abushaikha & Massah, 2013; Dellmann, 2004). Repeat interviews during the pregnancy, antenatal and postnatal periods demonstrated that fathers preferred having a variety of options that suited their needs in how they fulfilled their support role (Hallgren, Kihlgren, Forslin, & Norberg, 1999).

In a Turkish randomised controlled trial with 50 couples, Gungor and Beji (2007) explored the presence or absence of fathers during labour. The authors hypothesised that partner support would improve the woman's birth experience, shorten her labour and reduce the need for pain medication. By using the Perception of Birth Scale and Father Interview Form, the authors found that the woman's perception of her labour experience improved with partner support, but no measurable effects were found on labour length or pain medication request. Gungor and Beji (2007) assert that supporting the supporter can come in many forms, but support for the supporter needs to occur so that he can play an active role:

> …when mother and father are supported in labor and delivery, the rate of the fathers who adopt an active role in childbirth is high...[which highlights] the importance of support from health professionals for mother and father during each stage of this experience to benefit from the partner support in the best way (p. 228).

The physical design of healthcare settings has been shown to affect both physiological and psychological processes for patients and family members, depending on a variety of design variables (e.g. lighting, spatial layout, acoustics) (Ulrich et al., 2008). Dijkstra, Pieterse, and Pruyn (2006) report on a review of 30 controlled clinical trials that demonstrated certain relationships between the physical environment of

healthcare settings and patient well-being. Patients and supporters have been shown to experience anxiety or stress upon finding themselves within healthcare settings (Davidson et al., 2007; Ulrich et al., 2008). Architects, environmental psychologists and neuroscientists are beginning to understand how to redesign these spaces to alleviate stress (Henriksen, Isaacson, Sadler, & Zimring, 2007; Sternberg & Wilson, 2006; White, 2011). Similarly, the design of birth units can be argued to be an essential component in the creation of optimal birth spaces for labouring women and therefore one may assume an optimal environment is also relevant for women's birth supporter(s).

Research on the built birth environment's influences on women's birth experiences has only just recently begun to gain momentum (Duncan, 2011; Fannin, 2003; Foureur, Davis, et al., 2010; Foureur, Leap, Davis, Forbes, & Homer, 2010; Foureur, Leap, Davis, Forbes, & Homer, 2011; Symon, Paul, Butchart, Carr, & Dugard, 2008a, 2008c). The need to study the physical environment of birth units is increasingly called for by researchers, especially in the midwifery literature. For example, as part of a long-term vision for a "high-quality, high-value maternity care system" (p. S7) in the United States, Carter et al. (2010) indicated the physical environment as an essential component. Likewise, researchers in Britain (Singh & Newburn, 2006; Symon, Paul, Butchart, Carr, & Dugard, 2008b; Walsh, 2000) and Finland (Melender, 2006) remark on the lack of research focused on the influence of the physical setting on the experiences of childbearing women. Australian researchers agree there is a lack of evidence-based design information for maternity care (Priddis, Dahlen, & Schmied, 2012) and have developed conceptual models to help facilitate more design-behaviour studies in birthing units (Foureur, Davis, et al., 2010). Although the evidence has only just started making headway on understanding users' experiences in the birth

environment, new and hospital renovation construction projects continue to occur at a steady pace, both in Australia and in other resource-rich countries (Carpenter, 2011).

The Birth Unit Design Spatial Evaluation Tool (BUDSET) was developed to measure the optimality of birth units with the birthing woman as the centre of the process. In this case the term 'optimal' can be defined as the way the birth space is designed in order to facilitate a woman's "physiologically normal labor and birth" (Foureur, Leap, et al., 2010, p. 43). As Foureur, Leap, et al. (2010) describes, "The design principles [for BUDSET] are built around a sequence of a woman's progress through the birth unit when entering the space, giving birth, and leaving" (p. 48). The development of this tool is an indication of the need for and the momentum that is gathering for researchers to examine how physical design features influences the experiences of users in childbirth settings.

Australian Hospital Design: Birth Unit Design

In Australia, the design process for building or redeveloping a birth unit, along with that of all other hospital units, is based on the Australian Health Facility Guidelines (AusHFG). Designers, planners and architects are expected to refer to AusHFG during the design process, especially at the beginning while determining priorities (Forbes, pers. comm., 23 Nov. 2012). Section 510.4.40 of the guidelines, under the heading 'Ambience', states the need for recognising family members as integral to the childbearing experience: "Overall unit/centre design should recognise the pivotal role of the parents and other family members as part of the whole process of pregnancy, birthing and post-natal care" (Australasian Health Infrastructure Alliance, 2012, p. 6). Those who developed the guidelines appear to have understood that the physical environment of the birth unit is an essential aspect of an optimal birth experience regarding how the supporter is accommodated. Investigating how these components of

the guidelines are translated into practice in the building or redevelopment of birth units in Australia is the focus of this thesis.

Summary of 'Childbirth Supporter' Study Justification

This chapter has highlighted that supporters are seen as necessary and desired participants in most modern day childbirth settings, with their presence of benefit to the woman's birth experience and outcomes for mothers and babies. Supporters tend to have a large role to fill and often feel overwhelmed, anxious or uncertain about their presence during the childbirth experience. Although recent design guidelines show an awareness of the importance of supporters, it is possible supporters have been overlooked when it comes to the design of the physical birth setting.

Research Aims

The aims of this project are to:

1. Explore the experiences of the labouring woman's birth supporters; and
2. Identify if and how the design of the birth space enables the supporters to fulfill their support role.

The specific objectives of this study are to:

- generate evidence about the design of birth units in relation to childbirth supporters;
- analyse the influence of the birth environment on the behaviours and experiences of the woman's supporters; and
- identify the relevance of birth unit design features that support women's childbirth supporters.

This thesis aims to add new knowledge to the evidence base concerning the design of birth units so that birth supporters are better able to fulfill their support roles.

Improved support in labour may increase the likelihood that women have positive labour experiences that may increase rates of straightforward normal birth.

The question posed by the research presented in this thesis is:

How does the current design of birth spaces in resource rich countries, accommodate and facilitate the role of the woman's birth supporter?

Structure of the Thesis

The thesis follows a hybrid 'traditional' and 'by publications' framework. It contains papers that have been published throughout the author's candidature. The thesis contains eight chapters: 'Childbirth, Birth Unit Design and Birth Supporters'; 'Childbirth Supporters and Physical Birth Environments: A Review of the Literature'; 'Study Design and Methods'; 'Childbirth Supporter Study Design and Theoretical Framework'; 'Issues Faced in Gaining Ethical Approval for Birth Unit Design Research'; 'Thematic Findings'; 'Translating the Findings into Practice'; 'Reflections and Conclusion'. Two publications make up substantial portions of the 'Study Design and Methods' and 'Issues Faced in Gaining Ethical Approval for Birth Unit Design Research' chapters. The reader will be guided through the transitions between the main text of the thesis and publications so that the thesis reads as a unified work. There is some repetition between the main text and that of the publications, because the publications required a certain degree of background in order to flow, some of which is also addressed in the thesis text and vice versa.

The published papers in chapters 3 and 5 have been included as 'accepted for publication' versions so the figures and tables could be renumbered for consistency and flow of reading the thesis. The published versions of the papers are located in Appendix B and C. The citation styles of the papers are governed by each publisher, and relate to the reference list at the end of the relevant paper. A complete reference list using the

APA referencing style is at the end the thesis, and includes all references cited in the thesis, including those from the publications.

Synopsis of the Thesis

In the next chapter a comprehensive review of the literature, which has a focus on supporters' roles as influenced by the physical birth environment, is presented. All peer-reviewed publications that corresponded to the physical birth environment, childbirth supporters' experiences in the built birth environment or relevant research that alluded to these variables were examined. It was identified that although the body of research on evidence-based design for general healthcare settings has exploded in the last twenty years, and birth unit design research has had a slight surge in the past decade, there is still minimal research regarding childbirth supporters' needs in the physical birth environment. Therefore the childbirth supporter study described in this thesis is well justified.

Chapter 3 details the methods for conducting a complex, interdisciplinary, video-based ethnographic study in hospital and birth-centre environments in one Australian state and is presented as an accepted-for-publication version, with the published co-authored and peer reviewed publication available in Appendix B (Harte, Leap, Fenwick, Homer, & Foureur, 2014). The paper describes the overarching Birth Unit Design study to which the research detailed in this thesis, 'the childbirth supporter study', contributes and from which it is derived. Examples are provided of how relationships were formed to gain trust and foster mutual desires between the research team and research participants to explore the nature of the physical birth unit environment's influence on women, midwives and the women's childbirth supporters. The rationale for what to film, reflexivity in the study, and planning for the implementation of the study are described. The information sharing steps, recruitment

process, filming and handling the footage and the interview process are described in detail. The methods for conducting and gathering the data for the childbirth supporter substudy – the focus of this thesis – are the same as for the Birth Unit Design study, however, the analysis process for the childbirth supporters sub-study were specific to a single-case study design process. Therefore this chapter is presented as the BUD research design methods' publication (accepted version, altered to keep figure/table numbers congruous), with the intention to make clear the research methods for the childbirth supporter study.

Chapter 4, consisting of two parts, differentiates the childbirth supporter sub-study from the Birth Unit Design study and examines the theoretical foundations of the thesis study. Part one describes the relationship between the Birth Unit Design study and the 'childbirth supporter study'. This includes a justification for choosing one woman and her supporters' experiences for in depth analysis, based on the breadth and range of supporters and woman's activities during an extended labour experience, and the thesis author's participation in the field observations. Details regarding the setting, participants, and the reflexive-interviews are provided, including images of the setting. The data analysis for the video footage, interview transcripts and field notes is explained, with accompanying audit trail figures and tables.

Part two of Chapter 4 describes a theoretic framework grounded in ethnography, which guides the study in generating a detailed exploratory work made even richer with the use of video ethnography and reflexivity to enable participants' reflections on their experiences. The driving theory/hypothesis behind the choice of video-ethnographic and reflexive frames are the Birth Territory theory (Fahy, Foureur, & Hastie, 2008; Fahy & Parratt, 2006) and the Safe, Satisfying Birth model (Foureur, Davis, et al., 2010). These concepts of territoriality, power and jurisdiction enhance the

interpretation of the study findings to enable a translation to real world settings. Symbolic interactionism (Prus, 1996; Stryker & Vryan, 2006) provides an analytic lens to enhance the interpretations and understandings of the meanings that stem from the participants' interactions with the physical space and objects.

The ethical dilemmas and the challenging process of attaining ethical approval for the study are described in Chapter 5, which is also presented as an accepted-for-publication version of the paper (Harte, Homer, Sheehan, Leap, & Foureur, 2015), with the published version located in Appendix C. Understanding the challenges that were faced by the research team in gaining initial ethical approval to conduct video-based research in the hospital birth setting is an essential aspect of ensuring firstly that the study was conducted ethically, but also aims to facilitate future ethnographic and video-based research in this area. The relationship between the ethical issues faced by the Birth Unit Design project and the 'childbirth supporter study' reported here are similarly explored in an exegesis to this chapter.

Chapter 6 presents the three key themes and eight supporting sub-themes identified from the analysis of the video-cued interview transcripts, video footage and field notes. With one family as the centre of the study, the thematic findings of 'unbelonging paradox', 'supporting the supporter', and 'role navigation' are signposts towards a better understanding of childbirth supporters' needs in the built birth environment. Supporting examples, presented as an annotated 'thick description' include participants' interpretations of events and still images from the video that show exemplar design issues in the birth unit. The evidence reveals that, for the family who were the participants in this study, the physical birth environment did not facilitate the role of the supporters.

Chapter 7 presents the results of a cross-validation inquiry comparing the findings presented in Chapter 6 with the four domains of the Birth Unit Design Spatial Evaluation Tool (BUDSET), a quantitative measurement tool used to assess birth unit design optimality. Eight additions or amendments are presented to further refine and extend the BUDSET in measuring design factors that meet supporters' needs.

Chapter 8 presents a reflection on the connections between the findings and the original research question, aims and objectives and the meanings behind these findings. Any limitations of the study are discussed, such as possible gendered nature of examining one family's experience with the main supporter being female. Contributions of the study to birth unit design and evidence-based healthcare design research, as well as future birth unit design in practice, are presented and design recommendations are made to facilitate women's supporters who choose a passive or active support role. For example, design features such as, a family alcove or window bench seating, may better meet supporters' needs by providing both a place for close proximity and a space to remain unobtrusive. It is hypothesised that if childbirth supporters' needs are better met by the physical design, they will be better able to provide support for the woman, thereby improving the experience of childbirth for the woman, babies and families.

The following chapter is a comprehensive review of the literature that informs this thesis research. Healthcare based evidence-based design, birth unit design and support literature are assessed to provide a deeper understanding of the experiences of childbirth supporters in the physical birth environment.

Chapter 2: Childbirth Supporters and Physical Birth Environments: A Review of the Literature

This chapter is a review of research published between 1976 and 2015 addressing how the physical environment of the birth unit potentially influences the roles and experiences of childbirth supporters. It is a systematised literature review adopting a comprehensive approach to gathering literature that uses criteria for excluding and including relevant literature, but does not use an a priori, formal, resource intensive quality review process, such as is used by systematic reviews. Systematised literature reviews are a type of literature review that "attempt to include elements of systematic review process while stopping short of systematic review" (Grant & Booth, 2009, p. 95) due to resource limitations (such as with an independently conducted review). The goal of this literature review is to demonstrate that the knowledge developed by this thesis is pertinent, important and logically driven by the current field of knowledge towards a useful next phase of research. The review documents what is known about the presence and experience of childbirth supporters within the built childbirth environment, any uncertainty there is around research findings, and the limitations of current research. Inclusion criteria therefore were English-language, peer-review articles with a title or abstract focus on the physical design of birth environments, childbirth and/or childbirth supporters. Therefore, articles were excluded that did not provide: direct evidence or allude to physical environment factors and/or childbirth supporters.

The year 1976 was chosen as the starting point because several seminal writings on the relationship between human environment and behavior (see, for example, Alexander, Ishikawa, & Silverstein, 1977; Altman & Wohlwill, 1976; Moore &

Golledge, 1976; Proshansky, Ittelson, & Rivlin, 1976; Tuan, 1977) and perinatal benefits of the presence of childbirth supporters (Sosa, Kennell, Klaus, Robertson, & Urrutia, 1980) were published in that year or shortly after. Most of the literature was searched for during the years 2013 and 2014, with periodic checks occurring until the date of submission in early September 2015 to ensure all recent literature was included. The reviewed literature either directly explores the relationship between the physical birth environment and a woman's childbirth supporters or has findings that may indirectly inform us about the possible nature of the relationship.

For the purpose of this research, the 'woman' is defined as the pregnant and labouring woman. 'Environment' includes architectural features, interior design features and ambient features (potential sources of satisfaction or dissatisfaction for occupants, such as lighting, auditory levels, ventilation and odours, and warmth or coolness) (Harris, McBride, Ross, & Curtis, 2002). Supporters for this research are considered untrained, lay "companions from a woman's social network, such as husbands/partners and female relatives usually [with] little experience in providing labour support and are themselves in need of support when with a loved one during labour and birth" (Hodnett et al., 2013, p. 4). Doulas and other trained birth professionals were not included in this research, as they have a professional ability to interact with the woman and the physical birth setting.

As will be described, all of the research identified for childbirth supporters and physical birth environments, and the majority of childbirth supporters and/or physical birth environments had the participants as 'father'; therefore the review has a prevalence of fathers' experiences. However, there are many different types of people who may function as the chosen-supporter. It can be argued all supporters share the common denominator of 'not woman', yet each individual supporter will come with their own

perceptions, experiences and perspectives about what to expect, whether that be 'father', 'mother', 'sister', 'friend' or even 'friendly stranger'. The review progresses our understanding of the relationship between physical birth unit design and the experiences and needs of childbirth supporters.

Literature Review Method

Nine electronic databases were selected for the keyword search: ProQuest, EBSCO, PubMed, Ovid, Google Scholar, Web of Science (SCI, SSCI and A&HCI), PsycINFO, Cochrane Database of Systematic Reviews and Wiley Online. These databases were selected because of either: (1) A broad coverage of all peer reviewed literature (for example Google Scholar and Web of Science) or (2) Specialisation in research areas relevant to physical birth unit design and birth supporters (for example, PubMed and PsycINFO).

The databases were searched using 22 keywords grouped into two themes: (1) Built environment and childbirth and (2) Supporters in the built childbirth environment as shown in Figure 1.

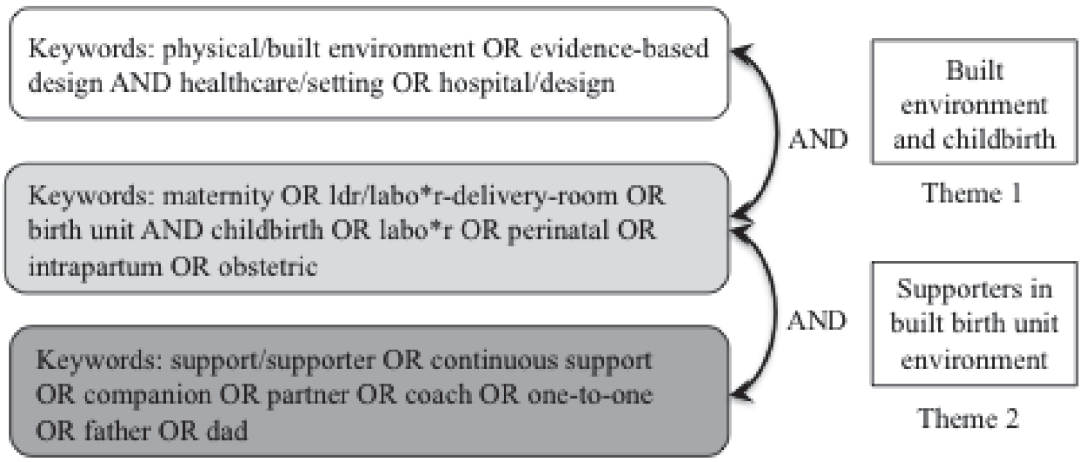

Figure 1: Keywords and combinations for search criteria and guiding themes

Literature Review Results

The first round search strategy was the selection of keywords and search criteria, such as, only peer-reviewed publications, resulting in 404 articles, see Figure 2 for a flowchart indicative of the search criteria, inclusion and exclusion process.

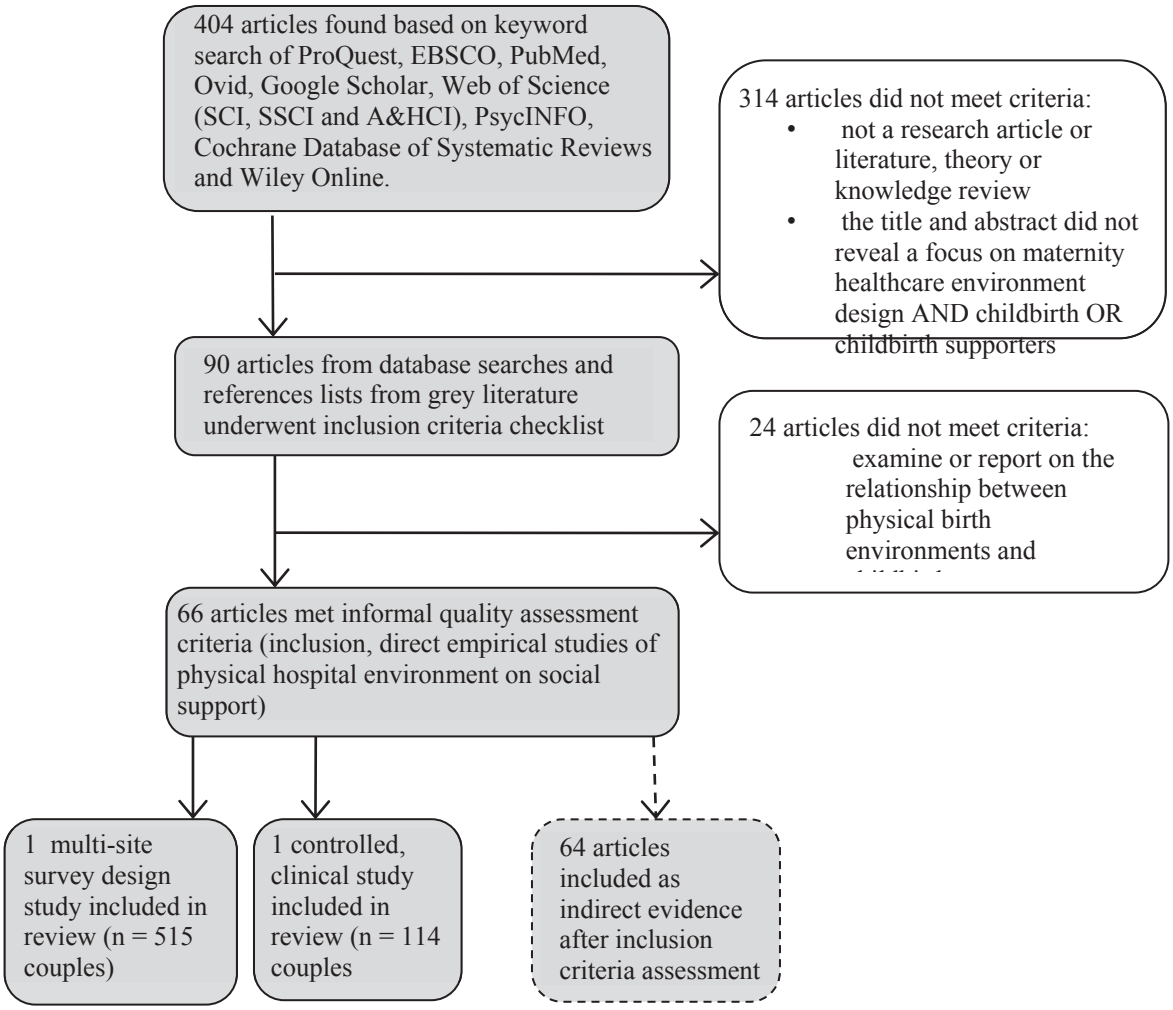

Figure 2: Inclusion criteria flowchart

The second round was to ensure the article was: either a research article or a knowledge, theory or literature review; and that the title and abstract alluded to a focus on physical environment design AND childbirth OR childbirth supporters, resulting in 90 articles. The third round was to determine if the primary research objective was to directly measure, discuss or assess the interaction between the physical environment and the supporter. If physical birth environment and supporters was not the primary

research objective, the article was assessed for inclusion as indirect evidence, based on the relationship between physical healthcare environment and childbirth OR childbirth supporters OR social support as the focus of the article, resulting in 66 articles in total.

The use of relevant criteria items from the 'consolidated criteria for reporting qualitative research' (COREQ) quality assessment checklist (such as methodological orientation, sample size, setting and type of data collection) was used to establish the characteristics of the included literature (Tong, Sainsbury, & Craig, 2007). A total of 66 articles were reviewed; 64 were indirect evidence, for instance articles alluding to possible physical environment influences on supporter or woman's behaviour as part of a larger analysis, or by including physical environment as one category in a satisfaction survey. Two studies were found that empirically investigated supporters' experiences as influenced by the physical birth environment and therefore directly contributed to the knowledge base of how physical birth unit design influences childbirth supporters (Symon, Dugard, Butchart, Carr, & Paul, 2011; Westreich et al., 1991). The composition of these 66 articles, as identified in a series of five Tables located in Appendix A are: five systematic reviews, two meta-analysis reviews and four other types of literature reviews included in Table A1; Table A2 includes six randomised controlled trials; Table A3 includes 20 quasi-experimental or experimental design studies; Table A4 includes 22 exploratory, descriptive, and/or interview methods studies; and Table A5 includes seven relevant non-empirical knowledge reviews. A mixture of qualitative and quantitative study designs and analyses were reported, with a total of 27,215 participants. For the qualitative studies there were 292 total participants: 113 were fathers and 112 were women or a midwife/woman pair. The other qualitative study participants were either couples, supporters of other patients, or midwives with a total of 67 participants. The quantitative studies included: more than 25 thousand

women or women and baby pairs; 598 couples and a mere 138 fathers, in either experimental or quasi-experimental studies. Literature, theory or practice reviews surveyed 281 articles and 28 hospital units were audited, including eight maternity units.

Based on the keyword search themes, this section first summarises research on the relationship between the physical birth environment and childbirth that has a bearing on the roles and needs of women's childbirth supporters. Second, it examines research directly addressing the role and needs of supporters' during childbirth. It concludes with a more detailed description of the two empirical studies addressing how the role and experience of supporters can be facilitated or inhibited by the physical birth environment.

Physical Birth Environment and Childbirth

The design of the physical birth environment is considered to have a powerful effect on women (Hodnett & Abel, 1986) and supporters' birth experiences (Dellmann, 2004; Foureur, Leap, et al., 2011). The physical design of the childbirth setting is situated within a range of factors, which may influence whether the woman experiences a satisfying or traumatic birth (Bohren et al., 2015).

There are many studies on women's childbirth experience that show an association between the physical birth environment and the experience of childbirth. For example, studies include both descriptive exploratory photo-elicitation interview studies (Hammond, Homer, & Foureur, 2014) and systematic reviews (Srivastava, Avan, Rajbangshi, & Bhattacharyya, 2015) of communication and interpersonal relationships during childbirth; descriptive, cross-sectional surveys of quality of care (Senarath, Fernando, & Rodrigo, 2006) and phenomenological feminist approach studies using multiple interviews and journals to understand women's prior knowing

about birth and experience of childbirth (Savage, 2006). The decision-making process about where to experience childbirth has been studied with both ethnographic (Carlton, Callister, & Stoneman, 2005) and descriptive, cross-sectional approaches (Thompson & Wojcieszek, 2012). How the physical environment may influence women's freedom of movement has been examined in both knowledge reviews and case studies (Lepori, 1994), as well as via current literature reviews (Priddis et al., 2012). Freedom of movement during labour and birth is one factor amongst many that has been assessed in investigating women's satisfaction, using data collection methods such as focus groups and questionnaires (Janssen, Dennis, & Reime, 2006) and longitudinal population-based studies (Rudman, El-Khouri, & Waldenström, 2007). The impact of the physical design of childbirth settings has been investigated in terms of perception of pain using repeated national surveys (Singh & Newburn, 2006) and experiences of fear as shown in a Cochrane systematic review (Hodnett et al., 2013). Ethnographic studies have suggested the importance of the physical environment supporting women's intuition and nesting behaviours during childbirth (Walsh, 2006) and childbirth outcomes have been positively associated with the physical childbirth environments in a Cochrane systematic review (Hodnett et al., 2013).

The level of satisfaction experienced by women in childbirth settings varies widely based on related and diverse factors, such as model of care, staff communication and the physical environment (Janssen et al., 2006; Noseworthy, Phibbs, & Benn, 2013), as revealed in satisfaction assessment tool development and antenatal/postnatal interviews. The high-degree of medicalisation within typical hospital physical birth environments may have the largest influence of all, even more so than continuity of care or other factors (Perez-Botella, Downe, Magistretti, Lindstrom, & Berg, 2014; Romito, 1986). The physical design of most birth environments appears to reinforce the idea

that birth is a medical event, with no thought for the human needs of both woman and supporter. Despite indicating an association, there is little conclusive evidence from this literature review, either rejecting or supporting this argument. The supporter as active user of this space also experiences a difficult adjustment in providing a confident, calm support role in such a medicalised space, that Steen et al. (2012) call, "not patient, not visitor" (p. 422).

Evidence-based design in healthcare

Certain design features regularly surface as important in evidence-based design research. Features such as noise, light, aesthetics (including positive distracters), privacy and room layout have commonly been studied and systematically reviewed (Dijkstra et al., 2006; Ulrich et al., 2008) in terms of patient perceptions of care and outcomes, especially the contribution of these features to increased stress or fostering social support. These findings were particularly highlighted in a recent experimental study with 217 participants (Andrade & Devlin, 2015). Using an on-line survey in their study, students were asked to imagine a hospitalisation situation and were then shown one of eight lists of different design features (such as space for family and friends, presence of plants and a refrigerator). The participants were then asked to select from these lists to select the room they expected to experience less stress and the results were analysed with meditational analysis to the responses. Additionally the participants' responded to Spielberger's 20-item State Anxiety Inventory. Those rooms with a greater variety of design elements were perceived as less stressful due to perceived increase in social support and positive distracters.

In a comprehensive literature review on the state of evidence-design for healthcare, sans childbirth settings, the physical environment has been posited to be an important factor in fostering the supporter's interactive role, such as inclusion of single-

patient room designs and positive distracters (for example hospital gardens) to facilitate social support (Ulrich et al., 2008).

Supporters in healthcare settings communicate and behave in ways that may be influenced by design features that have been indicated as influencing patient outcomes (such as reduced perception of pain with plants present (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003) and possible improved recovery after surgery when patients had a nature window views (Ulrich, 1984). Some of these design features include acoustics, layout, furniture type, privacy, lighting and the presence or absence of nature images or other positive distracters. Studies identifying these relationships have included an experimental simulation design study for social support in hospital settings (Andrade & Devlin, 2015), and in a phenomenological-hermeneutical interview study with supporters of dying loved ones (Fridh, Forsberg, & Bergbom, 2009).

Evidence-based design in birth environments

The array of interior design variables can be complicated, especially for healthcare settings. A co-editor for the Health Environments Research and Design journal, D. Kirk Hamilton (2008), suggest that there may be infinite design variations within healthcare environments. However, as detailed in Table 1, design variables commonly mentioned for birth spaces may be categorised as the need for: privacy; perceived control over physical environment; acoustics/music; lighting/colour; home-like aesthetics; and welcoming areas for family members/opportunities for positive distractions.

Table 1: Birth Unit Design variables and supporting studies

Design Variable	Studies
Privacy	(Buckley, 2003; Lothian, 2004; Singh & Newburn, 2006; Walsh, 2006)
Perceived control over physical environment	(Lepori, 1994; Singh & Newburn, 2006; Symon et al., 2008a, 2008b)
Acoustics/music	(Browning, 2000; Hodnett, Stremler, Weston, & McKeever, 2009; Singh & Newburn, 2006)
Lighting/colour	(Dalke et al., 2006; Duncan, 2011; Hodnett et al., 2009; Singh & Newburn, 2006; Symon et al., 2011; Thompson & Wojcieszek, 2012)
'Home-like' aesthetics	(Fahy & Parratt, 2006; Hauck, Rivers, & Doherty, 2008; Shin, Maxwell, & Eshelman, 2004; Singh & Newburn, 2006; Walsh, 2006)
Welcoming areas for family members/opportunities for positive distractions	(Douglas & Douglas, 2004; Foureur, Leap, et al., 2011; Hauck et al., 2008; Hodnett et al., 2009; Singh & Newburn, 2006; Symon et al., 2011; Thompson & Wojcieszek, 2012)

Each of the design elements in Table 1 (privacy, perceived control over physical environment, acoustics/music, lighting/colour, 'home-like' aesthetics, and welcoming areas for family members/opportunities for positive distractions) were ranked as important to preferred physical birth environment design by the 2,620 UK women who were surveyed about their preferred physical birth environment design-qualities (Newburn & Singh, 2003; Singh & Newburn, 2006).

Women often make choices about where to give birth based on both design and hospital policies, such as suggested in Thompson and Wojcieszek's descriptive, cross-sectional study (2012). For instance, factors contributing to women's decision-making included: 'how nice a facility is' (for instance, aesthetics); how supported the woman is to choose her positions during labour; and the extent to which her support people are "made to feel welcome" (p. 4). The question remains whether a welcome atmosphere comes from the caregivers or the physical design – arguably they are interconnected. Descriptive and cross-sectional studies alone cannot determine conclusively cause and effect for specific design features or model of care.

Indirect Evidence: Childbirth Supporters and Built Birth Environment

What is known about childbirth supporters?

There is a substantial research literature addressing the role of supporters in childbirth contexts. For instance, the importance of supporters' presence to women was identified in a cross-sectional study of 293 women in the process of validating a support during labour questionnaire to assess women's perception of support received during labour (Dunne, Fraser, & Gardner, 2014). A national cohort survey with more than 16,000 women participants highlighted that mothers without supporters may be at increased risk of experiencing adverse outcomes (Essex & Pickett, 2008).

The role of supporter can be performed by any one of the woman's choosing; often it is the father, but it may also be a female-relative, a friend or a paid trained doula, a person trained to support people in labour – although doula research was not included in this study. Father-centric research was the most dominant type of literature identified, but there are a few articles focused on non-father supporters, which are identified here. Supporters who are neither fathers nor trained have been shown to be beneficial in a randomised controlled trial with 189 women participants, especially when the supporter focused on providing "comfort, reassurance and praise" (Hofmeyr, Nikodem, Wolman, Chalmers, & Kramer, 1991, p. 756). Similarly, female relatives in a large non-randomised, descriptive comparison study of 333 women with or without support, showed a reduction in requests for pain-relief and an improvement in reports of a positive birth experience when a supporter was present (Khresheh, 2010).

Fathers in the support role have been well-studied including, literature reviews (Bartels, 1999; Gawlik, Müller, Hoffmann, Dienes, & Reck, 2015), an observational grounded theory study (Chapman, 1992) and recent longitudinal studies determining suitability of measurement instruments to assess fathers' experience during childbirth (Gawlik et al., 2015; Rudman et al., 2007). Both a quasi-experimental study (Diemer,

1997) and a study using qualitative interviews (Hallgren et al., 1999) have highlighted the importance of childbirth education on supporter behaviour. A recent meta-synthesis indicated the benefits of fathers' preparation for childbirth roles by either adopting an active supporter role, or being given the option of a passive observer or non-supporter role (Johansson et al., 2015). Fathers performing a 'just-being there' role are also valued and important to women, as indicated by the 24 women who imagined what would make a good childbirth experience for them, in an upcoming first or repeat childbirth experience (Melender, 2006).

Supporters typically desire to be involved in the childbirth process, as indicated by antenatal and postnatal interview (Somers-Smith, 1999) and phenomenological interview studies (Premberg et al., 2011), but typically experience a dramatic range of emotions, from euphoria to agony, as highlighted by a literature review (Dellmann, 2004) and a phenomenological descriptive study (Sengane, 2009). Supporters are often challenged in role navigation, as found by a grounded theory study (Chapman, 1992), an ethical and theoretical review (Draper & Ives, 2013) and a phenomenological study (Longworth & Kingdon, 2011). This emotional swing and uncertainty leads to masking of supporters' true feelings, as suggested by an exploratory study using antenatal/postnatal interviews, journals and observations during labour (Chandler & Field, 1997).

Fathers' experiences of being a supporter during complicated births has been studied via open-ended narrative interviews (Erlandsson & Lindgren, 2011), suggesting fathers in such situations should have 24 hour access to the birth unit to support the mother and baby postnatally. Studies highlighting the beneficial outcomes for mothers, babies and families when supporters' are cooperative and continuously available have been conducted using multidimensional measurement tools and antenatal/postnatal

interviews (Ford, Ayers, & Wright, 2009) and a Cochrane systematic review, concluding that supporters' presence is a low-cost, desirable and beneficial childbirth determinant (Hodnett et al., 2013). However, the imperative need for supporters to feel supported during the childbirth process should not be disregarded, as an experimental and prospective study (Gungor & Beji, 2007), qualitative open-ended interviews (Bäckström & Hertfelt Wahn, 2011), and a qualitative meta-synthesis have highlighted (Steen et al., 2012).

A randomised controlled trial, of 412 women's views of factors that contributed to positive birth outcomes, highlighted the crucial importance of calm, supportive and continuously present supporters as a central factor to foster a fulfilling experience (Lavender, Walkinshaw, & Walton, 1999). At the same time, three different phenomenological studies of supporters found that supporters often feel overwhelmed and struggle to find their role, feel anxious and are more vulnerable after a distressing birth experience (Longworth & Kingdon, 2011; Sengane, 2009; White, 2007). In the first study 11 first-time fathers struggled to find their roles, due to feeling overwhelmed (Longworth & Kingdon, 2011). In the second study of 10 Black South African fathers, the most commonly identified emotion was anxiety (Sengane, 2009). In the third study, by White (2007), 21 fathers who had witnessed a traumatic birth were asked to provide a narrative of their experiences. They reported feelings of vulnerability and/or distress, with some reporting post-traumatic stress symptoms (White, 2007).

The overall interpretation of these studies is that cooperative and continuous supporters are experienced as beneficial and desired by the woman, desire to be involved in the childbirth experience, yet supporters need preparation and both personal and physical support to help them navigate their roles and their emotions.

Links between supporters' needs and physical birth environment

In terms of how the physical birth environment might contribute to birth supporters' experiences, there appear to be some similarities between supporters and women in labour (see, for example, Fahy & Parratt, 2006) in their need for 'territorial rights' (MacLaughlin & Taubenheim, 1983, p. 12). An early study by MacLaughlin and Taubenheim (1983) compared antenatal and postnatal interviews between fathers who had, and those who had not attended childbirth preparation classes. Their findings found that fathers in both groups described feeling powerless when their wife/partner experienced discomfort. For men in this study, they wanted to receive "warm supportive care from the birth attendants" yet they also found it important to "maintain a degree of control" (p.12) over the wife's birth experience. For fathers who desire a passive observer role, the physical design needs may look quite different to the role of active supporter who is in close proximity to the woman. One literature review of fathers' experiences has suggested that the passive-observer supporter needs regular check-ins by the caregiving staff to ensure they are not anxious (Dellmann, 2004), and that a family alcove, window seating and transition space are beneficial for supporters without an active role (Shin et al., 2004).

As many authors argue, birth is a natural occurrence, not an illness and consequently it should take place in a home-like or familiar environment (Buckley, 2003; Lepori, 1994). Given birth is a social event, a sense of familiar, controllable space may be the essence of hominess. The childbirth experience should occur in designed birth environments that recognise supporters as valuable members of a family experience, centred on the woman, yet also incorporating a place for other children.

Midwife researchers found that supporters spend substantial time in the birth room, during which time the supporter is typically expected to play a supportive role to the woman in labour (Symon et al., 2011). From a large study of interior design

variables on childbirth experience, conducted via focus groups and a uniquely designed questionnaire Symon et al. (2011) suggest that by improving the experience of the father during childbirth, his role as supporter will improve. The studies by Symon et al. were partitioned among five publications with a different perspective for each: the background study (Symon, Paul, Butchart, Carr, & Dugard, 2008d), the perceptions of space and layout (Symon et al., 2008a), control and empowerment via the ambient design features (Symon et al., 2008b), and midwives perceptions of their work environment (Symon et al., 2008c). The research team surveyed 559 women, 521 birth partners, (a total of 515 dyads), and 227 staff, plus conducted a focus group with seven women to inform the questionnaire development. Statistical analysis was conducted to determine outcomes based on the types of unit in which the woman and her partner laboured (either midwife-led or obstetric-led). The questionnaire, delivered eight days post-partum, asked both participants about their impressions and experiences of the physical birth environment and about their perception of the care received. Symon et al. (2011) findings from the supporter-related publication are discussed in the next section on 'Childbirth Supporters' Experiences in the Physical Birth Environment'.

Another study with 35 participants investigated the relationship of seven specific design variables (family alcove, entrance transition, openness toward inside, openness toward outside, spatial continuity, display surface, and operable windows) on women's perception of hominess, preference to choose such a setting for childbirth and how much personal control they thought they could establish in each birth setting (Shin et al., 2004). The variables were depicted in sets of line drawings that conveyed a main emphasis for each design element. Line drawings differentiating the design features were rated using a Likert scale. Using quantitative analysis, these authors assert that the perception of hominess in the physical birth environment not only increases the

likelihood of a woman choosing the setting, but also communicates that the space is flexible, welcoming, is able to be controlled to foster privacy and appropriate territoriality, and exists to facilitate a safe, satisfying birth experience. Shin and colleagues' research method appears to be highly effective for investigating relationships between the physical birth environment and users perceptions of the space, and likely just as effective to assess supporters' perceptions.

Hospital environments may alter the normal behaviours of childbirth supporters. From a narrative literature review of birth supporters, Dellmann (2004) suggests that couples may be inhibited by the medicalised environment and not act as they normally would in a more familiar context. Dellmann posits that couples' ability to move freely and feel unobserved during intimate encouragement, such as massage or embraces, may be deterred by the ever-present and authoritative medical environment and presence of healthcare professionals.

Evidence from a range of qualitative study designs, using techniques such as focus groups, interviews and questionnaires, which explored women's satisfaction and preferences, also indirectly informs an understanding of the relationship between supporters and the physical birth environment (see, for example, Janssen et al., 2006; Rudman et al., 2007; Srivastava et al., 2015). Studies show that women want to have supporters in close proximity, feel in control, have the ability to make decisions, and have a sense of privacy (Janssen et al., 2006; Lavender et al., 1999). A UK study by Singh and Newburn (2006) similarly showed women want the space to be homely, welcoming, afford privacy and be able to meet the needs of supporters (for example, wanting supporters to be welcome at any time day or night and have a comfortable chair).

Three-quarters of 2,620 self-selecting UK women surveyed on their wants and needs in the physical birth environment ranked a comfortable chair for the birth supporter as highest importance (Newburn & Singh, 2003; Singh & Newburn, 2006). Given the survey design for this research; it is not possible to determine what other design variables for supporters could have been highly ranked if they had been available on the survey. One woman stated:

> Thirty five *(sic)* years ago my parents and some of their friends fought fierce hospital opposition to have the fathers present at births. Now we must fight to ensure that fathers' needs are taken care of and that they are comfortable during long labours, which can be stressful for them too (Newburn & Singh, 2003, p. 5).

Newburn and Singh (2003) note that the social and comfort needs of fathers are often overlooked by the designed physical birth environment, and this was similarly noticed by the women. Two-fifths of the women noted that no comfortable seating was available for their supporter, despite comfortable furnishings being ranked as a top priority by women for their supporters (Newburn & Singh, 2003). One woman spoke about how her partner "could really have used a nice sofa or bed to relax (p. 13)…(as) there was no comfortable seating…or pillows."

Childbirth supporters' during the childbirth experience need appropriate facilities. However, the interrelationships and interactions amongst all the people during the childbirth process are typically considered to be an equally, if not more important factor. Based on the national sample conducted by Newburn and Singh (2003) they argue that the two factors are interconnected and cannot be separated.

The Newburn and Singh (2003); Singh and Newburn (2006) studies add evidence to a growing body of literature that suggests maternity units in the UK, and

perhaps arguably in birth settings in many other resource-rich countries, are deficient in accommodating birth supporters' needs. These authors suggest the lack of facilities in the birth units sends messages to the fathers that they are overlooked and unimportant in their role as supporter and as a father, thereby likely adding concern for women during labour.

A team of researchers (Foureur, Davis, et al., 2010; Foureur, Homer, et al., 2010) developed a spatial evaluation audit tool, the Birth Unit Design Spatial Evaluation Tool (BUDSET) to "assess the optimality of birth units and determine which domain areas may need to be improved" (p. 43). This tool has been tested (Foureur, Leap, et al., 2011) and validated and found to be reliable (Sheehy, Foureur, Catling-Paull, & Homer, 2011). The BUDSET categorised four domains: "fear cascade, facility, aesthetics and support" with further divisions including, but not limited to: "privacy, noise control, birthing bath, light, color, texture" and most interesting for this review, "accommodation for companions and birth attendants" (p. 49). BUDSET is a useful tool that is currently undergoing further refinement to gain more insight into the 'accommodation for companion and birth attendants". The question of what does 'accommodation' really mean in terms of design for birth units as far as the childbirth supporter is concerned will be addressed in the study undertaken for this thesis.

Childbirth Supporters' Experiences in the Physical Birth Environment

Having reviewed literature on physical birth environment design and childbirth and the literature addressing supporters' roles and needs in the physical birth environment, two studies that directly examine the experiences of birth supporters in the physical hospital environment are now reviewed.

The first of the two direct empirical studies is a randomised controlled trial by Canadian researchers Westreich et al. (1991). The study compared participants' clinical

outcomes and experiences in two birth settings: one was conventional and the other was a home-like birth room, both located within a hospital. The 114 couples were randomly allocated to one setting at their arrival. The first of their two research questions is applicable to this literature review: "What is the influence of two different birth settings on the fathers' affectionate and helping behavior toward their partners during labor?" (p. 198).

The experimental birth room consisted of an "attractively decorated room with a brass double bed, hanging plants and an adjacent early labour lounge" (p. 198-199). Other differences from the conventional setting included encouragement for women's mobility, restrictions to the-then-routine procedures of shaving, enema, intravenous drip and electronic fetal monitoring. Data collection methods included three prenatal questionnaires to determine such factors as marital adjustment, communication tendencies and expectations for parenthood and a postnatal survey to measure childbirth experience satisfaction. An observer used a time sampling method, for one hour during mid-labour, to record "fathers' [helping] behaviour on a precoded checklist" (p. 199). These behaviours included: "coaching breathing, massaging, general support [such as]…instructions…verbal encouragement, and…physical affectionate interactions" (p. 199).

Surprisingly, Westreich et al. (1991) found, that father-supporters allocated to the homey physical birth environments were less supportive than those assigned to the conventional physical birth environment. Since couples might have agreed to the study because of the opportunity to labour in a home-like birth-room, the researchers suggest that the increased helping behavior of father supporters in the non-homey birth environment could be a compensating behavior to offset lack of hominess in the conventional birth environment. An alternative explanation might be that the homey

physical environment provided so much support that there was very little for the father-supporters to do other than provide a quiet supportive presence.

The second physical birth environment-supporter study was conducted by UK researchers to investigate women and their partners' views and experiences of the physical birth environment in terms of the care received (Symon et al., 2011) as part of a larger study described in detail in the previous 'Possible links between supporters' needs and physical birth environment section (Symon et al., 2008a, 2008b, 2008c).

The findings show that although supporters generally felt positive about their experience, they felt significantly less positive than did their partner about their satisfaction with the physical birth environment. Supporters' satisfaction was lower in obstetric-led units, but not statistically-significantly, than when in the midwife-led unit, due to "a range of environmental and care variables" (Symon et al., 2011, p. 880). For example, the supporters were more likely to circle the design characteristic option 'institutional' from a list of 16 adjectives (which also included words such as 'homely', 'roomy', 'disappointing' and 'cramped') than were the mothers. Both partners found the midwife-led unit to be more 'calming' than the obstetric-led unit and also less 'cramped' (Symon et al., 2011).

The supporters in the Symon and colleague (2011) and (2008d) set of studies felt a lack of privacy, especially in obstetric-led units and that facilities for them were inadequate, for example separate but closely located toilet facilities, lack of food or drink and comfortable seating. Supporters also found the temperature and air quality in the birth unit to be uncomfortable. A lack of control over acoustics bothered a support person, as one woman noted, hearing other women in labour was "[o]ff-putting to [my] partner" (Symon et al., 2008b, p. 169).

The environmental stimuli included on the central survey are important design factors to consider, yet it is difficult to determine how, or which – if any – individual design factors' contributed to the findings. Symon et al. (2011) suggest that improved facility design for supporters will likely lead to an increase in the quality of support they are able to provide for the woman, hence improving her childbirth experience.

Summary

There is little direct empirical research informing how physical birth environment design facilitates the role of the woman's birth supporter. What little direct evidence exists suggests that physical birth environments within healthcare facilities may not facilitate the childbirth supporters' role during labour, as shown based on what are interpreted as overcompensation behaviours as well as expressions of dissatisfaction in the Westreich and colleagues (1991), and Symon and colleagues' (2011) studies. When the physical birth environment is more traditional and medicalised (that is not flexible, homey, private, etc), the research shows that the supporter may behave in more supportive ways, as a means to counteract the challenges of a medicalised setting. This is hypothesised as a response to feelings of disappointment at being a supporter in the less desired physical environment (Westreich et al., 1991). The current evidence base provides little insight into *how* the physical birth environment design facilitates the role of the woman's birth supporter.

The conclusion to be drawn from the studies included in the review of the literature presented here is that there is strong support for the assertion that the physical birth environment has an influence on women's perceptions of how "easy or difficult it is to give birth" (Newburn & Singh, 2003, p. 3). This influence of the physical birth environment may very well also contribute to the experiences of how easy or difficult it is for supporters to provide a cooperative, continuous support role.

The limitations of the reviewed literature are the challenges of research design, which are either underpowered, or a lack of clear association between the participants and the physical environment. The literature included in this review often did not have similar methodological studies to compare, which also weakens the findings. Most critical is that none of the literature, apart from the two articles mentioned in the 'Childbirth Supporters in the Physical Birth Environment' section, has focussed on the woman's supporter.

In the absence of direct evidence about the relationship between physical birth environments and the woman's birth supporters' role and needs, it can be asked whether the needs of childbirth supporters are likely to be similar and compatible or differing and conflicting, to the needs of birthing women? Again, the available information to answer this question is insufficient. Where the couple (father and mother) is satisfied with their overall birth experience, the research suggests the woman is likely to be more satisfied while the father is more dissatisfied with the physical birth environment, especially the lack of facilities provided for him (Newburn & Singh, 2003). Perhaps the same can be argued to be true for non-father supporters. Therefore, existing research indicates that there may be different needs for women in childbirth and their supporters, but it is inconclusive and lacks insight into the design features or mechanism that may influence the differences.

The little research there is about physical birth environments relates primarily to the needs of the women, as it should. That said, one of the needs of the woman is to have a cooperative, calm and continuously present supporter with her, therefore supporters' needs need to be accounted for in the design of physical birth environments. There is however, no direct evidence to suggest one way or another that physical birth

unit design features that facilitate the role of the supporter impact the overall experience of childbirth in a significant way.

The findings from this literature review are inconclusive regarding how the birth environment may facilitate *any* supporters' roles, but shows that the physical environment *does* influence supporters' perceptions or behaviours. Childbirth supporters, even when motivated to be present during the labour and whose presence, either actively engaged or calmly passive, are desired by the woman, are likely not being supported as well as they could be by the design of existing physical birth environments. As an active and valued participant in the childbirth process, supporters should be afforded a supportive environment in which to fulfil their role. This aspect of the childbirth supporter's experience is the subject of the study presented in this thesis.

This new information identified by this literature review, that supporters are not adequately supported by the physical birth environment and have differing needs to the woman, confirms that a study undertaken on this topic is important. New knowledge is needed to examine how physical birth environments facilitate and/or inhibits childbirth supporters' roles and needs. The next chapters present the detailed design and methods for conducting the primary 'Birth Unit Design' and the 'Childbirth Supporter' thesis sub-study to address this need.

Chapter 3: Study Design and Methods

Introduction

This chapter presents the study design and methods for the overarching video-ethnographic study that aimed to theorise the relationship between birth unit design and communication and behaviour of labouring/birthing women, their supporters and care providers. This is called the Birth Unit Design, or BUD study. The study design and methods for the video-ethnographic sub-study, which is the subject of this thesis, is presented in Chapter 4. This is called the 'childbirth supporter study'. The 'childbirth supporter study' was conducted as part of the BUD study, but also as a stand-alone research project. Although the BUD study centred on women and staff experiences, with interest in the supporters' needs or experiences, no one else associated with the BUD study was or is analysing the supporters' experiences. Other research team members are or have conducted analysis from the midwives or the woman's perspectives. The studies complement one another, with the 'childbirth supporter study' providing the thick, rich description and examination of the possible influences of physical birth environments on supporters. In particular the childbirth supporter study designs, presented in Chapter 4, is focused on the experience of one woman, her supporters and care providers, who were recruited for the BUD study (see Table 2, coded as 'Purple' Woman 6). The study aims were satisfied by the richness of the data from the one family. The development of the analysis template during the analysis phase now makes possible further analysis of the other cases.

The objectives of the BUD study were to video record the labour experience of up to 10 women, their supporters and care providers (medical and midwifery) in two maternity units located in metropolitan Sydney in New South Wales. Following the

filming, the women, their supporters and care providers would be shown a shortened and edited version of the video footage during video-reflexive interviews that would be digitally recorded and transcribed. Editing criteria consensus was reached before data collection began, specifically, any instance when there was no observable change in activity nor any conversation could be edited without losing the meaning. This editing approach was verified with the other members of the BUD research team with a quality check of the first family that was filmed: a DVD, with both the full version and the edited version, was sent to all team members for verification. Analysis was planned to include video footage, field notes, and interview data.

Integrated throughout the BUD research project and within this thesis is the practice of reflexivity. Reflexivity can be understood as 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 realize on-going appreciation of the participants' experiences, the placement of the phenomenon within larger sociological contexts and the researchers' involvement (Alvesson & Sköldberg, 2000). Researcher reflexivity involves the self-awareness of the researcher in terms of how their past experiences may influence either the data collection and/or the analysis process. Therefore, a brief researcher positioning is presented here in the first person so that the reader may have deeper context for the work. My role in the BUD study was as the Project Manager. I am a design-behaviour social scientist and educator. I have a working knowledge of midwifery, but I am not a practicing midwife. I laboured and gave birth to one child, in a hospital setting in the United States. During the course of conducting the BUD and childbirth supporter study video ethnographic research, I resided in Sydney, but relocated to the United States during the analysis and writing stages of this PhD process.

The BUD study design is presented in this chapter as an accepted-for-publication version to provide context for the childbirth supporter study (see Appendix B for the published version (Harte et al., 2014)). The paper describes the process of developing a large interdisciplinary team (with members from midwifery, architecture, communication, public health and design-behaviour) to study a private and intimate childbirth experience in hospital settings. This BUD research objective was to provide an increased understanding on which to base future birth unit design and to determine if the physical birth space has an influence on communication patterns, physiology of labour and birth and women's experiences and satisfaction. In order to reach this objective, the rationale for why the research team selected video-reflexive ethnography is described in the paper. Video-ethnography and video-reflexivity are essential components of the BUD study as they enable an innovative and effective means to examine a complex phenomenon. As health video-reflexive researchers Carroll, Iedema, and Kerridge (2008) say, this research strategy enables the generation of "new information relations and feedback intensities" (p. 389), which the research team believed would be most effective for meeting the research aims.

This work stems from the conceptual foundation of the Safe, Satisfying Birth model (Foureur, Davis, et al., 2010) that proposes the physical birth setting influences: women's and staff stress; the quality of communication and care; physiological birth and safety for women and babies. This hypothesis arises from and reflects the theory of Birth Territory (Fahy et al., 2008; Fahy & Parratt, 2006). These theoretical foundations are described in the published paper and in expanded detail in Chapter 4.

Ethical approval for the Birth Unit Design study was granted in March 2010 (HREC/10/HAWKE/135 and SSA/10/SG/190) after a protracted period of negotiation

with an institutional ethical review board. The ethical review process is the subject of a further co-authored and peer reviewed publication presented in Chapter 5.

'Birth Unit Design' Study Design

The accepted version of the paper describing the methods for the Birth Unit Design research project is included in the remainder of this chapter. The figure and table numbers have been changed to correspond to the thesis numeration. The published version of the paper is included in Appendix B.

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Methodological Insights from a Study Using Video Ethnography to Conduct Interdisciplinary Research in the Study of Birth Unit Design

Author Byline: J. Davis Harte[1], Nicky Leap[1], Jennifer Fenwick[2], Caroline S. E. Homer[1], and Maralyn Foureur[1]

Institutional Affiliations: [1]University of Technology, Sydney and [2]Griffith University, Queensland Australia

Corresponding Author: J. Davis Harte

j.davisharte@gmail.com
Paradigm Spaces
2639 NW Fireweed Place
Corvallis OR USA 97330

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.

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

Introduction

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, Davis, 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, & Westen, 2010).

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 et al., 2011). Other studies have revealed women's preference for homeliness – a comfortably informal, inviting, cosy and homelike space (Dictionary.com, n.d.) – within hospital birth rooms. Homeliness 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 et al., 2004). These aspects of privacy, personalisation and homeliness 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 et al., 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 et al., 2008d); and a Cochrane review (Hodnett et al., 2010). 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., 2010).

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 nonverbal), 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 3) with roots in both architecture and neuroscience research (Foureur, 2008; Foureur, Davis, 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, Davis, et al., 2010, p. 521). The model reflects *Birth Territory* theory (Fahy et al., 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 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.

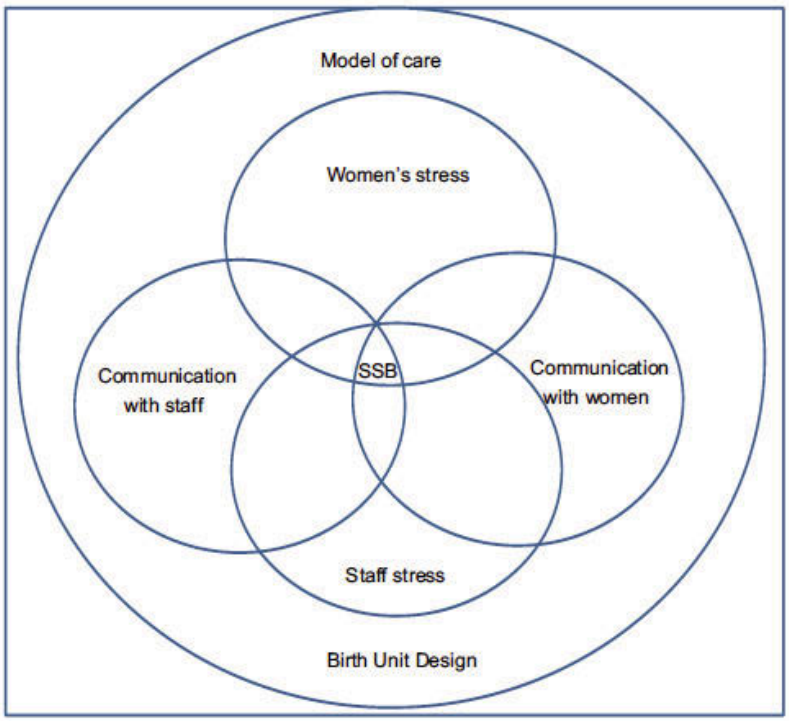

Figure 3: Safe, Satisfying Birth (SSB) Conceptual Model

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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 eleven birth supporter/s and the nine midwives[a] and one student midwife who attended them during labour participated in an

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

Table 2: 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[a]	Primip[b]	Multip[c]	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 program	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

[a] Number of times a woman has given birth.

[b] Primip - having first birth

[c] Multip - having second or subsequent birth

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 2 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, 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 et al., (1991) 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" (p. 762). 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 decontexualized (*sic*) sequencing of minute behaviours, concurrent behaviours, and nonverbal 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 realize 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 2,500 births per year; eight labour and birth rooms with en suite shower and toilet facilities; plus two 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 2,700 births per year, it had seven birth rooms, each with en suite shower and toilet facilities, plus two 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 ongoing 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[a]. 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

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

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 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.

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.

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 2).

Since the length of video footage for each woman ranged from 45-minutes to three 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 to 30 minutes long and were used to facilitate discussion during the follow up video-reflexive interview process with participants.

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.

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'. 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 eight 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 unraveling 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.

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.

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, one-hour video-reflexive interviews that were audio-taped and then fully transcribed, also with associated field notes.

In this study data analysis is multi-layered and remains ongoing as different team members work with the data in a variety of ways. To begin the analysis process, however, researchers met for a two-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 focused 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 et al., 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 ongoing 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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Summary

The accepted version of the published paper has described the detailed study design for the complex interdisciplinary project, the Birth Unit Design (BUD) study. The research design process, the settings, methods of participant recruitment and gaining staff cooperation were described. The process for gaining consent and for maintaining ongoing consent was presented. There are several perspectives that could be adopted to conduct an analysis of the BUD study. For instance, the data could be looked at from the points of view of the labouring and birthing woman; the midwives and medical staff caring for her; her supporters; the architects; or interior or industrial designers. Women and midwives both acknowledge the importance of childbirth supporters, but supporters' experiences have not been adequately examined in the context of the physical design of birth environments. The remainder of this chapter presents the design, research and analysis process from the childbirth supporter's perspective: the 'childbirth supporter study'.

Relationship between the Birth Unit Design study and the thesis

I began this study as the project coordinator of the already designed BUD study and therefore assumed responsibility for the production of the research. This involved selecting, purchasing, and maintaining the audio/video equipment; managing the budget; training and development for the research team, in the use of the audio/visual equipment; preparing and executing recruitment materials; developing and implementing a relationship building strategy with both the interdisciplinary research team, the hospital staff and the participants; managing interdisciplinary team meetings; coordination of data collection and data storage for all research participants, cleaning and editing video footage and arranging the transcription of the interview audio data.

As described in the preceding paper accepted for publication, two midwife research team members conducted most of the filming and the interviews for the labour, birth and immediate post birth period for five participants. I undertook the data collection for one further participant whose experience and that of her supporters and midwives is described in the next chapter.

Chapter 4: Childbirth Supporter Study Design and Theoretical Framework

Introduction

This chapter is divided into two parts describing the 'childbirth supporter study' (CSS). The first part describes the study details and the analysis methods for conducting the CSS study– with the assumption that the overarching research methods do not need to be repeated, as they comprise Chapter 3. The second section delves into the theoretical framework contributing to the CSS study.

It was deemed that a single-case study design was most appropriate for the childbirth supporter study, in view of the richness and complexity of the data. As an exploratory, descriptive study, the aim of this qualitative study was not 'data saturation', but rich and thick descriptions of the experiences of childbirth supporters in the physical environment of a hospital birth unit. The development of an analysis template from this thesis permits future analysis for the other cases. This single-case was selected from a group of six women's video-recorded labour/birth experiences within the BUD study, for several reasons: my role as the video-ethnographic researcher in this woman's experience; the active, mobile nature of the labour that demonstrated a diverse range of interactions with the environment by the birthing woman and her four supporters; the perspectives of her three attending midwives; the extended duration of the hospital labour and filming of 15 hours; and the use of a wide variety of birth props and range of movements. The following section describes the study design in detail.

Study Setting

The setting for this part of the BUD study was a labour and birth room with an ensuite (attached) bathroom, located within a maternity unit of an Australian metropolitan hospital. The analysed labour experience occurred in early March 2012,

between the hours of 11pm on day one and 2 pm the following day (15 hours duration). The set up of the main room can be seen in Image 1. As can be seen in the image, the focal point of the room was a single 'Hillrom' electronically operated bed on wheels, covered in crisp white hospital linen, stamped with the hospital initials and containing one pillow with a plastic cover under the white pillowcase. There was an array of technical equipment behind and beside the bed (shiny, silver metal pole for handling intravenous fluids and an electronic pump, with a cord plugged into the power outlet). Lining the walls were an infant trolley with a plastic mat, a two-drawer nightstand with an attached shelf above, an over-the-bed table tray, a small side-table and two old and faded chairs, one single-seat lounge chair and one 2-person couch. Image 2, parts (a) and (b), shows the main room after a night of use with the addition of a gym mat on the floor covered by a sheet, the woman's own pillows, silver exercise ball for sitting on, purple bean bag covered with a crinkled sheet, a blanket on the couch and personal belongings on the over the bed table, on the small side table and the window ledges. Image 3, parts (a) and (b), shows the ensuite bathroom equipped with a bathtub, shower, toilet and sink, located beyond this viewpoint. Also in Image 3, parts (a) and (b) in the bottom left corner is a large piece of technological apparatus, which is an infant resuscitaire.

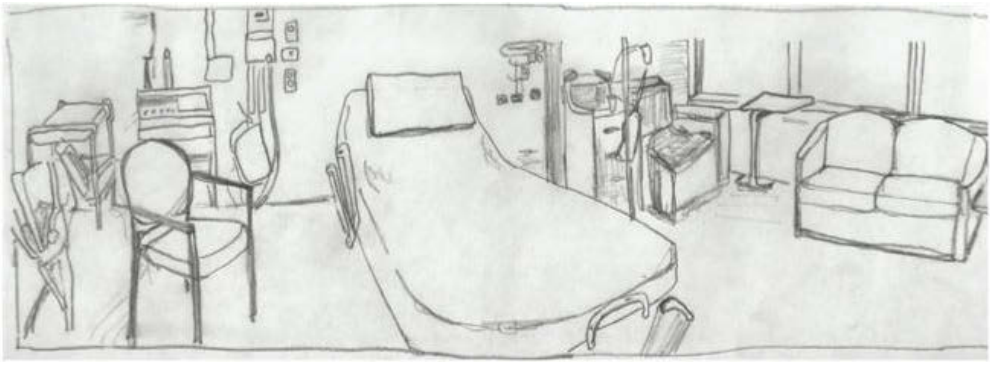


Image 1: Sketch from video of birth room arrangement

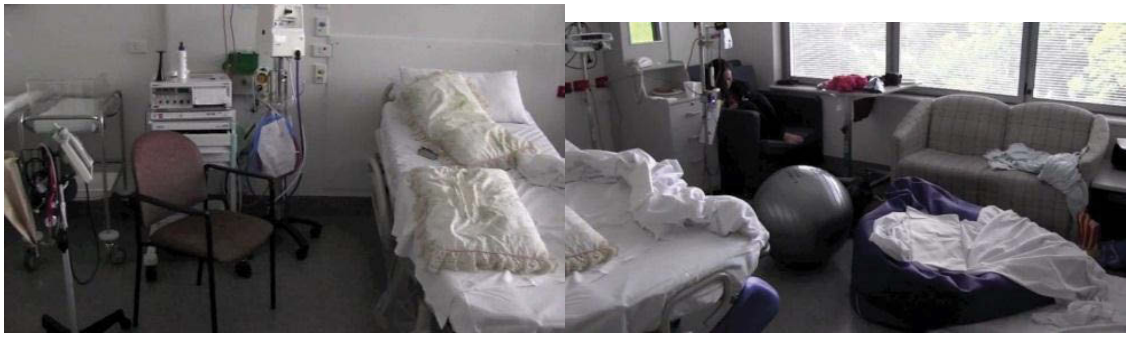


Image 2 (parts (a) and (b)): The main room after a night of use

Image 3 (parts (a) and (b)): The ensuite (attached) bathroom

Study Participants

The participants included: the woman Felicity (all names are pseudonyms); her primary supporter – mother Frances, who was with her for the majority of her labour; her two sisters, not interviewed but present on the footage; and Felicity's secondary supporter – husband Martin. This was the couple's first baby. Felicity fitted the study's criteria with a normal, low-risk, full-term pregnancy, carrying only one baby who was in a head down position (vertex). In addition to these supporters, Felicity had two midwife teams: her first midwife Lori worked with a student midwife Veronica for 9 hours of her labour; and her second midwife was Abby, who cared for her for 7 hours until the baby was born. Frances and Felicity (and Felicity's two supporter-sisters) were Australians who also have Fijian ancestors. Martin was Australian and also has Serbian ancestors. They were middle-class, educated and resided in Sydney Australia. Felicity and Martin were between the ages of 18-28 and Frances was between the ages of 49-59.

The supporter-sisters were aged between 18-28. The midwives were Australian middle-class, educated, Caucasian women, between the ages of 18-28.

Data Collection

Three sets of data were collected, as for all participants in the BUD study: (1) video and audio recordings of the labour and post-birth moments of greeting the baby; (2) field notes recorded throughout the filming; and (3) video-cued interviews 6 weeks later.

After confirming consent for all participants (including midwifery and medical staff who were on duty- and reconfirmed at each staff shift change), the researchers located themselves on chairs or on the floor in a corner of the room and began to film. One researcher filmed while the other wrote field notes. Early in the research design process, the BUD team decided on the filming process to establish consistency for what would or would not be filmed. This can be seen in the audit trail – examples of video data analysis in Table 3 – and describes the criteria, such as 'whenever the woman changed position', 'when dialogue occurred between two participants', or 'new use of the space'. Following these criteria, I filmed during the night, morning and afternoon until just before the baby was born, and then the first moments of greeting the baby. My research assistant and I gathered our materials, congratulated and thanked the family and exited shortly after the baby had been born. Key moments from the entire duration of hospital-based labour video footage, synthesised into illustrative stills, can be seen in Table 4.

Video-cued interviews

Five video-cued interviews were conducted six weeks post-partum. Two one-hour long interviews occurred at the woman's home, the first with the woman (Felicity) and her mother (Frances) together and the second with the woman and her husband

Table 3: Examples of video data analysis process

Video analysis exemplar	
First: 'Descriptive Coding' cycle	**Filming occurred during these situations (discussed and determined before labour)** Setting the scene (whenever there was time) – footage of the surroundings, the entrance to the birthing suite and rooms. Before and following (not during) any procedures (for example taking blood pressure, abdominal palpation, vaginal examination). 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). 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. (Harte et al., 2014, p. 43)
Second: 'Pattern Coding' cycle	 This cycle chose exemplar stills in a short series to demonstrate the video in a 2 dimensional format, labelled with descriptive text.

Third: 'Code weaving' stage

AEIOU frame work - analysis method used to analyse the *interactions* of each element as indexed in the prior analyses *within* elements

(scene)	**A**ctivities ("goal-directed set of actions– things which people want to accomplish")[6]	**E**nvironment ("entire arena in which activity takes place")	**I**nteractions ("are between a person and someone or something else, and are the building blocks of activities")	**O**bjects ("are building blocks of the environment, key elements sometimes put to complex or even unintended uses, changing their function, meaning, and context")	**U**sers ("the people providing the behaviors, preferences, and needs")
Supporter helping woman into tub 	• Frances helps Felicity • Felicity steps on stool • Lifts leg over side of tub • Steps into tub	• Ensuite bathroom • Hospital lights on – bright • Video camera view shows area by doorway – medical equipment	• Frances stands close to the right side of Felicity • Frances holds Felicity's arm • Felicity steps into tub	• Stool – small, low to ground • Birth tub – white and large • Infant resuscitaire in view • White plastic hospital chair on opposite side of tub	• Felicity – labours, climbs into tub between contractions • Frances spots Felicity – mostly stands erect, leans to side to follow Felicity's movement

[6]All quotes in video figure from (Wasson, 2000, p. 382).

Table 4: Key moments in 'the childbirth supporter study' labour

			
“arrival scene”	“bed”	“oils”	“bath”
			
“helping woman into tub”	“supporter leaning over tub”	“details of tub”	“supporter squatting”
			
“rearranging furnishings”	“bedding”	“’passive’ supporter”	“active supporter holding woman ”

			
"mat on wall"	"clearing couch area"	"getting pillow/blanket"	"transition to beanbag/mat"
			
"on beanbag/mat"	"taking walk on ward"	"reassuring touch"	"hugs from mum and sister"
			
"conversation about augmenting labour"	"using labour birth ball to support supporter"	"squatting, with pillow from home"	"putting foot on chair to help shift baby's position"

"needing place to grab/lean"

"room after night of labour"

"midwives 'hand-over'"

"birth ball/feet off bed"

"tenderness/tiredness"

"space for passive supporter?"

"blinds/window detail"

"darkness of bathroom"

"grabbing sink while squatting"

"intimate moment…"

"…in a crowded space"

"mobility with medical equipment"

"pouring water, second bath"

"kneeling/leaning next to tub"

"kneeling/pushing"

"welcome baby!"

(Martin). Three one-hour long interviews occurred at the hospital with each midwife who had provided Felicity's care during her labour and birth (Lori, Veronica and Abby). Two researchers (including myself) were present at each interview; one took notes and one asked open-ended questions in direct reference to the video footage of the labour, viewed simultaneously, which was stopped and started based on the discussion. Although this was a childbirth supporter study, we included midwives to develop contextual understanding and to attain a more comprehensive understanding of the supporters' roles and experiences.

It is likely that study participants may not identify or discuss aspects of their behaviour, hence the use of video-cued prompts to spark connections. The change in activity or behaviour (such as moving to a different position) was the original prompt used during video recording. During the interviews, we would occasionally say, 'What was happening for you here?' or 'How did you feel here?' when instances arose on the footage that we wanted to delve into more deeply.

Data Analysis

The process of data analysis was conducted completely 'by hand' into two layers of analysis. The first was a thematic analysis of video footage, observational field notes, and video-cued interviews post birth. The complexity of the data to be analysed required the employment of an additional analysis technique; the 'aeiou' framework (Wasson, 2000), as illustrated in Table 3.

The second analysis was a cross-validation analysis to assess the suitability of the Birth Unit Design Spatial Evaluation Tool (BUDSET) in terms of its applicability for childbirth supporter's perspective of childbirth experiences.

Thematic analysis

Systematic, reflexive reduction used to generate themes was based on Saldaña's

(2013) coding cycle processes. The data analysed were: 15 hours of observation and field notes during hospital labour; 1 hour of video footage edited by me (to reduce redundancies, as agreed upon during the editing criteria consensus process) from the original 3-hour film; field notes from the interview sessions; and more than 140 pages of verbatim text generated from the five interviews previously described. Two types of data were analysed: text and video as seen in the audit trail Table 5. Each data type underwent three analysis cycles, as seen in Table 3 for the video and Table 6 for the text. Table 5 shows an audit trail example with the first row demonstrating the first cycle of analysis, the second row depicts the second cycle of analysis and the third row provides an example of the third cycle of analysis. A similar pattern is presented in Table 6, except each column, rather than row, shows one of the three analysis cycles. The results for this analysis are presented in Chapter 6.

Comparison of thematic analysis with BUDSET domains

Further analysis was conducted to compare the thematic findings of the video-ethnographic thematic analysis with the Birth Unit Design Spatial Evaluation Tool (BUDSET), described in previous Chapters 1 and 2. This reflection, which I describe as a 'cross-validated analysis', highlights aspects of the BUDSET that consider the supporters and the areas where the study findings indicate there is a need for more design emphasis to better meet supporters' needs.

The cross-validation analysis was conducted by comparing the themes identified in the video-ethnographic thematic analysis, as presented in Chapter 6, with each BUDSET domain characteristic. This was done in two ways; looking for a theme expressed in a BUDSET domain and the reverse; each BUDSET characteristic used to assess the optimality of the physical birth setting was searched for in the video-ethnographic study via the transcripts, video observations, and field notes.

Ethical Issues

The key ethical issues to consider for this ethnographic study were informed consent from all potential participants (the woman, her supporters and all hospital staff involved) and ongoing consent throughout 15 hours of filming. Following the analysis of the data and selection of images to illustrate particular themes, it was important to gain consent again from the participants to check if they wished any images to be pixelated in order to render the images of their faces or body parts, unidentifiable. A particular requirement of the ethical approval process was the actual birth of the baby should not be filmed and that if any acts of negligence were identified during filming, the footage could not be erased and must be made available for any investigation of the events; requirements with which the researchers complied.

An accepted for publication paper discussing the challenges of gaining ethical approval for the Birth Unit Design study (and subsequently the Childbirth Supporter Study) is presented in Chapter 5.

Summary of CSS methods

This section has presented the study design for the 'childbirth supporter study' reported in this thesis. The section began by providing the study design for the BUD study to which this study contributes and from which it is derived. The relationship between the BUD study and the work presented in this thesis was described. The detailed study design for both the BUD study and the 'childbirth supporter study' is provided in the embedded publication. The particular setting for the 'childbirth supporter study' was detailed and the participant family described. Data collection and data analysis methods were detailed, revealing a range of data types including video with accompanying field notes and transcriptions of interviews with key participants. The volume and complexity of the data required the development of a careful analysis

strategy to ensure the trustworthiness of the research. This required several layers of analysis, which have been outlined and audit trails provided.

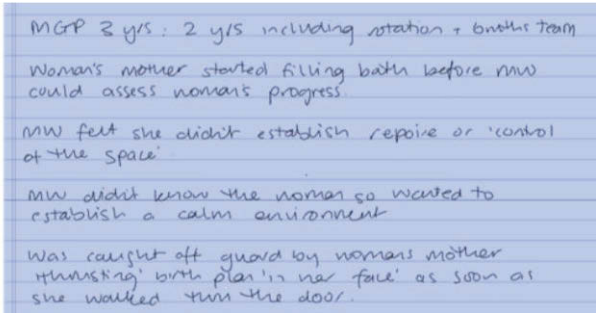
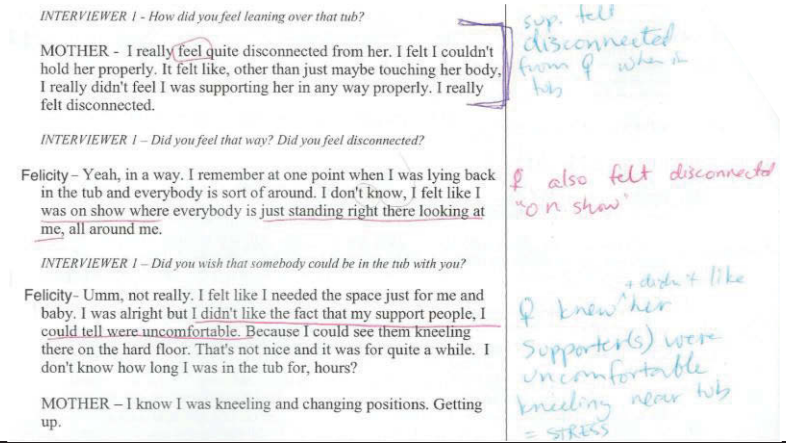
The next section of this chapter describes the theoretical framework in which the childbirth supporter study is ground.

Theoretical Framework Introduction

Recent work has begun to provide a theoretical perspective on the interaction between the physical birth environment and birthing women (Fahy et al., 2011; Foureur, Davis, et al., 2010) however less attention has been given to the experience of birth supporters and the physical environment of the birth unit. How the physical birth setting enables a woman's chosen birth supporters to fulfill their support role requires foundational, exploratory research to support hypothesis generation and ultimately, theory development. Although theory development is not the focus of this research, it is important to explore what theoretical ideas might provide guidance or useful insights into the issues of childbirth supporters and their place within the physical birth environment.

This study is situated within the interpretive/constructivist paradigm that assumes the existence of multiple realities, dependent on time and context (Lincoln & Guba, 1985). This approach calls for investigating, using words and images, the thinking, actions and behaviors of supporters in hospital based childbirth units (Heath & Hindmarsh, 2000; Heath, Luff, & Svensson, 2007). This chapter provides a theoretical

Table 5: Audit trail elements

Audit trail elements (Lincoln & Guba, 1985)	Examples of elements	Examples of elements from study
Raw data	Transcripts, audio data, videos, documents, photographic data, field notes	Exemplar from interview field notes with midwife:  MGP 3 yrs : 2 yrs including station + births team Woman's mother started filling bath before MW could assess woman's progress MW felt she didn't establish repoire or 'control of the space' MW didn't know the woman so wanted to establish a calm environment Was caught off guard by woman's mother 'thrusting' birth plan 'in her face' as soon as she walked thru the door.
Data reduction and analysis products	Condensed notes and summaries, transcript notes, emerging concepts, quantitative summaries.	Exemplar of cycle two coding process:  *INTERVIEWER 1 - How did you feel leaning over that tub?* MOTHER - I really feel quite disconnected from her. I felt I couldn't hold her properly. It felt like, other than just maybe touching her body, I really didn't feel I was supporting her in any way properly. I really felt disconnected. *INTERVIEWER 1 – Did you feel that way? Did you feel disconnected?* Felicity – Yeah, in a way. I remember at one point when I was lying back in the tub and everybody is sort of around. I don't know, I felt like I was on show where everybody is just standing right there looking at me, all around me. *INTERVIEWER 1 – Did you wish that somebody could be in the tub with you?* Felicity- Umm, not really. I felt like I needed the space just for me and baby. I was alright but I didn't like the fact that my support people, I could tell were uncomfortable. Because I could see them kneeling there on the hard floor. That's not nice and it was for quite a while. I don't know how long I was in the tub for, hours? MOTHER – I know I was kneeling and changing positions. Getting up. sup. felt disconnected from Q Q also felt disconnected "on show" Q knew her supporter(s) were uncomfortable kneeling near tub = STRESS

Audit trail elements (Lincoln & Guba, 1985)	Examples of elements	Examples of elements from study
Data reconstruction and synthesis products	Structure of categories (themes, definition and relationships), findings and conclusions (interpretations and inferences), a final report with connections to the existing literature (on concepts and interpretations).	Exemplar of cycle three codeweaving data synthesis: 

Table 6: Examples of text data analysis

Data analysis audit trail	First 'Descriptive Coding' cycle	Second 'Pattern Coding' cycle	Third 'Codeweaving' cycle
Verbatim reflexive-interview analysis exemplar	**DATA verbatim** • "I prefer them dim. There was no choice, only on or off. So I chose off." – Felicity (p. 15) • "I prefer it dim... sometimes the lighting is really harsh." - mother (p. 15) • "That was harsh, that spotlight." - mother (p. 18)	**CODES or CONCEPTS** **Lighting was harsh and did not provide appropriate options – dimmers needed.** "I prefer them dim. There was no choice, only on or off. So I chose off." "I prefer it dim...sometimes the lighting is really harsh."	**THEMES ARISING** **Major Theme:** **Unbelonging Paradox** **Subtheme:** **Lack-of-control** regarding lighting – non-adjustable lighting options creates discomfort for supporter/woman team
Observational field notes analysis exemplar	**DATA verbatim** • "00:55 [student midwife] moves to the midwives station, shuts down the computer and then pushes the baby bassinet to the other side of the room. There is so much standing against the walls of the room, clogging up the space. Two unused poles standing by the bed (could they be elsewhere while not being in use?), the baby bassinet, the resuscitaire (which makes a fan like sound while it is on). Everything is out in the open and must be a distraction. Mother sits on the lounge behind the woman, who sits on the birth ball. 'Relax, just relax beautiful, just relax the muscles in the face, in the eyes. Relax in the breathing. Beautiful.'" – mw researcher (p. 2) • "One sister says to other: 'CD', when music stopped. The air is permeated with scented oils: lavender, rose otto, jasmine, clary sage and neroli." – mw researcher (p. 2)	**CODES or CONCEPTS** description of medical equipment in room mw researchers assessment of how room must feel to supporter/woman team (distracting) noise of resuscitaire – fan-like sound Example of nurturing words spoken by mum-Supporter interactions between secondary supporters (keep music on) details of olfactory scent	**THEMES ARISING** **Major Theme:** **Unbelonging paradox** pervasive medical equipment familiar hominess **Major Theme:** **Role navigation** providing affective support *(social interactions* *or* *activity in space, and place)*

framework for the empirical investigations interpreting the interwoven relationships between supporters, the other users of the space and the physical environment of the birth unit.

Inheriting and Expanding a Theoretical Framework

The Birth Unit Design (BUD) research project proposed using an ethnographic approach to the research and a range of ethnographic methods as the means of data collection (see, for instance, Fetterman, 2010; Geertz, 1988; Harte et al., 2014; Prus, 1996). Ethnography was selected as the best fit with the underlying Birth Territory theory (Fahy et al., 2008; Fahy & Parratt, 2006), and the Safe, Satisfying Birth hypothesis (Foureur, Davis, et al., 2010). The Birth Territory theory and the Safe, Satisfying conceptual model are explained in depth in this chapter. Fahy and colleagues (2008; 2006) proposed that the physical environment of the birth unit influences the degree of stress experienced by birthing women, and also influences communication between staff and the women, which in turn affect outcomes and satisfaction. As this project was conducted in close collaboration with the BUD research project, the main conceptual positions of the BUD project, that are articulated through Birth Territory theory and the Safe, Satisfying Birth hypothesis, were adopted. However neither of these positions had been previously developed in relation to the experience of birth supporters. This project thus provided an opportunity to both engage with and extend the positions articulated through Birth Territory theory and the Safe, Satisfying Birth hypothesis.

As the research progressed and a more nuanced understanding of the interaction between the physical design of birth units and the experience of birth supporters was developed, the original theoretical approach was expanded to include the theoretical lens of symbolic interactionism (Blumer, 1986; Prus, 1996) as a means to enhance the

analytic interpretation of the supporters' experiences. Ethnography and Birth Territory theory and the Safe, Satisfying Birth hypothesis supported the data collection method, while symbolic interactionism and a thematic coding approach informed by Saldaña (2013) combined to guide the data interpretation. This chapter examines the contribution of each of these theoretical elements to the overall research framework.

Birth Territory theory.

Evidence-based design research has demonstrated the role that the design of a physical environment can play in user experience (Ulrich et al., 2008) yet the understanding of the influence of designed factors on users of physical birth environments is far less developed (Symon et al., 2008d). Research into the physical birth environment benefits greatly from the development of Birth Territory theory (Fahy et al., 2008; Fahy & Parratt, 2006) as this theory enables a clear conceptual description of how the terrain of birth environments may interact with the users of the space. Birth Territory theory was the driving theoretical informant for the Birth Unit Design study.

Birth Territory Theory, which is grounded in ethnography, guides research into the physical birth environment by highlighting connections between territoriality, jurisdiction, safety and the flexibility of the physical environment. The Birth Territory theory: "describes, explains and predicts the relationships between the environment of the individual birth room, issues of power and control, and the way the woman experiences labour physiologically and emotionally" (Fahy & Parratt, 2006, p. 45).

This theory is comprised of two main concepts: 'terrain', which incorporates the "physical features and geographical area" (Fahy & Parratt, 2006, p. 46) of the birth unit; and "'jurisdiction' [which] means having the power to do as one wants within the birth environment" (Fahy & Parratt, 2006, p. 47).

The concept 'terrain' is portrayed as a spectrum with 'birth sanctum' situated at one end as the preferred form of the 'terrain'. 'Birth sanctum' protects the comfort and privacy of the woman, often in a home-like aesthetic environment. On the other end of the 'terrain' spectrum is the concept 'surveillance room' which is a medicalised environment that facilitates the constant monitoring or 'surveillance' of the woman. The theory proposes that constant surveillance is disruptive for the labouring and birthing woman, but facilitates the observation work of medical staff (Fahy et al., 2008; Fahy & Parratt, 2006).

'Jurisdiction' is an important conceptual component of Birth Territory theory as it articulates the human dimensions of how people behave in the birth setting. The theory proposes that shifts in the locus of control within the birth space are influenced by the design of the physical birth unit (Hammond, Homer, et al., 2014). Descriptors such as 'midwifery guardianship' or 'midwifery domination' identify the ways in which power is being performed at particular moments within the birth process. Fahy and colleagues mention that any of the people in the space may display 'integrative power' or 'disintegrative power' (Fahy & Parratt, 2006, p. 45). The role played by childbirth supporters is not explicitly considered in Birth Territory theory, however this research sees the birth supporters as participants in the birth process, and in the power relations within the birth space. Birth supporters, like birth participants, may display either integrative or disintegrative power in the room.

Birth Territory theory focuses on the physical birth environment and the participants in the space. The strength of Birth Territory theory for this research is its inclusion of pragmatic interior design features of the birth room, as playing a role in the maternity setting.

In their commentary, Stenglin and Foureur (2013) refine the birth territory concepts with suggested terminology for "spatial security." They introduce the terms 'bound space' and 'unbound space', where bound space is "womb-like" (p. 820) and unbound space is a space with "loosen[ed] degree of enclosure around the occupant" (p. 821). They argue for spaces that are not "'too binding' or "smothering" (p. 821), in order to achieve a birth sanctum and avert the fear cascade. Binding concerns the interrelationship between the user and the physical space – which can evoke feelings of security or insecurity and constriction. These authors propose that a space that is too unbound would not promote "the sense of protection, safety and shelter one feels in a Bound space [that] helps dissipate anxiety and enables the woman to let go of fear and shift the focus of her attention inwards" (p. 820).

The fear cascade is a physiological reaction involving a complex array of hormones based on perceived threat, which slows down, or stops labour in order to enable the woman to move to a safer birth location. The fear cascade plays a significant role in the Birth Unit Design Spatial Evaluation Tool (BUDSET), which is examined in a later chapter in this thesis.

Stenglin and Foureur (2013) discussed in depth the changes in spatial configuration and sensory stimulation required to respond to the ebb and flow of the woman's labour. The perception of bounded/unboundedness within the birth space is argued to contribute to a labouring and birthing woman's experience. This conceptual framework may also apply to supporters' experiences. For example the authors mentioned that the supporter was unable to control the temperature of the space, as the behaviours were bound by the facilities. The application of the Binding scale to physical birth settings provides a conceptual framework for a more nuanced discussion

regarding design features and how they may facilitate users' perceptions of security or insecurity.

Appropriately designed physical birth environments and maternity care systems that are protective of the birth process would result in an increase in positive Birth Territory. Fahy and colleagues (2008) hypothesise that an increase in positive Birth Territory would have a beneficial influence on the supporter, the family and the wider society in general.

The Safe, Satisfying Birth Hypothesis.

The Safe, Satisfying Birth conceptual model, shown in Figure 4, provides a design orientation to the theoretical framework guiding this research. The Safe, Satisfying Birth conceptual model has its origins in architectural and neuroscientific research (Foureur, Davis, et al., 2010), such as the work of de Botton (2006) and Edelstein (2004). The conceptual model is developed from hypothesised interrelationships between well-designed physical birth environments and two main aspects of care: reduction of stress and facilitation of communication, for both the women and the staff. It is hypothesised that improvements in these two aspects of care influences physiological aspects of the birth, and so contributes to the safety of the birthing woman and the baby. The hypothesis suggests that, through optimal design of the birth unit, communication is improved and stress is reduced, thus positively impacting the birth and reducing the likelihood that medical intervention will be needed. It is thus argued that birth unit design influences both the safety and the satisfaction of the birth experience (Foureur, 2008; Foureur, Davis, et al., 2010).

The Birth Territory theory and the Safe, Satisfying Birth hypothesis are validated contributions to the theoretical framework of physical childbirth environments (Hadjigeorgiou, Kouta, Papastavrou, Papadopoulos, & Mårtenson, 2012; Hammond,

Foureur, & Homer, 2014; Meedya, Fahy, Parratt, & Yoxall, 2015). They provide theoretical underpinnings for discussing and investigating physical environment influences on childbirth supporters' experiences.

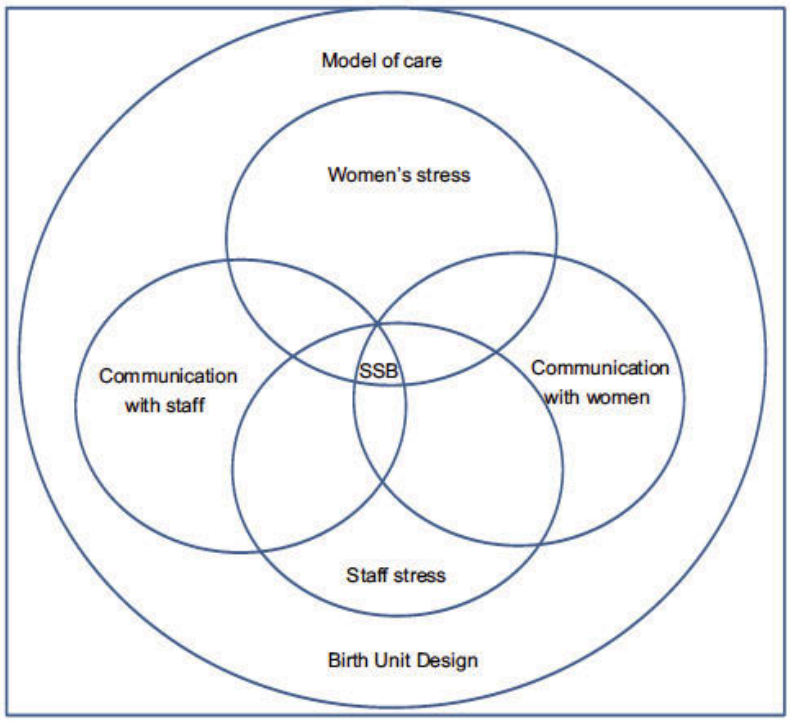


Figure 4: Safe, Satisfying Birth (SSB) conceptual model
From Foureur et al. 2010, p. 523

Critiques of Birth Territory Theory and Safe, Satisfying Birth Hypothesis.

In developing the Safe, Satisfying Birth Model, the authors collapse the supporters and women together into the single concept 'women' (Foureur, Davis, et al., 2010). The woman/supporter pair is treated as a dyad with the supporter understood as an extension of the birthing woman, facilitating and supporting her labour. This thesis argues that the current theoretical configurations of Birth Territory theory and the Safe, Satisfying Birth model do not adequately identify supporters as individuals in the physically designed birth environment. There is a risk that the lack of separate recognition for supporters within the theoretical constructs encourages oversight of their distinct needs, potentially compromising their ability to fulfill their supportive role.

The treatment of the birthing woman and her supporters as a 'dyad' is consistent with research showing supporters' needs are not accounted for (Symon et al., 2011). While the figure of the dyad may deliver some important insights, it is equally important that the separate needs of the supporters are not overlooked. Symon and colleagues (2011) state, of dyads, that "the two people involved are still distinct individuals, and the views and needs of one do not necessarily reflect the views and needs of the other" (p. 811).

Highlighting 'supporters' within the Birth Territory theory and the Safe, Satisfying Birth hypothesis strengthens the theoretical underpinnings for the study of all occupants' experiences in the physical birth unit environments.

Ethnography as both method and theory.

The use of ethnographic research to immerse the researcher in the culture of childbirth in hospital settings is central to this research. Ethnography is a type of inductive research that supports the observational and descriptive process (Jootun, McGhee, & Marland, 2009). Ethnography, characterised by 'field research' or 'fieldwork', is an established method for researching social phenomena and the lives of various cultures for hundreds of years (Neuman, 2006). Ethnography proceeds through the careful observation of a group of people (Hammersley & Atkinson, 2007).

Geertz states that a key element to any ethnographic study is for the researcher to have "truly been there" in the experiences and with the people they were observing (Geertz, 1988, p. 16). 'Truly', in this context, is a rather entangled concept. 'Truly being there' is not always possible, nor desirable, as the person holding the camera chooses what is filmed and therefore, to a certain degree, shapes the experience. However, video ethnography, as compared to other data collection methods, "is able to capture the *actual* behaviour …rather than behaviour that is simplified, reconstructed or

simulated for training or assessment purposes" (Carroll, 2009, p. 250). As Carroll further suggests, one "means of achieving researcher reflexivity and honesty between researcher and participants is the sharing of video footage with participants" (2009, p. 249); an integral part of the study design for the project reported in this thesis.

Both the context in which the people are being observed and the discipline from which the study is situated are acknowledged as influencing what is seen and understood by the observers. Pink and Morgan (2013) see the interpretive context that the researcher brings to ethnographic study as shaping the ethnography itself, making it "rather slippery to define" (p. 352).

The birth space has its' own culture, language and behaviours (Brodie & Leap, 2008; Johanson, Newburn, & Macfarlane, 2002; Rosenberg & Trevathan, 2002). While the birth environment and the event of birth belong to familiar everyday experience for those who work in a birth unit, for the birthing woman and her supporters the experience is exceptional and the environment foreign (Machin & Scamell, 1997). For them, the experience of childbirth unfolds in an unfamiliar space with unknown consequences. The ethnographic approach taken in this study seeks to acknowledge the different interpretive frameworks brought to the birth experience by the different participants.

Hammersley and Atkinson (2007) argue that the ethnography "be presented in a manner that is sufficiently explicit for the reader to be able to evaluate them" (p. 206). Thick, rich description is part of the ethnographic process, but "it is equally important that the ethnography should display and demonstrate the adequacy of its empirical and theoretical claims" (p. 206). The reader should first be able to establish what claims are being made… and why [the author] "believes that they are important and new" (Hammersley & Atkinson, 2007, p. 206).

Limitations of ethnographic research.

The use of video-based ethnography and video-cued interviews permits a layer of ethnography inquiry that is well suited in many ways for the 'childbirth supporter study'. The ethnographic approach is sufficiently adaptable to address complex healthcare contexts (Carroll & Mesman, 2011; Savage, 2000). An in-depth exploratory examination into the 'how' of a lived experience can be achieved through attentive participant observations, and by being present and engaged in the event. For this research, an exhaustive, short-term journey into the participants' childbirth experience was used (Pink & Morgan, 2013). Ethnography supports the observations of fluid interactions of shared experiences in a shared space to get at the underlying meaning of 'what is really happening here' (Walsh, 2006). However, it was deemed, during the analysis phase, that there were some limitations to the use of ethnography for the 'childbirth supporter' study.

The generalisability of ethnographic research may be limited. Although for this research, generalisability was not the aim. Rather the purpose was to describe the intrinsic interest of this exploration of the physical design of birth environments on supporters' behaviours. The aim was "to explore the 'how' and 'why' of human interactions, and… therefore communicat[e] meanings and interpretations...the strength of these approaches will be in understanding and explaining phenomena in similar settings" (Walsh & Downe, 2006, p. 117).

Additionally, ethnographic research findings are necessarily flavoured by the interpretive frame brought to the research by the researcher (Leslie, Paradis, Gropper, Reeves, & Kitto, 2014). Including researcher reflexivity as part of the descriptive, interpretative and video-based ethnographic study creates an opportunity to manage these challenges, as presented in Chapter 3 and Chapter 8. To analyse the participants'

interactions *with* the physical birth environment, *from* their own perspective, symbolic interactionism was adopted as a theoretical lens. Symbolic interactionism attends to the challenge of the researcher' understandings matching the participants' understandings, highlighting the supporters' experiences in the sometimes-subtle realm of 'interactions with the physical environment'.

Symbolic interactionism and childbirth research

A primary goal of ethnography is to understand the experience of the research participants, and this necessarily includes an understanding of what meanings the experience, and the phenomena encountered within the experience, have for those participants. Symbolic interactionism is an appropriate theoretical lens for the interpretation of ethnographic data, as it, too, is oriented towards participants' interpretations of the phenomena. Neuman describes ethnography as "moving from what is heard or observed to what is meant" (2006, p. 381). The messages conveyed or implied to the supporters by the built environment, objects and interactions, are key to this research. An environment conveys social scripts that direct behaviour, identities and roles. For example, scripts might say 'this is a medical procedure' or 'you are in an environment where only the experts know what should be done'. Such scripts give meaning to a space, altering power relationships, assigning passive or active roles. Scripts, and the roles they suggest, are emergent and not static in nature. As Prus (1996) explained, "People can and often do attend to the frameworks implied by the settings and roles in which they find themselves, but they have to formulate their own lines of action in a processual, interactive manner" (p. 80).

Symbolic interactionism is a lens through which to analyse the video, interview transcripts and field notes, with a focus on the interactions between the supporter and

the built environment. Symbolic interactionism as a theoretical approach, can be understood as attending to the:

> Ways in which people make sense of their life-situations and the ways in which they go about their activities, in conjunction with others, on a day-to-day basis. It is very much a 'down to earth' approach, which insists upon rigorously grounding its notions of the ways in which human group life is accomplished in the day-to-day practices and experiences of the people whose lives one purports to study (Prus, 1996, p. 10).

There is an historical progression between ethnography and symbolic interactionism, as they have common roots in the work of sociological researchers such as Blumer, Mead and Cooley (Prus, 1996). Symbolic interactionism is argued to be a framework and not a testable theory, although it is typically called 'symbolic interaction theory'.

An example of symbolic interactionism applied to the analysis of a built environment is given in the work of Smith and Bugni (2006) who focus on the relationship between spatial design and experience of empowerment or disempowerment and confusion, within a specific environment. Smith and Bugni examine the work of designers whose goals are to facilitate better work place situations. They discuss how the architects chose "specific designs [as a way to]…improve social interaction, foster symbolic identification, and enhance personal pleasure and growth" (Smith & Bugni, 2006, p. 134).

Those who subscribe to symbolic interactionism typically define the approach with three main premises: 1) an understanding or satisfactory description of participants' behaviour, including focusing on the participants' point of view; 2)

interaction between the participant and the "social structure emergent from interaction" (Stryker & Vryan, 2006, p. 5) where the individual constantly re-defines themselves through their interpretations of the meanings they attain from interactions with a range of other (including physical spaces); and 3) the meaning and interpretations made by the participants, as a means to understanding both the phenomenon under study, the larger sociocultural context and the participants' own self-awareness (Stryker & Vryan, 2006).

Smith and Bugni (2006) argue that the physical space is more than just a "setting or backdrop for conduct" (p. 143). They note that "people interact with the physical environment, designed or natural, in a manner similar to how they interact with people" (p. 143). However, they also note that while some spaces "are given recognition and assigned an internal voice [other spaces are] mundane and boring…[or] simply [do] not pique our curiosity and interest" (p. 144). The use of symbolic interactionism in this research, allows insight into the extent to which, the physical birth environment is internalised by the childbirth supporters.

The participants were able to step back from their own experience by viewing themselves on video. This facilitated their ability to identify key design features and their own interpretations of the birth unit environment, including their ability (or inability) for the physical space to support their sense of agency, or their ability to perform their roles, within the birth process. Therefore, video ethnography reciprocally aligns with the analytic approach of the symbolic interaction perspective.

Symbolic interactionism as an analytic contribution permits a more nuanced analysis of the participants' meanings generated about their experiences in the physical birth unit environment that the existing theoretical framework could not have conveyed.

Summary

This study embraces a qualitative, exploratory approach to research – using descriptive and interpretive research theoretical approaches. Specifically it uses a video-based ethnographic approach (Carroll & Mesman, 2011) to generate data. The Birth Territory theory contributes concepts of territoriality, power and jurisdiction. The Safe, Satisfying Birth hypothesis contributes a model of interactions between stress and communications within the designed physical birth environment. Ethnography is both the primary method and core theoretical construct underpinning this research. The ethnographic, video-cued interview process invited participant reflections about their insights and interpretations of their experiences.

A symbolic interaction perspective provides additional conceptual underpinning used to frame the analysis process for the video, transcripts, and field notes generated during data collection. Viewing the participants' experiences of the interactions they had with the physical birth environment, through their own interpretations and the self-made meanings, facilitates deeper understandings. When joined together, these theories, concepts and perspectives form a cohesive, relevant and useful framework for examining the childbirth supporters' experiences in the physical birth unit environment.

The next chapter presents the video-ethnographic results. The data was interpreted using a thematic analysis process, and the results are presented with images, verbatim quotes and supportive literature.

Before women and their supporters and care providers could be recruited to the study and data could be generated, it was necessary for the research to receive ethical approval. As briefly mentioned in the introduction to this chapter, gaining ethical approval for the study proved to be a challenging and time consuming process that we felt was worthy of comment to improve the process for future research involving the

filming of women during childbirth. The analysis and insights gained of the approval process are presented in the following chapter and in the co-authored, peer reviewed publication: Harte et al. (2015).

Chapter 5: Issues Faced in Gaining Ethical Approval for Birth Unit Design Research

This chapter discusses the issues of gaining ethical approval for the video-based, exploratory qualitative study described in this thesis. Communicating this type of qualitative research study can be challenging when the ethics review committee may be composed primarily of traditional, quantitative-minded and medical, ethic board committee members. Many dilemmas arose during the ethical approval process, related to what the research team perceived as issues of control, paternalism and institutional over-protection of 'vulnerable' women. Opportunities for rich discussions arose from these challenges, around feminism, jurisdiction over one's own experiences and social science research in healthcare settings, in the current ethical committee landscape.

A detailed analysis of the ethical approval process is described to provide an example of how facing the complexities of conducting video-based research in healthcare settings can be navigated in the ethical clearance process. An improved ability for researchers and ethics committees to share responsibility for reaching agreement about what constitutes 'vulnerability' and agency for participants can move more complex research projects ahead and into practice in a more straightforward way.

The following pre-published, accepted paper, with alterations to the Table and Figure numbers for consistency within the thesis, presents the ethical approval process and the analysis of the contributing factors. The published version of the paper can be found in Appendix C.

Accepted Version of Paper: Harte, J. D., Homer, C. S. E., Sheehan, A., Leap, N., & Foureur, M. (Prepublished July, 24, 2015). Using video in childbirth research: ethical approval challenges. *Nursing Ethics*. doi: 10.1177/0969733015591073

Title: Obtaining ethical-approval for researching hospital-based childbirth using video ethnographic approaches

Short Title: Ethical-approval for video-ethnographic research of childbirth in hospitals

Authors: Harte[a], Homer[a], Sheehan[a], Leap[a] and Foureur[a]
[a]Faculty of Health, University of Technology Sydney, Australia

Corresponding author: J. Davis Harte 2639 NW Fireweed Pl. Corvallis Oregon USA 97330 Email: j.davisharte@gmail.com

Abstract

Background Conducting video research in birth settings raises challenges for ethics review boards to view birthing women and research-midwives as capable decision-makers.

Aim The aim was to gain a deeper understanding of how the ethical approval process was experienced and to chronicle the perceived risks and benefits.

Research design The Birth Unit Design project was a 2012 Australian ethnographic study that used video recording to investigate the physical design features in the hospital birthing space that might influence both verbal and non-verbal communication and the experiences of childbearing women, midwives and supporters.

Participants and research context A total of six women, 11 midwives and 11 childbirth supporters were filmed during the women's labours in Australian hospital birth units and then interviewed while viewing the footage six-weeks post-partum.

Ethical considerations The study was approved by an Australian Health Research Ethics Council.

Findings Findings include: poor understanding of video-ethnographic research**;** paradigmatic view of modern childbirth processes**;** a desire to protect institutions from litigation; and what we perceived as a paternalistic approach towards protecting participants, one that was at odds with our aim to facilitate situations in which women could make flexible, autonomous decisions about how they might engage with the research process.

Discussion The perceived need for protection was overly burdensome and against the wishes of the participants themselves; ultimately this limited the capacity of the study to improve care for women and babies.

Conclusion Constructive suggestions are offered for researchers and health research ethics committees involved in processes associated with the granting of ethical approval for research involving video ethnography in childbirth settings. The complexity of issues within childbirth settings, as in most modern healthcare settings, should be analysed using a variety of research approaches, beyond efficacy-style randomised controlled trials, to expand and improve practice-based results.

Keywords

Video ethnography; ethical-approval challenges; Australian ethical process; childbirth; women's experiences of labour and birth; birth unit design; midwifery

Introduction

Childbirth is a physical and social experience, with communication and social support being essential components for positive outcomes.[1] The environment in which childbirth occurs influences the social nature of the experience and there is evidence to support 'home-like', comfortable environments for birth.[2-5] Most women in Australia and other westernised countries give birth in hospitals, in environments that are not usually home-like or conducive to supporting the normality of childbirth.

Evidence suggests that, for women in labour, admission into hospital environments may contribute to a 'fear cascade'[6] which could inhibit pain-reducing hormones and increase cortisol and stress-hormones.[7] The environment in which labour and birth occurs could then influence both the physical outcomes and also the quality of communication between women and care providers and between care providers. Our research has been interested in this interplay between hospital birth rooms and the quality of communication and support provided by the care providers (usually midwives) to women and their families and we sought to further explore the relationships in an ethnographic study called the Birth Unit Design study.[8] The aims of the study were to investigate, using video-ethnography, how the physical space of the birth environment might impact on communication and experiences of women, their supporters and health care providers, primarily midwives (Box 4).

Box 4: From the Birth Unit Design study brochure distributed to potential participants

The goals of the research are to provide increased understanding on which to base future birth unit design and to determine if the physical birth space has an influence on:

- Communication between women, supporters, midwives & other care providers
- The physiology of labour and birth
- Women's experiences & satisfaction

In July 2010, we applied to the local Human Research Ethics Committees (HREC) for ethical approval. The Australian HREC system is akin to the Internal Review Board (IRB) in the USA, the Research Ethics Board (REB) in Canada and the Research Ethics Committee (REC) in the UK. As is required, we applied for ethical approval to the local HREC prior to commencing the study. Approval, however, was not granted until eight months later, following protracted negotiations with the HREC and major modifications to the research design.

The aim of this paper is to explore the complex issues around: the duty of ethics committees to 'protect' childbearing women; women's rights when participating in research involving their labours and births; and the challenge of 'fitting' ethnographic research into a HREC paradigmatic view of childbirth in institutions. We aim to provide reflection on our ethical-approval experience that will be of use to HREC committees and researchers who use video ethnography in vulnerable populations in the future. Initially we will describe the Birth Unit Design study before explaining the process of obtaining HREC approval for the study.

The Birth Unit Design study

The Birth Unit Design study was a qualitative, descriptive observational study that used video-ethnography and interviews as data-collection methods. The aim of the

study, as conveyed to the HRECs, was to explore the relationship between the physical design of institutional birth spaces and the behaviour, experiences and communication between birthing women, their supporters and midwives. Our premise was that most typical birth units increase maternal stress levels and may therefore influence the neurophysiology of birth, leading to slow labour, uterine inertia, fetal distress and a range of interventions, including an increased rate of caesarean section.[9] Our goal was to increase understanding of how future birth unit design might reduce stress and increase the likelihood of straightforward and more satisfying birth experiences—for women, their supporters and health care providers.[6, 9-13]

A comprehensive description of the research methods is described by Harte et al.[8] We intended to recruit up to 12 women with uncomplicated pregnancies who were due to give birth in either a standard hospital labour ward, or a birth centre unit located within a hospital. We aimed to film each woman's experience from entry to the hospital, throughout labour and birth and for a short period after the birth of the baby. This would involve the woman, her supporters and health care providers consenting to being filmed. Although this was an interdisciplinary study involving researchers from architecture, public health, communication and midwifery, midwives who were most familiar with the environments and the process of labour and birth were to undertake the filming.

The recruitment plan was that a research midwife would explain the purpose of the study to potentially eligible women during their 36-week antenatal clinic visit. The process of how participants could grant consent would be explained during this initial conversation and revisited at regular intervals to ensure an ongoing consent process.

The proposal was that filming would focus on how the physical space of the room and the objects within it were used by the woman, her supporters and caregivers

and would explore verbal and non-verbal communication within those spaces. Two research team members were to coordinate the filming and recording of field notes, to include usual ethnographic observations, such as: use of the space and objects; acts and activities; events and time frame; and responses and feelings of the participants and the researchers.[14] Video footage would then be shared with the woman, her supporters and caregivers in subsequent separate interviews, eliciting reflection on the experience as influenced by the physical environment.[8] The Birth Unit Design study received national competitive funding in late 2009 (Figure 5). We then began ethical approval processes in July 2010, which will be described in the next section.

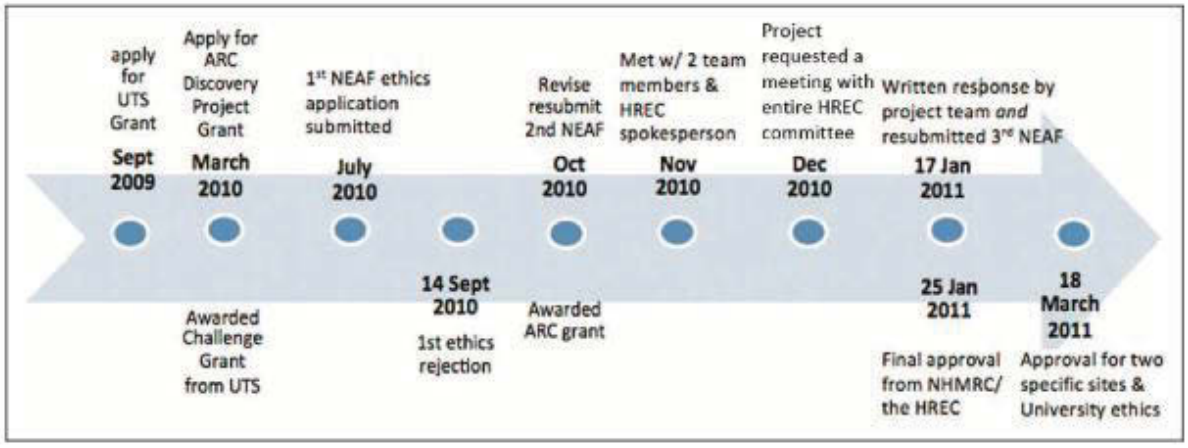


Figure 5: Birth Unit Design study grant and ethics application timeline

The HREC approval process in Australia

Gaining ethical approval from a review panel with specific training in ethics and research provides assurance to researchers and research participants that the study will not contravene their rights as autonomous individuals and that the research will be conducted and reported on ethically. In Australia, these ethical principles are clearly articulated in the *National Statement on Ethical Conduct in Human Research,*[15] published by the National Health and Medical Research Council (NHMRC) and was referenced by us and by the HRECs in their reviews of our research.

The HREC process requires researchers to complete an application form that seeks responses to questions about the design and conduct of the study that may have ethical implications. Developed by the Australian Governments' National Health Medical Research Council (NHMRC), the National Ethics Application Form, or 'NEAF', is a "dynamic, interactive, web-based tool for researchers of all disciplines to complete research ethics proposals for submission to Human Research Ethics Committees (HRECs)"(para1).[16]

For research conducted in a health facility, a Site Specific Approval must also be obtained for each subsequent facility the researchers wish to access, with the approval tabled with the coordinating HREC committee for a designated health service area. The first NEAF approval we received applied to one of the two area health services.

University ethics approval was also required "to ensure that people carrying out research under the auspices of the University are committed to high standards of conduct and practice and to the maintenance of their own reputation and that of the University"(para1).[17]

Our experience of the process

The research was planned to take place in two area health services, located within hospitals, so we first applied for the Australian HREC approval via the NEAF process. Of the three HRECs we worked with (one main NEAF HREC, one site-specific hospital and our university), the main NEAF HREC was the one with whom we encountered the most challenges.

Each submission of the NEAF presented us with issues. The first impression we received was that our study was not deemed scientific. We used the strategy of resubmitting with rephrased 'quantitative' language in order to address these concerns. During the second phase of clarification, however, it became clear to us that these

scientific concerns may have stemmed from poor understanding of ethnographic methods. We addressed this by describing in more detail the proposed benefits and standards of ethnographic research, as well as emphasising the grants and peer reviewed publications received for the study (see Table 7). During the third clarification phase, the underlying currents of paternalism and litigation rose to the surface in, what can be argued was, an over-protective stance for both the participants and the institutions, as based on the written and verbal communications from the HREC.

After the second of three rounds of written and verbal questions from the HREC we sought a face-to-face meeting with them. This meeting heightened numerous concerns, which revolved around how we would attend to filming potentially litigious acts, such as staff error and whether it was appropriate to film if women were unclothed. Additionally, concerns were expressed about how we would: ensure privacy; create anonymity; gain informed consent; ensure participants could communicate their desire to withdraw from the study; address potential data insufficiency; and ensure a researcher would be present to film. We saw these as reasonable questions in support of ethical qualitative research, however many of these issues had previously been provided in our application; the questions seemed to us to correspond to a lack of contextual understanding.

Table 7: Peer review process details for Birth Unit Design study

Review process	Funding body/Peer review journals	Objectives/Criteria	Timeframe
First grant review	The University of Technology Sydney (UTS) panel, for an internal Challenge Grant.	• Provide seed funding to encourage innovative research in a multidisciplinary, collaborative manner between researchers from traditional disciplines. • Excellence and degree of innovation of the project, especially in terms of collaboration across disciplines and potential for the project to garner outside funding, as well as the potential for the research to contribute to issues of national significance (Kostulski, personal communication, 23rd May, 2013)	Six months: Applied – Sept 2009 Awarded grant – March 2010
Second grant review	Australian Research Council (ARC) (Australia's highest-status research organization) Discovery Project grant. The 'College of Experts' are drawn from a multitude of disciplines in the Australian research community — from higher education, industry and public sector research organisations. They are drawn together flexibly to form groupings of expertise to meet particular needs at different times. Members of the ARC College are appointed for periods of between one and three years.[18]	• Support excellent fundamental research by individuals and teams • Enhance the scale and focus of research in the National Research Priorities • Assist researchers to undertake their research in conditions most conducive to achieving best results • Expand Australia's knowledge base and research capability • Foster the international competitiveness of Australian research • Encourage research training in high-quality research environments • Enhance international collaboration in research[19]	Seven months: Applied – March 2010 Review by the College of Experts – August 2010 Awarded grant – October 2010
Publications	Foureur, M., et al.[6, 12], Sheehy, A. et al. [13]		

After three resubmissions, we finally received approval; we were then required to repeat the process of applying for approval via the Site Specific Application process with the second area health service. Lastly we applied for host University HREC approval, which was quickly granted. In accordance with the university ethics protocol, the study finally received full approval from all three HREC bodies in March 2011 [HREC/10/HAWKE/135 and SSA/10/SG/190]; this was eight months after the ethics application process had begun.

Composition of the principal HREC

The principal HREC (hereafter referred to as 'the HREC') who reviewed our application was composed of 19 individuals. The majority were from a quantitative, clinical or medical-specialist background, which is common in hospital-based committees. This "preponderance of institutional and scientist members"(p294)[20] on ethics review boards is not unique. The Australian HREC must also have members who are either lay-people or religious ministers. There is no specific requirement for experience or expertise with qualitative research or with the particular issues associated with research with labouring women or birth settings.

Understanding and addressing the HREC issues

To analyse the HREC submission process, we shall discuss our perspectives on the HREC's issues with our submission drawing on literature describing similar experiences of researchers in other contexts. We shall then explain how we addressed each concern.

The HREC litigation-related concerns

The HREC was concerned about what we would do if, during filming, "serious unexpected event(s)" were to occur. Our initial response that "we would stop filming" did not satisfy the HREC. We elaborated:

> In the case of a serious event, filming will cease, however, any footage accidentally made will not be erased. The aim of this research is not to capture obstetric interventions or emergency situations. In our practice, emergency situations are precipitated by maternal and fetal indicators that the normal process of labour and birth [has gone] awry. That said, practitioners generally have warning prior to emergency situations of birth(p17).[21]

The HREC expressed concern that the woman or families might want us to keep filming if an emergency arose during labour and appeared to find it hard to accept that, as researchers and midwives used to working in this environment, we would respect the interactions between the caregivers and the families and cease filming if such an event were to occur. Other researchers who have conducted video-research in birth settings have also had to deal with HRECs' litigation-related concerns during initial research stages.[22]

Multiple site approval

This study was being undertaken at two sites; therefore we had to receive ethical clearance from two site-specific HREC's. The primary reason for selecting these sites was because they had been part of a prior audit, which contributed to the Birth Unit Design Spatial Evaluation Tool (BUDSET): a tool developed and tested to "assess the optimality of birth units and determine which domain areas may need to be improved"(p43).[6]

The HREC advised that we should have a *random* sample of sites. This suggested to us that the committee might not fully understand common ethnographic research methods. *Purposive* sampling is an important method for qualitative research

to ensure a specific range of data, rather than using a random sample, such as is used with cause and effect quantitative-type experiments.[23]

Many have suggested streamlining the multiple site ethical process[24,25] to allow an approved application to gain approval at subsequent sites without having to repeat the entire process; this had yet to occur in our local ethics-review area. Although we did not encounter additional problems at the second site, the application and approval process to gain ethical clearance remained cumbersome, daunting and inefficient, as reported by other Australian researchers.[24,25]

Addressing the HREC's concerns

In order to address the HREC's concerns, we resubmitted the project three times, with changes in terminology and amendments to inform and reassure the HREC as to our intentions. This process required extended time and resources that had been planned for commencement of the research and had financial implications for the research project. It involved salaried research assistant time for several months in order to attend to the rewriting and resubmissions, as well as material resources (for example multiple copies of documents), which can, in some cases, total tens of thousands of printed pages, such as in large multi-site studies.[26]

In our assessment the HREC's concerns were often directly related to their poor understanding of video-ethnography. Furthermore, committee members appeared not to understand the basic woman-centred interactions that occur between a midwife and a birthing woman, or indeed that the birthing woman is an autonomous, self-determining individual, capable of making her own decisions.

Additionally, it is important that research investigating complex healthcare problems, such as those in childbirth settings, utilise the wide range of research methods available beyond that of reductionist randomised controlled trials. As Kessler and

Glasgow state, "such trials are limited in their ability to address the complex populations and problems we face"(p637).[27] Indeed, there is a growing realisation of the importance of supporting, as Klassen et al describe, "behavioral and social science perspectives in clinical research, the formation of interdisciplinary research teams, and use of multi-faceted approaches"(p377).[28]

De-identification as a compromise

Offering a de-identification process and coding or changing of participants' names to maintain their privacy and anonymity addressed some HREC concerns. All participants were offered the option to have video footage edited to blur their faces (or body parts); three of the six women and one supporter of 28 total participants selected this option, given that it was offered. No participants initiated this pixilation process.

De-identification in visual research is an area of further challenge within the ethics process. As Jordan states, "anonymization of research photographs of identifiable individuals is technically and ethically problematic for researchers"(p446).[29] Wiles et al concur stating, "ongoing tensions [exist] between, on the one hand, research participants' rights and researchers' desire for participants to be seen as well as heard and, on the other hand, researchers' real and perceived ethical responsibility to safeguard participants"(p41).[30]

This modification to the footage could be viewed as a reasonable requirement to help build trust with the participants and ensure ethical behaviour (for example, allowing individuals to express their autonomy). It may, however, have resulted in considerable consequences for our research. A blurred face in the video footage inhibits accurate analysis of facial expressions. Pixilating participants' faces altered our ability to assess some non-verbal communication, such as eye contact, facial expressions, and glances. As Mehrabian[31] formulated, 55% of meaning derived from interactions are in

facial expressions. These tensions were juggled by taking detailed field notes while honouring our offer to pixilate faces or body parts as requested. We join others, such as Lowrance,[32] who claim "serious privacy and confidentiality impediments continue to hamper research"(p5), such as amending research to 'protect' participants as the risk is deemed greater than is actual.

Some visual researchers object to anonymising images, such as pixilating faces, as they perceive the participants' voice and rights to be diminished in such cases. Some even perceive anonymised images as appearing 'criminalised' and disturbing to look at.[30] There is a recent account of an Australian HREC believing the use of facial pixilation might "change the visual narrative and as a result decrease the validity of the research"(p320).[33] De-identification as a compromise may not be such a straightforward solution. The idea that blurring faces will solve ethical challenges may not be sufficient. Perhaps attentive use of images during dissemination may be more appropriate. Nutbrown, in her research with young children, states that "through continued questioning of the pictures we use, and vigilance over how we use such photographs in dissemination, we can still avoid the need to blur children out by masking their faces thus limiting our interpretation of their meanings"(p11).[34]

Modifications to 'thank you' gift for participants

The main provisos we agreed to in order to satisfy the HREC, were that, in addition to offering pixilation, the baby's birth could not be filmed for research purposes, nor could the baby's birth be filmed to give as a gift to the woman and her supporters. (Our previous intention was to offer this as a 'thank you' gift). These stipulations appeared to originate from the HREC's concerns about video footage usage in potentially litigious circumstances. Our view is that the modifications may have played a role in deterring participants who might have desired to have a filmed version

of their baby's birth. This hallmark occasion recorded for posterity could be considered an appropriate thank you for participation.[35] The researchers saw the 'risk of coercion' from providing parents this video footage as negligible. From our experience in practice, it was thought participants would have enjoyed receiving a film of their baby's birth; personal birth films having become commonplace in contemporary birth culture. Our compromise, allowed by the HREC as appropriate, was a 'welcome to the baby' film instead, which was to be taken shortly after the baby's birth, showing the parents greeting their new baby and offered to them as a gift.

Informed consent in the context of video-ethnographic research

The HREC asked for clarification regarding our proposed informed consent process. Again, we saw this as a suggestion that the HREC had a poor understanding of video-ethnographic methods. We offer here our explanation of the on-going consent process, with the hope that this may prevent delays for others facing the same difficulties in obtaining ethical clearance for the use of video in ethnographic studies.

Unlike quantitative studies with set procedures, where a one-time upfront consent process is sufficient, with video-ethnographic studies, the consent is best acquired in an on-going process.[36,37] In our case it began with intentions of the study; how we would be in the room with the camera (including showing pictures of ourselves with the camera, so that the potential participants would be familiar with what the research would 'look' like); and what would occur during the filming and interviews. We explained that if any of the participants at any time wished to stop their participation, it would be an option to do so without any repercussion or hesitation on our part. This was reiterated after the birth and again during the interviews. The interviews were conducted at the participants' choice for location (for instance, their own home), where they were invited to reflect on their experiences, using stimulus

video clips from the labour. This ongoing consent process, respect for participants' preferences and reciprocal relationship-building are considered essential elements to reflexive ethnographic research, especially in private settings such as birth units.[38]

Assessing the research merit as part of ethical considerations

It would be unethical for HRECs to approve any study that was not well designed and that would therefore be unable to produce meaningful results. For this reason, HRECs must be able to judge the study design's merits, as well as consider whether ethical principles have been addressed. It seems, however, that hospital-based HRECs in Australia may not always fully understand the nature of qualitative video-ethnographic research.

The potential challenge of getting ethical clearance for qualitative research has previously been recognised. For example, Richards and Schwartz reported that, "A major reason for advocating guidelines for qualitative health services research is the growing evidence that medical research ethics committees have difficulty assessing ethical issues arising in relation to qualitative studies" (p136).[39] In Australia the National Health and Medical Research Council provides advice and a protocol in an attempt to alleviate some of this burden for HRECs: "Section 1.2: Where prior peer review has judged that a project has research merit, the question of its research merit is no longer subject to the judgement of those ethically reviewing the research" (p10).[15]

We had been awarded two competitive peer reviewed grants from peer review committees. It is possible that, if the HREC had accepted our study's research merit based on these previous peer review processes, as the NHMRC recommends,[15] our approval might have been granted more expediently and many restrictions that were placed on the methods we used may have been avoided.

Who was the HREC protecting?

While it may have appeared that the HREC's decision-making process focussed on the women's needs, in reality their decisions often prioritised the needs of the health care providers and the health services. At times it seemed that they were focussed on the litigious possibilities of filming birth. A persistent apprehension about litigation appeared to be prioritised over the potential needs of birthing women undergoing straightforward, uncomplicated labour and birth, that is: a sensory rich environment in which women can find privacy and safety, without undue distractions that take her away from her undisturbed birthing zone.[10] The HREC's considerations for 'minimising risk' had a different translation into practice from our own, as midwives and designers. We join others in asserting that birth environments should not *automatically* favour the caregivers' perceived surveillance needs, but balance clinical needs with women's needs for privacy and safety–for both the physical and the intangible inner self.[10,40,41]

The extended time period for ethics approval and the required modifications to the study design are a concern because, arguably, they were due to the methodological preferences and prior experiences held by some HREC members who reviewed our application.

In addition, we suggest that the HREC adopted what can be perceived as a paternalistic approach towards protecting childbearing women, who they perceived as a vulnerable population**,** unable to make decisions for themselves about how and whether they wanted to participate in our research. In our estimation, the HREC's protective efforts towards the participants became overprotective, which may have inhibited the research quality and the childbearing women's rights to make autonomous choices around participation in this particular study. In our opinion, in studies such as ours, women, their supporters, and the midwives who attend them will quite readily state 'that's enough' if they wish to retract their consent. We agree with Raudonis, that

"Health care providers must tread a fine line between appropriately protecting vulnerable populations and paternalistic decision-making supposedly made in the patient's best interest" (p242).[42]

This issue of paternalism from ethics committees is an area of on-going tension, especially in visual research, as Wiles et al suggest:

> It is important that researchers using visual data engage in debates about ethical research practice and issues of paternalism and agency in order that visual research is used in ethically appropriate ways that help to further our understanding of the social world (p51).[30]

Researchers working with hospital based ethics committees also commonly perceive paternalistic tendencies, creating unnecessary challenges for conducting ethical research. As Parnis[36] states, "Cutcliffe's (2002) argument that an element of paternalism that exists across the attitudes and actions of ethics committees can have a "direct impact on the empowerment of certain groups of people" (p. 204) fits with our experience" (p694). The perception of paternalism also resonates with our experience.

Discussion

We faced particular issues in obtaining HREC approval for the Birth Unit Design study. In particular, we were undertaking a video ethnographic study, which is not well understood by hospital-based researchers who usually come from a positivist paradigm.

Ethnography and ethical approval

Ethnographic studies are challenging to describe before they are conducted as they are undertaken whilst immersed within a specific social context, with many factors yet to be discovered during data collection.[14] HRECs often desire accurate predictions for research, however ethnographic researchers cannot provide these due to the flexible

nature of human experiences.[43] It can, therefore, be challenging to discern "which rules and ethical guidelines apply to the social study of medicine"(p1745).[43] In this light, the issues to be considered for gaining ethical approval for clinical trials versus those for ethnographic research need to be differentiated.[39]

In a 2011 study, ethnographers were surveyed on issues experienced in the ethical approval process in the USA, Canada, Australia, New Zealand and the United Kingdom.[44] A salient finding was the ethnographers' perceptions regarding requests by ethics committee for research protocol modifications; these were commonly deemed detrimental or neutral to the research outcome and/or protection for the participants. Ethnographic ethical challenges may be compounded when the population invited to participate in the research–in our case birthing women–seems to be considered by the HREC as vulnerable, thereby unintentionally excluding them from research and, in doing so, possibly even causing harm from exclusion.[45,46]

Moving forward in a constructive way

We support others' proposals for the improvement and streamlining of HREC processes in Australia, which might include: creating an ethnographic-specific HREC;[47] ensuring HREC's members' expertise diversity; or providing a wider range of training, to include assessment for ethnographic and exploratory studies.[18,48] Moreover, reflecting on and analysing the ethical review process can be useful for social science research. The HREC may have more easily understood our research if there had been more members on the committee who were familiar with ethnography, descriptive, exploratory studies or, especially, studies involving video ethnography.

There are many forms of HRECs composed of members with a wide expertise range. Yet, the challenges repeatedly faced by video-ethnographers,[49] indicates a need for systemic change in HRECs ability to understand a variety of research methods.[50] We

suggest it is a shared responsibility to improve ethics and research outcomes. Researchers can work to draft more HREC friendly procedural applications, while HRECs can broaden understanding for ethnographic research methods.

We suggest that there should be timely discussions between HREC members and researchers about what constitutes both the 'vulnerability' and agency of participants, and how this should be addressed - particularly within the context of childbirth research. The aim would be to ensure that the ethical approval processes are rigorous and yet not held up unnecessarily.

Conclusion

Due to an array of reasons, human ethics committees often have a poor understanding and appreciation for ethnographic studies. We argue this misunderstanding results in institutional overprotection: one which views birthing women incapable of making flexible, autonomous decisions and results in significant delays and, likely unnecessary, compromises by the researchers. Impeded ethical clearance is a problem that can be addressed with various straightforward solutions. Hospital based ethics committees need to get more skills and knowledge in qualitative, exploratory and ethnographic studies.

Research conducted in hospitals and health care settings must accommodate such places' complexities. Non-linear and complex aspects, actors and factors within these settings require a methodological range to study how to improve outcomes. Single quantitative studies that are neat and tidy will not always work. Therefore qualitative studies are needed, especially ethnographic methods trying to explore underlying aspects and influences. Our Birth Unit Design study is one example of this.

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Summary

This chapter has accounted for the ethical approval journey undertaken by the research team to obtain approval for the Birth Unit Design (BUD) research project, and therefore also for the Childbirth Supporter Study (CSS) centred in this thesis. I was not involved during the original ethical approval process; rather I conducted a post ethics application approval analysis to examine the contributing factors involved in the challenges faced, as reported in this chapter and publication.

The family members who participated in the research study presented in this thesis were highly motivated to participate and contribute to the BUD research. The woman and her supporters all perceived themselves as capable of being primary decision-makers regarding their ongoing participation in the research.

The following chapter provides the theoretical framework applied to the research presented in this thesis to help ground and transition the research methods with the findings that follow.

Chapter 6: Thematic Findings

Introduction

The previous chapters have laid the foundations for the study and given a detailed description of the methods and theoretical framing for the 'childbirth supporter' study. This chapter presents the findings from the thematic analysis, of the video-ethnographic study of childbirth supporters' experiences in the physical birth environment. As described in Chapter 3, there were eight participants in total, including one family of five and two sets of attending midwives, totaling three midwives. These numbers were deemed sufficient to provide a rich and complex data set. Reaching data saturation, as is commonly the gold standard for qualitative research, was not the aim of this study: the goal was to provide thick and rich descriptions of an exploratory research question. The context, participants and setting are reintroduced here so they are proximal to the analysis. The midwives were included and interviewed to provide contextual understanding of the supporters' behaviours.

Felicity and her supporters.

Felicity was in labour with her first baby, and was supported primarily by her mother Frances. Frances had learned some hypnotherapy techniques and they had planned for Felicity to have an active, mobile, unmedicated, low-intervention labour and birth experience. It was their plan that Felicity's husband Martin would not be an active supporter, but would wait with his own parents in the hospital waiting room, although this changed during the course of Felicity's long labour. Felicity's two sisters also provided support, and although they were unavailable to be interviewed, their participation contributed to the results due to their behaviours, positioning and roles in the video and field note data.

Felicity had been labouring at home for a night and a day when the family decided to go to the hospital. I received a call that they were on their way to the hospital. I arrived shortly after they had, at 11pm. My midwife-research assistant had arrived shortly before me and had received the participants' written consent to participate. I reconfirmed ongoing consent throughout the 15 hours at appropriate points. The research assistant primarily took field notes and I filmed for the majority of the labour, although she had to step away for a few hours in the middle of the night, so I both filmed and took notes during that time.

The Setting

The location for the 'childbirth supporter' study was a Sydney metropolitan hospital. The room was located in the birthing suite on the second floor of the building and the room for Felicity's labour and birth is one of 10 delivery rooms, each with ensuite (attached bathroom) with a large, deep tub for water immersion during labour and/or birth. Felicity arrived with her family of four people and a few bags of extra clothes, her own pillows, and food and drink. The family placed themselves and their belongings wherever they could find space around the room. Her midwife was paired with a student midwife, both of whom were present when I arrived. As I entered the room I heard the rush of water filling the tub. I saw a large room with many people moving around, setting things down and looking around the space. Felicity was leaning on the bed, which was at the center of the room and set at a height above Felicity's waist level. Frances stood next to her with a hand placed on her shoulders.

The main room was darkened and it was night, so the video footage from the first eight hours is also quite dark. Therefore some images are represented as line drawings based on the video footage to better show the details of the space, as shown in Image 4.

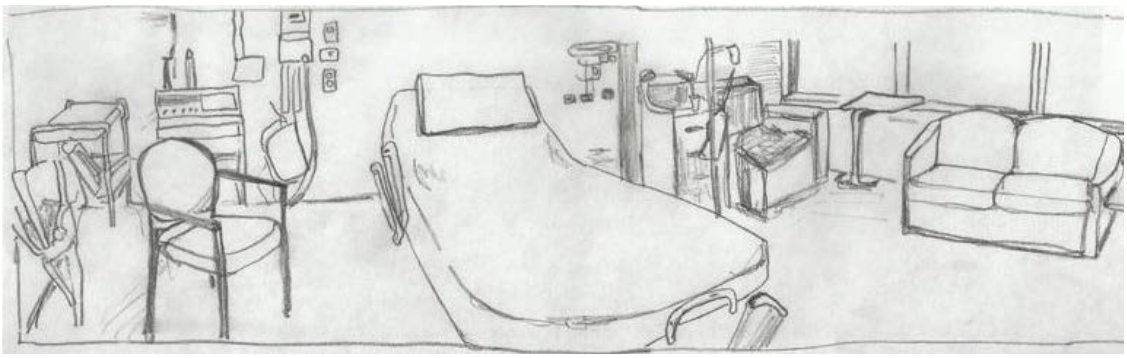

Image 4: Sketch from video of birth room arrangement

Having introduced the participants and the setting and context for the birth experience observation, the remainder of the chapter presents the findings. The data analysed was the video footage, interview transcripts and field notes from the observation and interviews. The analysis process was explained in Chapter 3.

Findings

Analysis of the data revealed three major themes, which can be seen in Table 8: 'unbelonging paradox', 'role navigation' and 'supporting the supporter'. The subthemes that comprised the 'unbelonging paradox' were: 'tenuous nest-building behaviour'; 'elusive privacy'; 'technocratic environment conveys mixed-messages'; and 'lack of control'. The subthemes revealed for the 'role navigation' theme were: 'role navigation by social interactions' and 'role navigation by space, place and activity'. The subthemes revealed for the 'supporting the supporter' theme were: 'supporting the supporters' instrumental aid activities' and 'supporting the supporters' informational and emotional

Table 8: Key results based on video-ethnographic thematic analysis

Thesis Research Question: How does the current design of birth spaces in resource rich countries accommodate and facilitate the role of the woman's birth supporter?

MAIN THEMES	SUBTHEMES
Unbelonging paradox	**Tenuous nest-building behaviour –** supporters are inhibited and struggle to feel empowered to personalise and modify the environment, upon arrival and throughout labour, to create home-like, familiar and safe space for the woman and themselves. **Elusive privacy** – Privacy needs are difficult to satisfy in a public hospital birth unit. **Technocratic environment conveys mixed-messages** – the objects and the designed space itself send messages of 'act like a patient', which sends conflicting messages to supporters who need to feel calm and confident, not passive, in their support roles. **Lack of control** - Hospital environment did not provide appropriate choice making for any occupants; acoustic, olfactory (fresh air), visual, light, water and air thermal regulation.
Supporting the supporter	**Instrumental aid needs** – supporting the physical needs (nutrition, rest, space, bodily needs) of the supporter is essential to prevent exhaustion, mistakes, poor communication and lack of support for woman. There is room for improvement in designing the space to take care of all the users of the space. **Informational and emotional needs** – supporters often need information, emotional reassurance and assistance in working with others. This may be provided by a soft, nurturing physical space.
Role navigation	**Social interactions** – working with others in supporting a woman in labour requires the supporter to be aware and sensitive to their own and others abilities and skills, including how to position oneself in the space. **Activity, space and place** – Whether one is an active or passive supporter, finding a place and purpose in the birth unit can be challenging.

activities'. Data is presented in support of each theme and subtheme with images, quotes from the participants and verbatim field note excerpts. Some of the presented images are dark in hue due to the labour occurring at night and the lights being dimmed in the room being dimmed, therefore some of the images have been dawn as line-drawing to ensure clarity. Related supporting literature is included in this chapter where relevant, although such material is usually presented in the discussion chapter. The choice to include supporting literature here draws connections of the interpretations and enhances the analysis.

'Unbelonging Paradox'

'Unbelonging paradox' arose as a major theme. While the birthing woman and her supporters appeared to initially settle in (as described in field notes and seen on the video), the supporters described their experiences as challenging. The supporters were aware of their own desire to be present to support Felicity but also the hospital's expectation that they would be there to provide support. Their later comments, upon viewing video footage of their time in the birth room, revealed that their experience was of feeling being unwelcomed, under-supported and impeded in the performance of their roles, by the built environment. They found it difficult to create a safe, undisturbed nest. The 'unbelonging paradox' theme comprised of the following four subthemes: 'tenuous nest-building behaviour', 'elusive privacy', 'technocratic setting conveys mixed-messages', and 'lack of control'.

'Tenuous nest-building behaviour'.

'Tenuous nest-building behaviour' is the first subtheme in the theme 'unbelonging paradox'. Nesting has been identified as a central desire for women, prior to birthing (Singh & Newburn, 2006; Walsh, 2006) and arguably for their supporters. Nest building may be seen as related to the birth sanctum concept described in Chapter 5 and in Stenglin and Foureur (2013). Anderson and Rutherford (2013) define nesting in humans as:

> measurable change in behaviours and attitudes related to birth preparation that happens during pregnancy. Nests provide safety and protection again[st] conspecific and climatic hazards, and also offer more subtle advantages. A safe environment facilitates mother–infant bonding and the development of attachment (p. 390).

As with other mammals, many women experience a powerful need to create a

safe, comfortable nest or space for birth where they feel confident they will remain undisturbed (Foureur, 2008). A desire for familiarity – knowing who is in the space with her – has been noted as customary for women cross-culturally in a social-selectivity process, that is, a process of selective narrowing of social interactions and determining who is in a woman's environment during late pregnancy and labour (Anderson & Rutherford, 2013).

Analysis of the field notes, interviews and video found that midwives and researchers saw the participation of supporters in this nest building behavior, through their attempts to adapt the birth room to the birthing woman's needs, as important to their sense of autonomy within the space. However, the experiences reported by supporters were very different to what was assumed by the midwives and researchers, based on their observation.

It was identified from the interview transcripts that the family's reactions to the built environment was a feeling of disorientation and inhibition. Despite having had a tour of the facility during pregnancy, they could not remember the process for entering the birth unit upon arrival. This negatively impacted their sense of being welcome within the space. A belief that she will be welcomed into the birth unit has been shown to reduce a woman's anxiety levels and increase her confidence to stay at home longer (Green, Spiby, Hucknall, & Richardson Foster, 2012). Although there is no evidence regarding the positive benefit gained when the supporters also feel welcomed, it may be reasonable to assume feeling welcomed would also benefit the supporters. Frances described a feeling of uncertainty during the wayfinding process of entering the unit:

> We didn't realise that there were still people in the delivery reception…[because] that was behind the door…we had to be buzzed in

> order to get through. We didn't know that would be how to get through that [door]. Or if there was anybody on the other side.

Once in the birth space, the group appeared relaxed. As a researcher wrote in her field notes:

> The woman's support people are friendly, relaxed and seem comfortable in the space. The three women walk barefooted around the room and have spread their supplies: snacks, drinks, mobile phones, CD's and an oil burner (which the woman's mother has brought from home) on the tables and desk.

However, later interviews revealed that their experience continued to be characterised by uncertainty. The perception by others, that they were making themselves comfortable – building a nest – was noted in the field notes and by the midwives during the video-cued interviews.

One aspect of feeling settled is the perception that there is a designated place for belongings. The main supporter expressed a feeling of being cluttered due to scarce storage space.

The field notes and video observations confirm lack of storage and a lack of sufficient segmentation between areas of the room (such as dividers or partitions to separate one large room), seen in Image 5.

Image 5: Tenuous nest-building behaviour

The family had brought bags and personal objects they perceived as necessary for a labour and birth experience (such as bags of extra clothes, extra pillows, aromatherapy oils and snacks). The lack of storage space in the room suggested the redundancy, or unwantedness, of what they had brought.

> I felt like we had brought a lot of things…bags and all of that…stored them on top of the couch…maybe if we had stored our belongings in a corner somewhere, or in another room or something, it might have been better. It might have helped. Not cluttering the place. – Frances

The lack of a clear place for things contributed to the difficulty the supporters experienced, in settling. The meaning associated with the absence of a clear place for things (and perhaps, by extension, for the supporters themselves), was unbelonging. Unbelonging was experienced as difficulty settling in:

> It just took a while to settle in and just see *where are we*? Where do we fit in, in this place with everything around there? How do we move around and feel comfortable without being too cautious? – Frances

Women tend to be aware, at least peripherally, of their supporters' activities, comfort and mood, even when the women are in the birth "zone", as described by

Dixon, Skinner, and Foureur (2014, p. 371). Felicity recalled her supporters' nest building attempts:

> My mum and…sister had all my stuff so they were just trying to get ready. Like my mum had set up the oil burner and put…a couple of drops of this and that, trying to set that up. Set up my music and they were trying to do all that while I was just trying to breathe and trying to use whatever positions.

A midwife describes her observation of the supporters' nest building attempts:

> On reflection, she [Felicity] was creating her environment in that room, which was great – doing what…she needed to do. Having her two sisters there, running the bath, having her mum being there…helping her create that space for her.

Nest building can provide supporters with an opening role, however the space did not invite or support this activity. Frances, Felicity's mother, felt foreign in the space, and was not comfortable. When asked what she would change about the physical birth environment, Frances replied:

> Just to make it more of a home. It is so foreign…I'm not the mother that's going to go there and give birth. But when I walked in there, it took me a while to settle down, for me to feel like I'm comfortable in this place. Because I was really a bit…lost.

The capacity a space has: "to be made familiar" or "to be personalised" emerged as an important criterion in the development of design guidelines, consistent with research in personal space preferences (Gosling, Craik, Martin, & Pryor, 2005), especially in the context of nest building in this study. The supporter's ability to provide

access to things from home was an important part of their role in creating comfort, as seen in Image 6. For instance, Felicity said, "We brought our own pillows…I had been using it at home…I preferred my pillow". The familiar scent and feel of her own pillows appeared to have created a positive olfactory and sensory response for Felicity, which may have positively contributed to experience. It is important to consider all sensory stimulation in the nest-building process.

Image 6: Familiar hominess with own pillows facilitates nest-building

Another birth space characteristic that inhibited nest building was the inability to play favourite music at appropriate volumes. Frances found it especially important to be able to have familiar music playing continuously – described as a 'music stream' by Kopec (2012) – as a way to keep acoustic consistency:

> [It] would have been nice to just keep that energy and…that environment of sound and calmness and tranquility. Because music is wonderful! It holds the space. It keeps the energy and keeps things constant…it's a…nice cover, to keep music going. But we weren't able to always do that so there was always this lapse.

The positioning of the electrical power points made it difficult to establish an intimate soundscape. As Frances said:

> I think where we could plug in the CD was quite a distance away and I felt that if we were to turn it up to a decent volume that she could hear wherever she is, it would be really loud.

Felicity recognised and appreciated that her mother actively sought to take care of her, by providing her with comfort and familiarity. The presence of her own pillows was a materialisation of Frances' care for her. Their presence was meaningful as something that not only takes care of Felicity's comfort, but also represents the mother's care for her daughter's comfort. Nest building by the supporters was important in establishing a caring environment for the woman. The things that will take care of the woman materialise the desire of her supporters to care for her. Finding a place for the things brought from home, such as snacks and extra clothes, enables the supporters to establish a locus of care within the space, and thus to place themselves.

'Elusive privacy'.

The second subtheme identified, building upon 'tenuous nest building' and expanding the 'unbelonging paradox', was the perception of 'elusive privacy'. Women prefer to feel their privacy is protected and that they are safe and secure, without unnecessary distractions, in order to facilitate labour progress (Buckley, 2003). Supporters also appreciate a sense of privacy, consistent with the literature (Johansson et al., 2015). However, there is a conflict between meeting this desire for privacy and the hospital culture, which is focused on surveillance and observation of the woman. If nest building is an attempt to establish ownership of the space, then the goal of ownership remains elusive, as the space is actually owned by the institution, and is beholden to the institution's agenda of achieving a safe birth by medical means. This creates a challenge for designers.

One example of a design decision that impacted privacy is in the design of the door to the birth space. In the studied birth space, the design of the door allowed people outside the birth space to look through a window located at the top of the door, as seen in Image 7. This allowed those outside the room to make judgments about when to enter, and reduced the chance of inappropriate or unnecessary intrusion. As researchers we were among those who benefitted from the window in the door. We had agreed that stepping out during procedures was the appropriate action, but the ease of monitoring the setting that this viewing window provided, highlighted the reality of elusive privacy for the participants.

Image 7: Window in door and mat on wall

> 23:47 – 00:45 Researchers wait in neighbouring room, and then in hallway, outside of door looking in through glass window during Felicity's exam. – researcher

Frances interpreted the window-in-door feature as an example of elusive privacy. She proposed a possible solution; in the context of her daughter's own straightforward labour experience:

> I think there was just one door and when you open the door…if anybody was walking out they could see right in. It's not like you have a double door…[where you have] one door to walk in and when that door shuts you can open this one.

The institutional requirement that privacy may be breached at will by the medical team (for the sake of a safe birth) shapes the design of the space and influenced the support role for both Martin and Frances. The design of the door and the window negotiate that breach of privacy, limiting it, but also facilitating it. Three of the four supporters were regularly observed entering and exiting the room (for example to return to a waiting room or to visit the bathroom or vending machine, where they may have inadvertently invaded other families privacy just by being out in the hallways). This negotiation between medical safety and the family's privacy is a good example of the ambiguous status of many designed elements within the birth unit. Is the door participating in the project of the woman and her supporter, in their desire for privacy? Or is it a participant in the larger institutional project of monitoring the birth process? Such ambiguities unsettle the space, and contribute to the family's experience of an unbelonging paradox.

'Technocratic setting conveys mixed-messages'.

The third subtheme contributing to an 'unbelonging paradox' was identified as the 'technocratic setting conveys mixed-messages'. While this technocratic setting assured the birthing family of the presence of back-up medical support, it also reminded them of their potential inadequacy to their task. It conveyed both reassurance and disempowerment.

As Frances said:

> There's just equipment everywhere…even when I looked at it, it actually scared me. Because I sometimes think I'm going to walk back and reverse into it or knock it…I felt like I always have things within my peripheral vision but I didn't feel safe that if I have to walk back, I know that I'm not going to knock something.

The room feels foreign for those who do not regularly inhabit such settings (Timmermann & Uhrenfeldt, 2015), exemplars of this can be seen in Image 2 (in Chapter 3) and Image 8.

Image 8: Supporter felt anxious she would bump the nearby equipment

Felicity's husband Martin perceived himself as in the way. He attempted to defuse his sense of awkwardness with humour, remarking: "What are you going to do? Just hang like this off a machine?" Martin pantomimed a 'cool guy' pose, with his arm draped over an IV pole, saying, "Hey, how's it going?" Martin's humour was triggered by a desire to dissipate his discomfort, and a sense of the incongruity of his awkwardness in this particular technological setting, given the commonplace association between masculinity and technology (Lohan & Faulkner, 2004).

The woman, supporters and midwives perceived the medical equipment as inhibiting movement. As described by a midwife:

> [If there is] an IV pole and then maybe the battery runs out and so you've got to plug it into the wall and then [it] can only reach, the power cord can only reach so far, and then you don't have telemetry, you're then stuck with the CTG on the wall. So…that definitely restricts where you can go.

The hospital bed suggested a disempowered patient, "You're just sitting there like you're the sick…or…a patient on a hospital bed" – Frances. The script and design indicate the person is a patient, even when they perform a support role.

Frances described how the medical equipment conveyed the meaning, 'not authorised to touch'. She had a confessional tone here, "I think I might have moved something actually. I might have moved something. It might have been that [pointed to IV pole] or something. I remember moving some equipment out of the way. Away from the bed".

The medical equipment typically relays an unnerving message to families, as a midwife described:

> It can be a little bit confronting I find when I show people rooms. That's the first thing [infant resuscitaire] that they talk about – 'what's that'? It is a little bit scary…for some people and most of the time we just do a baby check on there and…if that was away, that would maybe change the feel of the room a little bit and give you a lot more space in there.

Ideally technocratic environments, as guided by experts and technology, would embrace the latest research and evidence on promoting physiological birth. However, the separation between the human person and the technological equipment is entrenched (Davis-Floyd, 2001) and the space is dictated by the 'other' (such as the CTG machine) as having the power to "do the birth" – not the woman. For example the birth space did not facilitate an active, mobile and upright labour, as recommended by research on physiological birth (Lawrence, Lewis, Hofmeyr, & Styles, 2013). Image 9 shows an example of Frances holding Felicity, who holds onto the sink. Frances describes this design oversight, "Clearly the place doesn't have enough places for the [birthing]

mother to hold, like a railing or a hand thing or something that juts out or something that you can hold on… A comfortable padded leaning counter".

Image 9: Sketch from video of supporter holding woman, who holds onto sink

This is one example of how technocratic design can create additional burden for the supporter, who must provide the physical support required by a woman's physiological need to lean or pull to enable support for all four limbs during labour (Jowitt, 2014). The technocracy of the situation aligns with Italian architect Lepori's (1994) statement that, "the organisation of the entire setting is a function of the patterns of movement that occur during intervention" (p. 4). The equipment in the current design of birth units is intended to assist the staff, whereas there appears to be a deficit of equipment that assists the supporters and women during labour.

Supporters and women in labour want to know equipment (for the medical staff) is available if needed, but we agree with others (Duncan, 2011; Stenglin & Foureur, 2013) that this sort of equipment should remain hidden to create an anxiolytic (anxiety-reducing) space. Medical-based equipment communicates that 'something might go wrong'. The woman and her supporter, for the most part, are capable of managing the labour and the presence of thoughtful design and more woman/supporter assistive equipment in the birth space would shift the balance of the current day message of the need for trained staff to use equipment to 'do the birth'.

'Lack of control'.

The last subtheme to comprise the 'unbelonging paradox' theme was 'lack of control'. This corresponds with territorial behaviour research, exemplified by Kaya and Weber's (2003) study of college dorm room personalisation behaviour. Felicity's family sought control where they were able, however they had no control over most design features. As the supporters attempted to personalise the space and create a nest (for example adding pillows from home, familiar music, favourite scents), overall they experienced an unbelonging paradox in their inability to take control of the physical environment they inhabited for the labour and birth. Lighting design in the birth space could have offered a greater range of choices. A supporter expressed, "I prefer it dim...sometimes the lighting is really harsh…that was harsh, that spotlight".

The other supporter agreed, "A dimmer in the bathroom would have been good…because you couldn't have the light on. It was too uncomfortable. You just had to rely on the light from the window or from the other room".

The aesthetics of the space, specifically furnishings, fixtures, equipment and wall colour aligned with "tenuous nest-building" and "technocratic space convey mixed-messages" subthemes, but the aesthetic aspect strongly overlapped with occupants' perception of "lack of control" over the space. Shiny metal equipment contributed to the technocratic, medicalised aesthetic, while dreary white walls and old, grey, faded upholstery did not facilitate reduced anxiety or a sense of domestic familiarity. Lack of art in the space also contributed to lack of domesticity with a clinical feel. It wasn't possible for the supporters to change the aesthetic environment to suit their preferences or encourage a sense of belonging. Frances interpreted the space as cold:

> It's the colour, that grey or white, it's so cold. Maybe some murals or something…paintings…or pictures of a baby on the wall…a beautiful piece of sketching or something of a baby…or stars or the moon, or nature, that sort of thing [would make the space more appealing].

A midwife described her feelings about the unappealing aesthetics, "The white walls and the grey furniture…now I'm so used to it, I don't think about it but I'm sure the women [and presumably supporters] get that sense [of discomfort] as soon as they walk in".

'Role Navigation'

The next two themes were revealed from more practical design aspects and are therefore more straightforward than the more theoretical 'unbelonging paradox' theme. The second major theme identified was 'role navigation'. Typically the childbirth support experience is one non-professional supporters rarely perform, therefore, the act of supporting a birthing woman requires in-the-moment learning and role navigation (Bäckström & Hertfelt Wahn, 2011). The interactions between the professionals and the non-professional family members, as well as between the family members, are facilitated by the designed birth space. This demonstrative quote from the midwife sets the scene for the 'role navigation' theme:

> I wanted to create some sort of rapport to begin with…I like to come in [and] creat[e] a calm environment. And at that stage, when [Frances] handed me the birth plan, I didn't come in calmly…Especially because … I hadn't even had time to meet the woman. And there was a whole heap of people already in the room … I came in confronted and quite … off–guard … To work with Felicity … I really had to go through Frances …

> maybe … if she hadn't gone straight in there without me? Or if I had met her in – like, the waiting room? Like a middle ground.

'Social interactions'.

The first subtheme comprising 'role navigation' was 'social interactions'. According to the field notes, there were some tense conversations between Frances and one of the midwives and between Frances and Martin during the night, when labour did not seem to be progressing. Despite this, Frances navigated her support role with focused determination and a calm affective state. Throughout labour, Frances murmured encouragement and offered gentle touch for her daughter, despite her own lack of sleep and discomfort. She defended Felicity's tenuous nest space by conversing with Martin and the midwives when she felt Felicity's birth zone was being disturbed by conversations in the room.

> [My primary concern was to provide] comfort and to minimise annoyances…granted she was safe in there, but sounds are important and…if things become annoying and distracting…it's not really good for her because I want her to feel calm and allow the process to take its course naturally without hindrance. - Frances

The room layout and supporters' lack of space may have contributed to a sense of redundancy for them – feeling unneeded and without a 'job' to perform, as mentioned in the supporting the supporter section. Communication amongst the support team, including the midwife, could alleviate this perception of redundancy by discussing possible activities to do, to fill a support need. These moments could be better facilitated if there was a designated space for such conversations. A midwife described a common scenario; cooperative versus obstructive support:

> You are more aware of the support people when they're not supporting the women, as opposed to when they are supporting the women – it seems to flow nicely. They're in the space you work around them, but when they're not, they're kind of clumped. That's when it gets really difficult. – midwife

This midwife mentioned clumped supporters as problematic. It is possible the act of clumping may be supporters' coping mechanism to foster familiarity and group-support during an anxious time, albeit resulting in increased feelings of redundancy. Navigating roles is an important aspect of the childbirth support process when no continuous role has been identified. On other occasions, separating the supporter and woman may reinforce roles, for instance, reinforcing the midwife's role while undermining the supporter role by the midwife directing a conversation to occur outside of the room, outside of Felicity's range. This was noted in the field notes:

> 03:40: L asks mother [Frances] if they can talk outside. They leave the room. They return 5 min[utes] later together. Mother has returned with her eyes downcast. It is obvious that the conversation has not been an easy one. Mother sits in the large comfortable chair and places her hand over her eyes. She seems distressed by the conversation outside. - researcher

'Space, place and activity'.

The second subtheme identified in 'role navigation' was 'space, place and activity'. The physical environment appeared to influence supporters' role navigation, either by providing a place to be and therefore ability to attend to Felicity's needs; or inhibiting close proximity and therefore sending an obstructive message. There was an atypical instance of support facilitation when Frances tried to tidy the room. She moved

the gym mat placed on the floor from the middle of the floor, to an empty wall area. Unprompted, Felicity gripped the mat's top edge, seen in Image 6, and alternately rocked her body and pressed her forehead against the mat, appearing to shield against outside distraction and gain a focal point. This was an unintended shift in support approaches for Felicity, based on Frances' ability to work with and feel comfortable taking initiative with the furniture and equipment in the birth room.

This midwife provides an example of the built environment's inhibition script regarding lack of proximity and role to play:

> It was hard for [Martin] because the mum [Frances] was on one side; the sister was on the other side. Unless he snuck himself up high, so he could get to her [Felicity's] head as well. Then a lot of support people don't feel comfortable doing that if they think they've already got support people doing that. They feel like there's no place for them.

Martin described the feeling of no role to fulfill and being in the way, "Sometimes when I went in and…then [Felicity] wanted to move, 'move out of the way', go to the corner and there is not really a place to [be]".

As mentioned previously, a family alcove or window bench seating, could communicate acceptance of a passive supporter's calm presence nearby. Martin expressed a similar idea:

> If I was doing the room, it would be near the entrance, you would have a sort of section almost like a viewing area…it can be still part of the room but a place where you can chill out maybe if you need to have a rest...a single bed length in an alcove that's not in the way… just a few square metres near the entrance where people can go in and out without having to cross over to get to this place.

Martin's role shifted to a more primary support role during the last few hours when Felicity laboured in the bathtub, while Frances shifted to a secondary support role. This relocation to the bathroom created a spatial 'opening' for Martin to enter the scene, and place himself in a supportive way. By this time Frances appeared exhausted and can be assumed to have appreciated Martin's more active support role. The data revealed Martin's emotional state shifted when he perceived the birth was imminent. Becoming less anxious, he observed a physical space for him near Felicity at the bed, as seen in Image 10, parts (a) and (b) and later, by the tub. Frances and Martin both shifted their roles to accommodate change in location, and their own and Felicity's needs.

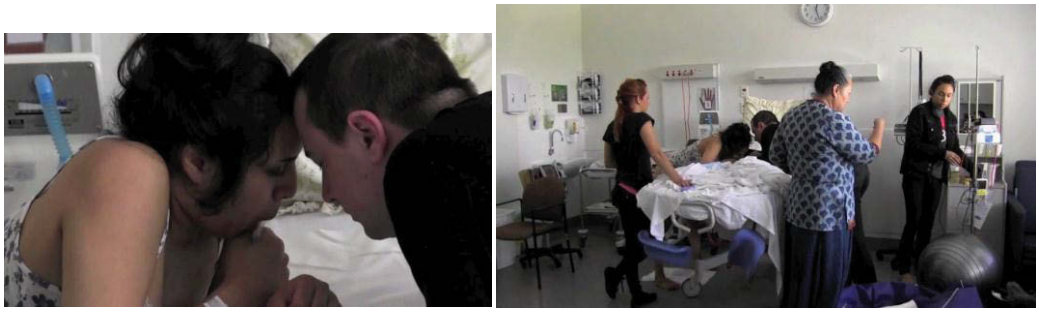

Image 10: (parts (a) and (b): Role negotiation - adapting to changing needs and available space

'Supporting the Supporter'

The third main theme identified was 'supporting the supporter'. This theme arose from the designed elements of the room that facilitated or inhibited the supporters' comfort, in terms of their physical, cognitive and emotional state. The importance of this is exemplified by Felicity, who was distracted by the need to consider her supporters' well being, "I didn't like the fact that my support people, I could tell were uncomfortable. Because I could see them kneeling there on the hard floor. That's not nice and it was for quite a while".

These findings are consistent with work on social support that has identified four types of social support, ["(1) emotional concern (liking, love, empathy), (2) instrumental aid (goods and services), (3) information (about the environment), (4) appraisal (information relevant to self-evaluation)"] (House, 1981, p. 39). Three of the four social support types described by House (1981) were identified as subthemes: instrumental aid activities; and informational and emotional activities.

'Instrumental aid activities'.

This first subtheme for 'supporting the supporter' was identified as 'instrumental aid activities'. It was observed that the physical environment hindered meeting some of the supporters' needs.

The room was considered too small and may have increased stress for the participants. Felicity said, "[I wish there was] more space for family, support people".

Felicity often varied her position in search of comfort, including being on the floor or squatting. The supporters attempted to keep their eye-level the same as Felicity's eye-level, so had to kneel, squat or be on the floor. No padding or soft areas were available for kneeling. When asked how his legs felt the next day, Martin was thankful for his physical fitness training, "I train actually a lot. No it wasn't comfortable at all but if I didn't I would have been like whinging[whining] …our instructors make us do squats up and down the hall. Walk in a deep squat".

The furnishings account for Frances' perception of diminished strength. For example, seated in a plastic chair in the bathroom, she struggled to hold Felicity under her arms. "It did feel uncomfortable for me but I felt because of my discomfort, I…felt I wasn't in a position to be strong enough in my upper body to be able to hold her, or to support her".

The ergonomic birth ball, meant for use by the woman, appealed to Frances, as can be seen in Image 11 where she is using it as a seat since it enabled her to be at the right height for supporting Felicity who at that time was on the bed. It also provided Frances with the ability to move easily whilst seated.

> Because the ball, you can…manoeuvre it for your comfort. It is just like when you're lying in bed and you move for a comfortable spot. Well you can do that on the ball. On a chair it is pretty fixed. You can't really find a comfortable spot on a chair. But on a ball you can move it.

Image 11: Supporting the supporter, using the birth ball

The comfort of the supporters in the birth tub area was similarly challenging, as Martin noted, "The research should say that the sides of the bath should be designed to be comfortable for people to use to support someone in labour". In addition, Martin found the seating to be inadequate, "Comfortable lounges should be provided in the [waiting] room".

Martin felt frustrated due to having no place to rest, "When I got really tired, I think I just conked out on that [floor mat] for a while, just on the ground. I mean that couch is totally pointless. A couch with arms is ridiculous!"

Nutrition is important for maintaining energy during long labour support. During this nighttime labour, the long trip to access the vending machines and the available choices of food were concerns. Martin said:

> [I wish there was] a bit of kitchen facility. I'd pay ten dollars for a drink, if it was nice. Twenty dollars for a sandwich it doesn't matter. At that time…it's just like, give us something good to eat, instead you're making toast and trying to get those little [plastic knives to spread butter]…drinking from a Styrofoam cup and drinking coffee and all that. That's a bit [shrugs shoulders].

The supporting role of the sisters

The primary role of both sisters was to support Felicity by being support people for their mother Frances. Both sisters were younger than Felicity, and neither had given birth or been present at a birth. Examples of their supportive behaviours include: handing pillows and blankets to Frances when requested; getting Felicity's clean clothes out of the bag; checking that the music was on; offering water and drinks and being constantly available to both Felicity and more directly to Frances. This required their presence in the room, which corresponds to the space, place and activity subtheme, as well as the 'social interactions' subtheme for the 'role navigation' theme addressed in the previous section. Their presence in the room created challenges due to lack of space. However, their presence facilitated Frances' confidence that Felicity would not have to be alone during labour and that Frances could have extra sets of hands to help when needed.

Frances appeared to take only one break during the night and this occurred when both sisters helped Felicity walk around the hallways. At the family's arrival to the hospital, Frances spoke about having many hands to help them transition into the space,

which facilitated her ability to be fully present to Felicity, "We had quite a few [people] to help. [Sister 1] was here, [Sister 2] was there too. So I was with [Felicity] mostly and I think [Sister 1] and [Sister 2] took care of the bags."

Additionally, having an unoccupied sister available to ask questions of the midwives outside of the room assisted in communication. The following quote is situated during a time when clarification about a suggestion was needed. The midwife suggested a gentle maneuver of lifting one foot onto a chair to shift the angle of the hips. The midwife believed this would assist the baby to rotate slightly and help progress the labour, as there was little progress and the midwife was concerned about the energy levels of both Felicity and Frances. Indeed, Frances was tired and missed that the incorrect foot was suggested, as is communicated in the quote from Frances:

> It was actually something that I completely missed. I didn't pick that up [incorrect knee to lift was suggested] and [Felicity] asked a second time…[Felicity] asked [her] sister "go and ask the nurse is that the right, or whatever knee"? And [sister] went and asked and "yes [it is the right knee]". And sister came back and said it's the right knee… then [Felicity] asked again. She knew something wasn't right.

The sisters' presence during the labour was beneficial and helpful for Frances, the main supporter. They exemplified a passive supporter role, in that being nearby in case of need was demonstrated in the examples provided. During the times they were not needed, there are examples of them struggling to find a way to pass the time or in the way of the midwives or Felicity. When one midwife was asked about how that number of people could be accommodated in the room, she suggested,

> Having a bigger space…[Because having that many people] reduced where I could put [Felicity]…because her sister was sleeping on the couch, as well. I mean, she'd move for her, but I think it just limited…the space.

'Informational and emotional support'.

In addition to 'instrumental aid activities' to support supporters, the built environment should attend to supporters' 'informational and emotional needs', which was identified as the second subtheme for 'supporting the supporter'. Supporters' informational needs may range from: knowledge about the normal labour process; positions the woman might try; location of comfort equipment (for instance, hot or cold packs); how to keep the space safe and peaceful, and how the labour is progressing. Emotional needs are any that facilitate the supporter to feel "supported, included, and prepared for the reality of risk and uncertainty in pregnancy, labour…and for their role in this context" (Steen et al., 2012, p. 422).

Martin, Felicity's husband, became a secondary supporter by default. The original plan was his passive proximity, as the family's belief was, "birth is 'women's business'". However, due to the labour's duration, Martin cycled through various activities: nervous pacing; attempted rest in an uncomfortable waiting room chair; messenger between the midwives and Felicity and Frances; to his final activity as intimate cooperative supporter. The three roles Martin negotiated between were: "concerned outsider", "messenger" and "supporter".

During the night and morning, he sporadically checked on Felicity's progress. One midwife communicated how difficult it can be for supporters without any discernable role: "It's hard for them [supporters] to just be in the room. They feel awkward too". The perception of redundancy, which can be debilitating, can arise from a long labour without identified tasks, or the belief that one is incapable of performing

needed support roles (for reasons that might be personal, cultural, physical or environmental).

An example of Martin's anxiety and his desire to find a role occurred when he was able to inadvertently invade the acoustic privacy of an adjacent birth room. He entered Felicity's room and compared her progress to the woman in the adjacent room, whom he had overheard giving birth, declaring the neighbouring woman had "beat [her] to it". This action and message seemed to increase everyone's stress. He appeared to need more informational, emotional and appraisal support than the other supporters, to reassure him of labour's wide range of 'normal'. Frances said, "I think he [Martin] was more fearful than any of us were."

> Sometimes I felt it was a bit – 'oh no he's come back in again and I still haven't done this, I still haven't completed it'… it was a bit of a disappointment that every time he came back in there was still no improvement or so little improvement … obviously that wasn't his intention. – Felicity

As there was insufficient space in the room for Martin to be a passive supporter, he waited in the waiting room, located out of sight and sound to Felicity. This lack of proximity may have contributed to his anxiety. Research has indicated that family members may have differing privacy needs, which can be satisfied by the presence of family alcoves, especially those located at a window (Shin et al., 2004). Rippin (2011) described an intensive care unit ethnographic study, with examples of "family studios [as a] saving grace" (p. 77). At one point Martin chose to take a nap on the birthing mat on the floor of the birth room as shown in Image 12, exemplifying the need for supporters to be supported.

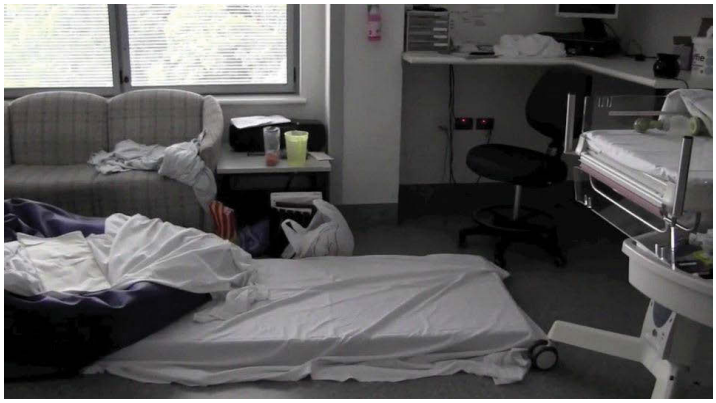

Image 12: Supporting the supporter: supporter slept on mat intended for woman

Summary

The evidence presented here suggests that when observed by others and through video recordings of the event, childbirth supporters may appear at ease in their occupation of the hospital birth space. However, the video-cued interviews consistently revealed an unbelonging paradox for childbirth supporters, who remarked on physical design inhibitors to nest-building behavior; elusive privacy; lack of control; and the need for instrumental, emotional and informational support for their own needs and role navigation as childbirth supporters.

The next chapter extends these video ethnographic findings through a reflection on how the themes might translate in 'brick and mortar' birth settings. This is done through a comparison with the physical birth setting audit tool, the Birth Unit Design Spatial Evaluation tool (BUDSET)

Chapter 7: Translating Findings into Practice

This chapter provides a translation between the findings of the research and evidence-based design practice. The themes described in Chapter 6 are discussed in relation to recommendations arising from the analysis and how these compare with the optimal characteristics proposed as required in the physical birth environment by the Birth Unit Design Spatial Evaluation Tool (BUDSET) (Foureur, Leap, et al., 2010; Foureur, Leap, et al., 2011; Sheehy et al., 2011). Because healthcare settings are inherently complex, intricate and layered spaces that provide endless challenges for architects and interior designers to design (or refurbish) with all of the necessary components for delivery of care (Caixeta & Fabricio, 2013; Van der Aa & Blommaert, 2015), it is important to translate the research into recommendations to guide design practice. Researchers and designers must coordinate their efforts to facilitate this process (Blossom, 2011). The discussion takes the form of what I describe as a 'cross-validation analysis' that highlights aspects of the BUDSET that account for the supporters and the areas where this study findings indicate there is a need for more design emphasis to better meet supporters' needs.

BUDSET: Background and Domains

An important factor in the research examining the childbirth supporters' experiences and roles in the physical birth unit environment was the availability of a physical birth space design audit tool. This section describes in detail the origin and development of the Birth Unit Design Spatial Evaluation Tool (BUDSET) an audit instrument developed by a team of midwives and architects (Foureur, Leap, et al., 2010), as initially mentioned in Chapters 1, 2 and 3. The BUDSET is used as a

reference point for discussion of the themes presented in Chapter 6.

BUDSET began it's development via convergence of evidence indicating modern childbirth practices were not facilitating uniquely normal, physiological birth for women (Downe & McCourt, 2004). The original research team reviewed evidence from healthcare research conducted in general healthcare settings and hypothesised that the design of institutional childbirth settings was also not optimal (Foureur, Davis, et al., 2010).

After an initial literature review failed to identify an existing measurement tool for assessing physical design quality for childbirth settings, the team began the process of developing their own tool. This required a broadened search of the literature in the evidence-based healthcare design field, as well as neuroscience, architecture and midwifery fields (including homebirth literature). Interviews with key informants were conducted and validation of developed concepts occurred with an expert panel (Foureur, Leap, et al., 2010). Birth Territory theory was referenced and applied to provide a theoretical framework since this theory recognises the physical birth space as a construct that holds influence over the power or jurisdiction displayed by the occupants of the space (Fahy et al., 2008; Fahy & Parratt, 2006).

The objective of the measurement tool was to facilitate a valid and reliable means to audit physical birth unit environments in terms of the quality of the built spaces, including the objects within them. The BUDSET is comprised of four domains, which were developed to allow measurable audit of the overall optimality, or most favourable or desirable conditions, of birth units. The domains measure design factors contributing to the 'fear cascade', the 'facility' attributes, the 'aesthetic' elements of the space and the 'support' attributes for family and friends (Foureur, Leap, et al., 2010). The tool was pilot tested on eight hospital birth units located in Sydney Australia, using

five auditors trained to conduct the audit. This pilot study indicated that the BUDSET is a viable tool for "assess[ing] the optimality of birth units …[to] determine which domain areas may need improvement" (Foureur, Leap, et al., 2011, p. 36). Subsequently a mixed methods content validity study was conducted to assess if the BUDSET was able to measure what it proposed to measure (Sheehy et al., 2011). The data was collected with surveys and interviews with pre and postnatal women and midwives who were familiar with birth environments. The findings indicated content validity for the BUDSET and the authors recommended further refinements of the measurement tool (Sheehy et al., 2011).

BUDSET Domains Relating to Supporters

The supporters' needs are currently identified primarily in the last domain of the BUDSET, 'support characteristics' by categorising supporters' needs for food and drink (including availability of microwave, toaster, hot water, refrigerator and vending machines) and to be made welcome outside of the birthing room with available toilets and showers, places to use a mobile phone and the presence of a child's play area.

The findings from the analysis presented in Chapter 6 indicate that limiting the description of supporters' needs to one domain is insufficient to truly address supporters' needs optimally. The current content of the BUDSET in relation to supporters' needs appear to view supporters as a relatively passive participant in childbirth. This chapter will demonstrate how and why supporters' needs should be integrated into each of the four BUDSET domains more consistently. The supporter is part of the birthing dyad and should be supported to remain comfortably by the woman's side throughout labour. The supporters have two 'sets' of needs – those that are related to the provision of support, and those needs that are for the supporter as an individual. This analysis recommends that the role of 'active supporter by the woman's

side' be more clearly established throughout the BUDSET.

The BUDSET domains are presented throughout this chapter in an extended table format. Individual domains are placed at the beginning of each section, followed with the comparison of themes arising from this research analysis.

First BUDSET domain: 'fear cascade' and theme 'unbelonging paradox'

The first of four domains that comprise the BUDSET tool is 'fear cascade'. This is associated with a well-supported hypothesis regarding fear and anxiety often prevailing over normal birth processes (Foureur, 2008; Stenglin & Foureur, 2013). Characteristics that contribute to the fear cascade within the designed birth space, according to the BUDSET, are: "space (arrival area, outside area, reception area, and birthing room); sense of domesticity; privacy; noise control; and universal precautions" (Foureur, Leap, et al., 2010, p. 49).

Fear cascade domain: space: arrival (Foureur, Leap, et al., 2011, p. 58).

Space: Arrival
A. Drop-off area appears safe and well lit.
B. Drop-off area is directionally well labeled and easily navigable.
C. Drop-off area has temporary parking places
D. Birthing center/labor ward has its own entrance (separate from main entrance)
E. The distance to unit is short and the route logical

The theme corresponding to 'fear cascade' is 'unbelonging paradox.' The analysis of data in this study suggests that both concepts share a number of characteristics. The necessity of having spatial design elements that are clearly identifiable through labeling, are easy to navigate due to being well signposted and a direct route, and provide a welcoming arrival is evident in the responses of the labouring woman and her supporters. Felicity (the woman) expressed her and her supporters' challenges upon arrival, due to unclear wayfinding signage:

> I was waiting for somebody [so I could] use the bathroom and by that time my husband came up [from parking] and he said, 'no, no, through here, don't you remember we just go through and they'll buzz us through'. So then we went [into the birth unit]. But it was just that it was late at night and it was really quiet and there was no one around and we didn't know [what to do or where to go]. We thought maybe we should be waiting for the midwife to come and see us before we go in, or whatever. So, a bit unsure about what to do there. – Felicity

The BUDSET states the drop-off area should be "directionally well labeled and easily navigable". Felicity indicated this was not the case for her family. The one supporter who did recall the arrival procedure was not present as he was parking the car after dropping off Felicity and other family members. The BUDSET appears to have anticipated such events as one of the 'space: arrival' criteria is the presence of temporary parking places. No mention was made in the study analysis about the safety, lighting, distance or logic of the route to arrive at the birth unit. Therefore some characteristics of the BUDSET 'space: arrival' are validated by the findings from the supporter study analysis. The challenge of entering an unknown space can influence and set the tone for both the woman and supporter so attention needs to be paid to this aspect of the physical birth environment.

Fear cascade domain: space: outside (Foureur, Leap, et al., 2011, p. 58).

Space: Outside
A. Outside space is visible from the birth unit
B. Outside space is accessible with places to sit
C. Views are of trees, landscapes, mountains, or fields
D. Space provides positive distractions (plants, flowers, water features)
E. Space minimizes intrusions (urban noise, smoke, artificial lighting)

The second characteristic of the BUDSET first domain, 'fear cascade', is 'space: outside'. This corresponds most with the supporter study subtheme: 'tenuous nest building'. This characteristic overlaps and is refined in the 'space: birthing room' characteristic, as discussed ahead. None of the 'space: outside' characteristic observations were mentioned by any of the supporters. Observing views through windows is often a subconscious activity for which people do not have direct awareness, as it occurs for such brief moments of time yet having a view, especially of nature, is shown to have many benefits (Kaplan, 1993). Felicity seemed surprised that she "actually had a window". The majority of her labour in hospital occurred during the night, which would have affected the view from the window. This characteristic, in terms of supporters needs, would benefit from further examination.

No outside space was available to the family during the night; although one midwife spoke about the invitation other families receive, if the woman is in early labour, to walk outside to walk around a neighboring cricket oval. Although the student midwife speaks here about the birthing woman, this sentiment would appeal equally to the supporters:

> The [cricket] oval is where we often send women out…there is nice sun…and grass…they'll often quite enjoy walking out there…But obviously being in the middle of the night it was not an appropriate option [for Felicity]…I think it helps because…while all the rooms have great light with sunshine – there's no fresh air, it's all hospital air conditioning and I think sometimes getting outside help[s]. Get her out of that hospital…I think maybe she feels more comfortable in herself and obviously an increase in oxytocin and maybe a decrease in adrenaline being outside. – Veronica – student midwife

On another occasion, the supporter study family could have had their childbirth experience during the day, perhaps providing evidence of 'validation' for this characteristic from the supporters' perspective. The inclusion of positive distractions in this set of characteristics is a valid placement, however this characteristic is somewhat undeveloped. The findings recommend an additional set of characteristics conveying more options for appropriate indoor positive distracters that would benefit the domain 'aesthetics' could be added to the BUDSET. The 'space: outside' characteristic is partially validated by the supporter study analysis via the video footage, with a view of trees, rooftops, buildings and if one looks closely, a cemetery, see Image 13.

Image 13: 'Space: Outside' – view from window

Fear cascade domain: space: reception (Foureur, Leap, et al., 2011, p. 58).

Space: Reception
A. Reception space is open and inviting
B. Corridor leading to birth rooms provides a sense of going into a private space
C. Reception has indoor plants, flowers, and living things
D. There are spaces for supporters to sit and wait
E. There are beverage and snack provisions for supporters

There was no mention by the main supporters about the third BUDSET characteristic, 'space: reception'. This, ideally, is an inviting transition area that facilitates coming into the birth environment. This was the case for Frances, the main

supporter, who was always in close proximity to Felicity, within the birth room, so she did not spend more than a moment in the reception area after arrival.

However Martin, the husband and mostly 'passive' supporter, spent the majority of the 15 hours of Felicity's labour in hospital, outside of the room, therefore he had more experience with the reception (and waiting) areas. The elements included in this characteristic were not all noted in the data analysis, such as presence of plants and flowers. These are the types of design features that may remain unnoticed except on a subconscious level (Park & Mattson, 2009). Martin spoke about the lack of privacy due to his having heard another family arrive and soon after, their new baby's cries, which seemed to increase his anxiety regarding Felicity's labour, 'taking so long'.

Martin felt dissatisfied with the lack of comfortable seating in the waiting area. He was unable to rest and this created a situation where he was out of touch with his wife's progress and uncomfortable, with little positive distractions available. The waiting room was a few minutes walk away from where Felicity was labouring, so there was little opportunity for him to be close, yet unobtrusive, as he may have preferred.

Martin did not mention the absence of plants, flowers or living things (for instance, fish in an aquarium) in the reception space. These elements may have helped provide some positive distractions that could have facilitated his ability to cope with his anxiety. He also spoke at length about the inadequate beverage and snack provisions, as they are not familiar or home-like. Martin described coffee in Styrofoam cups and trying to scrape butter on toast with a plastic knife as examples of poor design and discomfort in the birth space even in relation to simple refreshments. The analysis of his experience, video and field notes validates several but not all aspects of the 'space: reception' characteristic.

Fear cascade domain: space: birthing rooms (Foureur, Leap, et al., 2011, p. 58).

Space: Birthing Rooms
A. There is sufficient space within the room (square metre parameters provided in BUDSET)
B. The window(s) in the unit face a northerly direction (in the southern hemisphere)
C. There is a window with a positive outlook (i.e., no cemeteries, waste disposal, walls)

The fourth characteristic comprising the fear cascade domain is 'space: birthing rooms'. This relates to the themes 'role negotiation', specifically the subthemes 'social interactions' and 'activity, space and place'.

The relevance of the BUDSET observation 'sufficient space' in the room is validated by the supporter study analysis, as the supporters offered remarks about feeling their ability to provide support was inhibited due to lack of space in the room, which created challenges in how they could fit within the space and coordinate movements and actions with the midwives and the birthing woman.

The main supporter especially struggled with a lack of space in the room. At one point she unintentionally designed a support system for her daughter by moving the floor mat out of the way and leaned it against a wall. Felicity was drawn to the mat on the wall, and began to lean against it, her head pressed into the mat, her hands holding the top edge. This mat was not physically stable as it could have been pulled down, but it provided Felicity with the quiet soft area she sought. This was a rare example of turning the lack of space into a benefit. Frances described the challenges of keeping the space from feeling crowded and messy. There was no storage space evident for them to put the belongings brought from home.

Based on the supporter study analysis, this set of characteristics is partially validated. This characteristic could benefit from the suggestion of an added interior design element, a family alcove or window bench seating, as initially proposed by Shin

et al. (2004). Such a space can alleviate the dynamic tension in people's needs for simultaneous seclusion and togetherness (Fridh et al., 2009; Shin et al., 2004). A second recommendation for the space: birthing rooms characteristic is the addition of areas for personalisation, such as a bulletin board and a dedicated area for personal items, keepsakes and other items to increase familiarisation of the space and sense of control (Andrade & Devlin, 2015; Ganoe, 1999; Shin et al., 2004). Such a space might facilitate a positive focal point for the woman, or any user who needs a restorative break (Frampton & Gilpin, 2008; Sullivan, 2015).

Fear cascade domain: sense of domesticity (Foureur, Leap, et al., 2011, p. 58).

Sense of Domesticity
A. Sense of cleanliness without signs of previous use
B. Medical gasses available and obscured from view
C. Gurneys and emergency equipment obscured from view
D. Linen baskets and waste bins available, but obscured from view
E. Gas outlets flexible enough to allow woman's movement

The fifth BUDSET characteristic is, 'sense of domesticity'. This is an area that corresponds to subthemes 'technocratic space conveys mixed-messages' and 'tenuous nest building'. As the main supporter, Frances remarked that the "equipment was just everywhere", rather than the "equipment (was) obscured from view" as specified for an optimal physical birth environment in the BUDSET.

The midwives discussed the presence of gurneys/bed trolleys in the hallway, the lack of space for the equipment and how, although they had become used to the medical feel of the space, that the women and their families are often visibly anxious at being in the midst of so much medical equipment, especially during tours or during arrival. Linen baskets and waste bins were not obscured from view.

There was a discussion from a midwife about the challenge of working with the

gas outlets to help the woman and her supporters relocate from the bed area to the bathtub. Although the designers of this unit had placed the gas outlets in two areas, the process of detaching and reattaching the tubing prevented easy mobility by the woman. "That is incredibly frustrating – with the gas, 'cause we have an outlet in the bathroom, but we have to carry the gas." – Lori, midwife. And this was confirmed:

> Very painful [to relocate the gas equipment]. You've got to take the whole machine into the bathroom…I used to work in a place [where the gas was already set up in the bathroom, which is] much easier. Then the women can get it really fast whereas you've got to take it, set it up and they're usually distressed waiting for it. – Abby, midwife

Although the 'sense of domesticity' focuses on the needs of the birthing women, the lack of a woman's mobility is one example of the interconnectedness between the woman and the childbirth supporters' role. As a supporter, the person must be able to shadow the birthing woman. For example, during removal of the gas tubing from the outlet, the supporter felt unsure about what to do and how to support the woman. This characteristic was validated, as Frances specifically mentioned her perception of feeling overwhelmed by the pervasive presence of medical equipment, shown in Image 14 (additionally in Image 2 in Chapter 4 and Image 7 in Chapter 6).

Image 14: Room showing monotone colours, institutional aesthetics and lack of textural variety

Fear cascade domain: privacy (Foureur, Leap, et al., 2011, p. 58).

Privacy
A. Rooms contain interior lockable doors to control who enters the room
B. A 'knock before entering' policy is used and enforced by staff
C. Perception of not being able to be seen from outside the window
D. Secure and lockable places for women's belongings when leaving the room
E. Entry door screened so women cannot be observed from the doorway

The sixth characteristic for 'fear cascade' is 'privacy', which correlates with 'elusive sense of privacy' and 'lack of control'.

It is not known if the room in the case study had an interior lockable door – however, no instances of a locked door were observed, nor mentioned in the observations or other data. Rather, the researchers observed both staff and family freely coming in and out of the room without any 'knocking before entering'. The main

supporter conveyed her sense of dismay at this, as she perceived her primary role as to prevent distractions. The lack of control over the entrance was perceived as a constant source of anxiety. Depending on who entered the room, the mood could shift almost tangibly, according to both Frances and Felicity.

The door to the room had a large window at eye-level, which allowed people to view into the room if the curtain, located a few paces inside, was pulled back. The curtain was automatically returned to the position it was found in by the midwives, according to accepted birth unit culture, but comments during the interviews revealed the complexity even in this simple-seeming situation; the room often became stifling with the door closed, but if it was open, the sounds from inside the room would be audible to people outside of the room. The door, the window, and the curtain combined to prevent the sense of privacy or control for the supporter and the woman.

There was no storage of any kind for the supporters or woman's belongings, contributing to the perception of 'elusive privacy' for the family. The supporters expressed a desire for more places to store "all of their stuff".

A refinement is suggested for this characteristic. The combination of the observations, A, B, and C above indicates the need for an interior design feature that facilitates the woman's perception of being protected and the supporter's perception of having agency of providing protection for the woman from unnecessary disturbances. A recommendation to streamline these observations or devise another option is to create a 'transition area'. Research has demonstrated that a transition space increases the perception of hominess and enables supporters an opportunity to slow down and give the woman time to adjust to their arrival (Shin et al., 2004). This recommendation does not negate the importance of the existing three observations, but is intended to provide an alternative; if interior lockable doors are not an option or a 'knock before entering'

policy is not enforced.

Fear cascade domain: noise control (Foureur, Leap, et al., 2011, p. 58-59).

Noise Control
A. Absence of loudspeaker paging system and/or common music
B. Confidentiality (ranked in BUDSET with three identifiable cues regarding ease of hearing conversations)
C. Music can be selected and controlled by women within the rooms

'Noise Control' is the seventh of eight characteristics for the BUDSET domain 'fear cascade'. This corresponds to the subthemes 'tenuous nest building' and 'lack of control'. In the supporter study birth room, there was no central music or loudspeaker system to disturb the birth space, which is ranked as positive on the BUDSET. However, this positive design element may have been negated by the challenges the family expressed in their lack of control over the music. In order to create a familiar environment for themselves, they had brought favourite music selections, but found it difficult to hear it in different parts of the room, as the volume was perceived as being too loud for neighbors if it was loud enough for Felicity to hear, especially when she was in the birth tub. Frances spoke about how the desire to have music throughout labour, as a way to "hold the space", but as they moved from the main room to the ensuite bathroom, she found they could not hear the music. The meaning she relayed to this design challenge was that she lacked power to create the ambience that met her objectives.

The midwives attempted to communicate that women and supporters have acoustic privacy, but Frances recalled the acoustic privacy as elusive. Many sounds from outside the room could be heard. Indeed, when Martin related the progress of another woman, and compared the speed of her birth process, a validation of lack of privacy was confirmed. This set of characteristics is validated by the supporter study

thematic analysis.

Fear cascade domain: universal precautions (Foureur, Leap, et al., 2011, p. 59).

Universal Precautions
A. Presence of scrub basin in room with soap and glove dispenser
B. Sharps disposal box located within room
C. Staff assist systems installed in room
D. Presence of telephone or intercom in room
E. Protective measures in place to prevent slippage around water usage areas

The last and eighth characteristic for the 'fear cascade' domain is 'universal precautions'. This corresponds to the subthemes 'technocratic environment conveys mixed-messages' and 'instrumental aid support'. The room had a scrub basin and sharps disposal box available. However the sharps box and other medical equipment should be readily available, but hidden or discreet to facilitate the woman and supporters comfort.

The presence of medical equipment is needed to satisfy universal precautions and acknowledged as important aspects of a birth room – yet this aspect is an example of an unbelonging paradox. The supporters and woman spoke about how the medicalised space conveyed the message of not belonging. They felt 'like patients' even though they believed birth to be a normal healthy activity.

Communication can be a key factor in the satisfaction attributed to a birth experience (Foureur, Davis, et al., 2010). The room was equipped with a call system, which was deemed as less desirable than the preferred intercom system by the supporter. Frances felt frustrated by the inability to communicate and feel supported by the midwives when she said,

I know there's a buzzer there, to call the nurse but I also thought that…if

> they had an intercom where you could actually talk to somebody…rather than buzz and wait for somebody. You don't know how long before they come. The fact that you can talk to somebody just gives you some kind of assurance that you've been heard, that somebody knows, you know? And also they may even be able to answer your question from there. They don't even have to come all the way around to you. – Frances

The bathtub played a part in their experience and yet Frances and Martin expressed that it was not as safe as they would have preferred. Specifically, the floor and step stool used to enter the tub were deemed slippery for Felicity. The midwives laid towels on the floor to help with potential slips, but then the towels became a potential trip hazard.

This BUDSET characteristic is identified as valid by the supporter study analysis, although none of them were mentioned directly as being beneficial and welcomed by the supporters. The designed aspects that are ‘taken for granted’ did not appear to surface even during a detailed, in-depth video-ethnographic study.

Second BUDSET domain: 'facility' – themes 'supporting the supporter' and 'role negotiation'

Facility domain: physical support (Foureur, Leap, et al., 2011, p. 59).

Physical Support

A. Availability of birth assistance material other than the bed (e.g., Birth stool, beanbag, gym mat, exercise ball, chairs, extra pillows)

B. Presence of bars on walls at various heights

C. Presence of mantelpiece or bench on which to lean

D. Presence of comfortable chair for breastfeeding

E. Comfortable place for supporters to rest or lie down

The second of the four BUDSET domains is 'facility'. The characteristic 'physical support' corresponds to the case study theme 'supporting the supporter' and specifically the subtheme, 'instrumental aid needs'. It also relates to 'role navigation', touching on subthemes 'social interactions' and 'activity, space and place'.

Frances stated that her primary role was to "provide comfort and minimise annoyances". The act of physically supporting Felicity, such as holding her to facilitate a forward lean-sway motion, could potentially exhaust and physically strain Frances, as well as take her away from other roles, such as turning the music on, speaking with a midwife or trying to make the space more comfortable. However, if the room was equipped with built-in equipment to facilitate Felicity's mobility, in sufficient quantities, this could free Frances up for other roles. This room had a birth ball; one beanbag for the whole unit to share – during this labour it was available for Felicity to use – but no one else could have one; and a floor mat. There were two chairs – a 'typical' cushioned/plastic institutional chair and a plastic, lawn-chair near the tub, as well as two worn and uncomfortable small upholstered chairs. Extra pillows were available.

There were no birth stools, bars, or mantels present in the supporter study room.

The absence of a "comfortable padded leaning counter" as Frances called it, was noted during the interview. The midwives in this unit are told to instruct women to lean on the bed. This creates the need to have the bed be a central part of the room, thereby inhibiting the open floor, which is important to facilitate active labour. As student-midwife Veronica noted, how the room is arranged will communicate the behaviour of the woman and her supporters, "Often we'd already have the mat set out with a ball, she could have come straight into that space." The call to have the bed decentralized, or even completely removed from the birth room, is a growing movement for a host of reasons, all centred around benefits derived from increased mobility (Walsh, 2000).

The theme 'unbelonging paradox' is evident in birth equipment intended for the woman being used by supporters. There are two notable instances when both supporters, Frances and Martin, benefited from the 'birthing' equipment. There was no space designated for the supporters to rest or lie down, so at one point Martin simply laid down on the floor mat in the middle of the birth room. This impeded the midwife, and inhibited ability to move freely in her work environment, as well as possibly created tension between the midwife and supporter.

The second instance was the use of the birth ball by Frances. She was in close proximity to Felicity throughout labour, leaning forward and keeping within touch and soft-voice speaking range. She struggled with keeping herself free of discomfort with this posture and position. During the time when Felicity chose to rest on the bed, Frances was able to benefit from the ergonomic design of the birth ball. She found it preferable to sit on the birth ball rather than the chair, as she could shift and move according to Felicity's needs.

This characteristic was identified by the supporter study analysis as partially validated. With the childbirth supporter's needs also accounted for, as facilitated by the

physical environment, it becomes clear that an increased quantity of labour support provisions be made available. The suggestion is to refine and emphasis the quantity of equipment, to ensure sufficient birth supports for both woman and supporter. Adding pull ropes, stools or platforms and portable soft kneeling mats would increase the variability of types of equipment. This would simultaneously provide physical support for the birthing woman, but also alleviate some of the supporters' physical strain and free them up to provide other types of support such as emotional support.

Facility domain: birthing bath (Foureur, Leap, et al., 2011, p. 59).

Birthing Bath
A. Birthing bath present within room or en suite toilet
B. Access to bath is contiguous with birth room
C. Bath is deep and wide enough to allow woman to be totally immersed when on hands and knees
D. Bath has rails to pull up on
E. Two-sided access to the bath

The second characteristic for the 'facility' BUDSET domain is 'birthing bath'. This corresponds to the theme 'role negotiation', especially the subtheme 'activity, space and place' and the subtheme 'lack of control'. The room in the case study did have a birth bath present in an en suite bathroom, which was contiguous with the birth room. However, Frances expressed her desire for the birth tub to be even closer to the main room,

> I felt like the bathtub was kind of in an enclosure and I felt it was too far away. I would [have preferred if] the bathtub was right next to the bed. Like perhaps in the middle…so that she can move from any part of the room she's at and come to the bath whenever she wants to. – Frances

The size of the tub was both deep and wide enough to allow Felicity to be completely immersed when on her hands and knees, as indicated in the BUDSET and

also in the literature (Cluett & Burns, 2009). The bath was accessible from three sides, with each of the two longer sides equipped with short rails for the woman to pull. There is no mention in the BUDSET about any integration of supporter's roles or needs within the birth bath area. Frances felt disconnected from Felicity while she was in the tub. She said, "I felt I couldn't hold her properly. It felt like, other than just maybe touching her body, I really didn't feel I was supporting her in any way properly. I really felt disconnected." – Frances.

The main supporter spoke of her experience near Felicity in the tub, "I was very uncomfortable [sitting in a plastic chair next to the tub]" – Frances. An example of Frances' awkward positioning near the tub can be seen in Image 15.

Image 15: Video stills showing supporter's forward leaning position

The tub was intended to be a calm, safe environment for Felicity, yet it prompted many concerns and issues for both Frances and Martin. Frances suggests a safer design for the entrance to the tub with predictable step increments instead of the woman having to "just get on a stool and put [her] leg over trying to get into the tub it was a bit scary really. It didn't look like the safest thing to do." – Frances.

Martin increased his role as supporter during the last hour when Felicity laboured and birthed their baby in the tub. "Oh, the step! If she slipped on it, it would

be a bit of a…you'd hammer yourself!" – Martin. He also spoke at length about the design of the tub and suggested custom building with padded vinyl where supporters lean and kneel.

Martin had many design suggestions to increase the comfort for the supporters and minimise disturbances. One detail, which could increase the satisfaction of the experience, would be the addition of cup/bottle holders at the edges of the tub. This tub had moulded edging, so on one occasion the water bottle was knocked off and created a disruption. These contributions are among many slight alterations that could be amended throughout the BUDSET to facilitate the positive experiences of the childbirth supporters, so as to facilitate the woman's optimal childbirth experience. The supporters expressed refinements for the birthing bath (larger so she could join the woman, safer option for getting in and out, place for supporter near the edge, space for cups and water bottles); therefore this characteristic is partially validated by the supporter study analysis.

Facility domain: en suite facilities (Foureur, Leap, et al., 2011, p. 59).

En Suite facilities
A. Toilet and shower in en suite available
B. Adequate space within toilet and shower room [square metre parameters provided in BUDSET]
C. Décor has a domestic rather than institutional feel

The third characteristic 'en suite facilities' corresponds to the subthemes: 'lack of control', 'tenuous nest building and 'elusive privacy'. The toilet facilities were an en suite layout, with toilet, shower and oversized tub located in a room directly adjacent to the main birthing room. Although the presence of a birth tub is not guaranteed to women arriving to birth in this hospital, the family in this study planned to birth in the water and was fortunate to have this option.

Frances, the main supporter, felt that the location of the en suite was not convenient and stated her preference for the tub to be located within the main room. This is a different preference to what most women express or display during their labours, as it is common for women to seek out a 'cave- or nest-like' space during labour (Walsh, 2006), and this darker separate room may have provided this sensory experience for Felicity. Interestingly an in depth interview study of women's experience of waterbirth revealed that women may use the birth tub as a sanctuary to prevent 'others' from touching or disturbing them in labour (Maude & Foureur, 2007). Arguably women may be able to use the walls of a deep tub as a 'cave-like' space or nest even if the tub is located in the middle of the room. This requires further research.

The en suite, as well as the main room, lacked any home-like décor. It felt and looked institutional, as shown in Image 15. These characteristics were partially validated. The primary reason for partial validation is due to the lack of characteristics addressing the needs of the supporter around the ensuite bathroom.

Third BUDSET domain: 'aesthetics' – theme: 'unbelonging paradox'

The next BUDSET domain is 'aesthetics', which corresponds to the case study theme 'unbelonging paradox' particularly the subthemes 'tenuous nest building' and 'technocratic environment conveys mixed-messages'.

Aesthetics domain: light (Foureur, Leap, et al., 2011, p. 59).

Light
A. Presence of natural light through windows and/or skylights
B. Windows low enough to see through when lying in bed
C. Ability to control for variable lighting (multiple switches for ceiling, wall, portable lighting)
D. Absence of operating room-style lighting
E. Ability to create a "cave-like" space (dark and protective)

The first characteristic for 'aesthetics' is 'light'. In addition to the above thematic correspondences ('unbelonging paradox', 'tenuous nest building' and 'technocratic environment conveys mixed-messages') the BUDSET characteristic 'light' also corresponds with the subtheme 'lack of control'.

The presence of windows permits natural light to enter the room, as well as provide a view of the outside. This room did have windows along one wall, which were low enough for someone in the bed to see out, indicated as preferential on the BUDSET.

The midwives regularly mentioned their frustration over the inability to control the amount of light and heat that can develop from the windows and sunlight, verifying that this is an important aspect for users to control. It is recommended that the observation of the presence of adjustable blinds be added to this characteristic set, which would facilitate the need for agency over the space for the supporter, for instance to help create a nest- or cave-like environment for the woman. In Sydney, where this study occurred, the heat can build in the room if the blinds are left open, which would

occur if a view and natural light were desired. The room was equipped with aluminum venetian blinds that did not appear to facilitate sufficient control over light, view and temperature.

The 'lack of control' theme prevails with the designed lighting. The light controls were not adjustable. The room had bright spotlights, typical in medical institutions, and a lack of any familiar home-like lighting options. The supporters, midwives and the woman all stated they wished for dimmable and adjustable lights.

As discussed in the 'en suite' section, the ability to create a cave-like space, as indicated in the BUDSET, was facilitated by a separate room in the supporter study birth room. The lack of space in the room mentioned in the 'space: birthing room' domain, also may have contributed to the inadvertent creation of a small dark and protective space when Frances set the floor mat against the wall.

This characteristic is marked as 'suggestions recommended' by the supporter study analysis, with one additional amendment suggested. The availability of adjustable blinds to facilitate individualised lighting with the express permission that any user can make the adjustments. This would increase perceptions of control and familiarisation in the space.

Aesthetics domain: colour (Foureur, Leap, et al., 2011, p. 60).

Colour
A. Use of tonal contrast (walls, floors, and ceilings are of different tones)
B. Colors coordinated using a limited palette
C. Minimal use of white and yellow
D. Floor finishing is not shiny
E. Use of wood or woodlike materials in the rooms

The second characteristic for the 'aesthetic' domain is 'colour'. This corresponds with the theme 'unbelonging paradox' and the subthemes 'tenuous nest

building' and 'technocratic environment conveys mixed-message'. The birth room had a tonal contrast between the floor and walls/ceiling; however, the room did not use a limited palette of coordinated colours, as the BUDSET indicates, seen in Image 14. The colours throughout are institutional grey and white. The floor finish is shiny and there is a lack of wood or natural materials throughout. The supporter study analysis provides validation for these characteristics, primarily through the video still images and via comments about the feeling in the space, which corresponded to a plain, medical, unattractive aesthetic.

Aesthetics domain: texture (Foureur, Leap, et al., 2011, p. 60).

Texture
A. Presence of textural variety on wall surfaces, floors, and ceilings
B. Presence of textural variety on furniture, fabrics, and artwork
C. Furnishings viewed as soft/yielding but also firm/strong
D. Use of natural materials such as timber and tiles
E. Minimal use of metallic materials on surfaces or the presence of gurneys

The third BUDSET characteristic for 'aesthetics' is 'texture', which corresponds to 'tenuous nest building'. There is little textural variety within the birth room used by participants in this study and visible in Image 14. The fabrics consist of the hospital bedding, the small couch, seat and chair, all of which can be argued are not soft or welcoming, but grey, worn and scratchy. The couch arms seemed to create a barrier to supporters achieving rest– the furnishings were not yielding and their firmness inhibited both the woman and the supporters' comfort. There is no artwork in the room, nor are any natural materials used. Frances especially disliked the prevalence of metallic finishes. "I know hospitals have a lot of equipment but when I walked in there and I just found this sense of just too much steel. Too much steel everywhere." This characteristic is also validated by the video still images, as well as by the supporters'

expressed meanings.

Aesthetics domain: indoor environment (Foureur, Leap, et al., 2011, p. 60).

Indoor Environment
A. Adjustable temperature to enable woman to be naked in comfort
B. Additional heating for mother and baby available
C. Blanket warming cupboard or system available
D. Windows open for fresh air
E. Ability to use aromatherapy or oil burner

The fourth characteristic for the domain 'aesthetics' is 'indoor environment'. Similar to the previous characteristics, this corresponds with 'lack of control' and 'tenuous nest building' – two subsets of the theme 'unbelonging paradox'. The temperature unit was not controllable for the supporters, women or even the staff. This could inhibit the comfort of everyone in the space, as commented on by the midwives. The ability to have additional heating was not available, nor was there a warming cupboard or the ability to open the windows.

> It's all pre-set. We have no way of controlling it…Most women, every labour will ask me is there any way I can change the temperature in this room and we'll say no…some women want it hotter and some women a lot colder…[when] women have been in the shower…and these rooms in the summer, the sun comes blazing in. It actually gets stifling in some of them. – Veronica, student midwife

The BUDSET notes the option to use aromatherapy and an oil burner, which was permitted in this birth room. This was one of few areas where Frances felt she had some control over the setting and ability to personalise the space with familiar scents. She was able to heed the advice from the midwives and chose certain oils deemed beneficial for labour. The scent in the room was a highlight for the researcher, who

during field note analysis, could still pick up the scent, which had become infused in the notebook. A midwife commented on the relaxed, 'sleepy' feel of the room due to this scent. These characteristics are validated by the supporter study analysis as important needs for the woman and the supporters.

Aesthetics domain: femininity (Foureur, Leap, et al., 2011, p. 60).

Femininity
A. Presence of feminine archetypes in artwork within common areas
B. Rounded corners and edges to walls and furniture
C. Presence of appropriate flowers/potted plants within birthing room
D. Sense of calm and peacefulness within common areas
E. Artwork embraces multiple cultures

The fifth characteristic measured by the BUDSET domain 'aesthetics' is 'femininity'. This corresponds to the case study themes 'technocratic environment conveys mixed-messages' and 'tenuous nest building'. Despite being a 'birth centre' facility very little about this space conveys a sense of the feminine. Few of the characteristics from the BUDSET tool were observed in the entrance, waiting room or the birth room.

The only feminine characteristic noted is the presence of the birth tub, with curves forming the inside of the tub. Research shows that curvilinear furniture elicits more relaxed and calm feelings than non-curvilinear furniture (Dazkir & Read, 2011). Supportive positive distractions are an important component in the aesthetics of a hospital space. As Frances says, she wished for:

> Some murals or … paintings … pictures of a baby on the wall. You know, a beautiful piece of sketching … It doesn't have to be a photo but just sketching … something lovely … Or stars or the moon, or nature, that sort of thing. – Frances

This set of characteristics is validated by the supporter study analysis, both the main supporters responses and direct ideas about including more art, as well as the analysis of video still images.

It is suggested that a sixth set of observations be added for the ‘aesthetics’ domain: a ‘positive distracters’ characteristic. Although BUDSET includes the presence of plants, flowers and other living things in ‘space: outside’ and ‘space: reception’, there appears to be a gap in the quantity and variety of measured positive distracters available in the birth room. The addition of ‘positive distracters’ is consistent with design evidence recommendations (Andrade & Devlin, 2015). Some examples of positive distracters are: nature images, plants, videos, music, mobiles or other attractive stimuli, some of which have indicated a reduction in anxiety or feelings of discomfort (Drahota et al., 2012; Lohr & Pearson-Mims, 2000).

Fourth BUDSET domain: 'support' – theme: 'supporting the supporter'

Support domain: support characteristics (Foureur, Leap, et al., 2011, p. 60).

Support Characteristics
A. Food and drink available 24 hours
B. Microwave for heating foods available and accessible
C. Toaster available or accessible through staff
D. Hot water available and accessible
E. Refrigerator with ice available and accessible

The fourth domain is 'support' which aligns with the study's theme 'supporting the supporter'. At the hospital where Felicity gave birth, her supporters had a vending machine available they could access any time, but the options in the machine and the distance to travel to get there were dissatisfying for them. There was a small room shared with the staff, located on the birth unit floor which was a place to access tea or coffee or make some toast, and included a microwave, toaster and hot water. There was also a refrigerator and ice available for the supporters, but the interviews revealed that they did not access this space. Martin described his dissatisfaction at using plastic knives to spread butter and drinking out of Styrofoam cups. Perhaps the temporary, institutional nature of this made them feel uncomfortable, which would align with the 'unbelonging paradox'. Frances perhaps, could not rationalise leaving Felicity's side to access food or drink of any kind. Nor perhaps did Felicity's two sisters feel confident enough to help themselves. This room was a 'staff' room and hadn't been welcoming to women's families. The quality of these provisions left much to be desired.

This characteristic was analysed to indicate suggested recommendations. The characteristic of food and drink available 24 hours falls short of providing satisfactory support. The first suggested recommendation is to amend the food and drink to include an observation of quality of provisions and to make the concept of 'available' clearer.

Because there was a vending machine on site, does not mean food and drink were perceived as 'available'.

The second recommendation is the addition of an informational support area in the 'accommodation for companions and birth attendants' characteristic, which would show educational or reminder information for supporters. Some ideas for this area are posters or brochures with easy-to-absorb visuals of birth postures, support techniques and reminders about the wide range of normal behaviours during each stage of labour. If the area was also set off to a side with soft calming features, the supporter could take an emotional break, as well as to distract themselves with some helpful information that could help reassure them.

Support domain: accommodation for companions and birth attendants (Foureur, Leap, et al., 2011, p. 60).

Accommodation for Companions and Birth Attendants
A. Companions feel welcome outside of birthing room (e.g., able to access toilets, food, etc.)
B. Access to vending machines available
C. Access to telephones or place to use mobile phone
D. Access to toilet and shower not in birth room
E. Presence of playroom and/or provisions for the entertainment of additional children

The second characteristic for 'support' is 'accommodation for companions and birth attendants'. As described in the previous section, there is an overlap between the presence of the food, drink, microwave, hot water, and refrigerator and the permission granted to the supporters to access these things. 'Access to vending machines available' is redundant to the 'food and drink available 24 hours a day' from the previous characteristic.

The ability to access telephones or a separate place to use a mobile phone was not present in this birth unit. The sisters spent significant portions of the labour playing

games or otherwise passing the time on their mobile phones – which created some tension between Frances/Felicity and the midwives due to the wishes of the birth plan to keep technology to a minimum around Felicity.

There was a bathroom without a shower located outside of the birth room, across the hallway and down a few doors. Frances was so focused on her task of staying with Felicity throughout the duration of labour, that even this distance was too far away. During the interviews, a midwife spoke about the supporters using the bathroom in the birth room, but did not indicate how this was communicated as acceptable with actual families.

This family did not have any other young children present during the labour, so the lack of playroom or entertainment for other children in the birth room was not relevant for them during this occasion. The 'accommodations' characteristic is partially validated by the analysis, however the set of observations did not strongly resonate with the experiences of the supporters for this supporter study thematic analysis.

Summary

Most of the characteristics in the BUDSET, although designed to measure the birth space with the woman as the focal point, also implicitly touch on supporters' experiences, based on the findings of this cross-validation discussion. There are congruent overlaps between the 'childbirth supporter study' themes and the BUDSET, as seen in Table 9. For instance, the overlap between 'fear cascade' and the supporter's 'unbelonging paradox' confirm the suitability of the domains and characteristics of the BUDSET. However, it is suggested that the supporters' needs be more explicitly integrated throughout the entire BUDSET, as they are not a separate entity, but ideally are present, calm, attentive and engaged by the woman's side for the duration of the childbirth experience.

The support for childbirth supporters designated on the BUDSET included key features that were also revealed in the research analysis, for instance: access to food and drink; access to toilet facilities; aesthetic features; noise control and privacy. However, there are characteristics for supporting the supporters that were not provided in the BUDSET, as indicated throughout this analysis.

Table 9: Comparison of BUDSET and study themes

STUDY MAIN THEMES	STUDY SUB-THEMES	BUDSET DOMAINS	BUDSET CHARACTERISTICS
'Unbelonging paradox'	**Tenuous nest building** – modifying the space upon arrival to become empowered and increase satisfaction with the space Adding familiar sensory ambient design elements (for instance oils, music or pillows) to make the foreign environment feel more welcoming	Fear Cascade Facilities Aesthetics	Space: Arrival Space: Reception Space: Outside Noise Control En Suite Facilities Indoor Environment Femininity
	Lack of control - Hospital environment does not provide appropriate choice making for any of the occupants; acoustic, olfactory, visual, light, water and air thermal regulation are usually not in individual hands.	Fear Cascade Facilities Aesthetics	Noise Control Privacy En Suite Facilities Indoor Environment Light
	Elusive privacy – Privacy needs are difficult to satisfy in a public hospital birth unit.	Fear Cascade Facilities	Privacy En Suite Facilities
	Technocratic environment conveys mixed-messages – the challenge to overcoming the sense of 'unbelonging' or not being fully welcome to do as one wishes for a satisfying labour, is communicated via the hospitalised environment by the objects in the space.	Fear Cascade Aesthetics	Sense of Domesticity Texture Colour Femininity
'Supporting the Supporter'	**Instrumental aid needs** – supporting the physical needs (nutrition, rest, space, bodily needs) of the supporter is essential to prevent exhaustion, mistakes, poor communication and lack of support for woman. There is room for improvement in designing the space to take care of all the users of the space.	Fear Cascade Facility Support	Universal Precautions Physical Support Support Characteristics Accommodation for Companions and Birth Attendants
	Informational and emotional needs – supporters often need information, emotional reassurance and assistance in working with others. This may be	Support	Accommodation for Companions and Birth Attendants

STUDY MAIN THEMES	STUDY SUB-THEMES	BUDSET DOMAINS	BUDSET CHARACTERISTICS
	provided by a soft, nurturing physical space, visually appealing information such as posters of possible birth positions or a private space for supporters to be alone if needed to cope with the unknown of labour.		
'Role Navigation'	**Social interactions** – working with others in supporting a woman in labour requires the supporter/s to be aware and sensitive to their own and others abilities and skills, including how to position oneself in the space.	Fear Cascade	Space: Birthing Rooms
	Activity, space and place – Whether one is an active or passive supporter, finding a place and purpose in the birth unit can be challenging.	Fear Cascade	Space: Birthing Rooms

Summary and conclusion: Supporters' needs in BUDSET

The recommendations revealed through this discussion identify a few areas in the BUDSET characteristics (as subset of domains) that could be improved to help meet the childbirth supporters' needs. They include amendments to the characteristics: 'sense of domesticity', 'privacy', 'space: birthing rooms', 'accommodations for companions and birth attendants', and 'facility: physical support', as seen in Table 10.

This analysis indicates that the BUDSET is an accurate measure for determining the optimality of birth units for the woman as the centre, yet refinement for measuring the physical birth unit environments' ability to facilitate the supporters' needs are recommended. Suggested amendments and additions based on the supporter study analysis are offered throughout. The analysis demonstrates a distinct overlap in meeting the environmental design needs of both the supporter and the woman. Because there is sparse evidence available to inform birth environment design for the supporter, this is an area for further study, refinement and validation.

The next and final chapter of the thesis presents the reflections and conclusions for the findings and the potential applications for practice. Proposed recommendations to better accommodate childbirth supporters in the hospital birth environments are presented.

Table 10: Design suggestions for BUDSET amendment to facilitate supporters' role

Amendment, addition or refinement	BUDSET characteristic	Example
Family alcove or window bench seating to provide a space for both togetherness and privacy.	'Space: Birthing Rooms'	Family alcove near entrance or bench seating near window.
Place for **personalisation** to increase sense of control and familiarisation.	'Space: Birthing Rooms' or 'Sense of Domesticity'	Bulletin boards and shelf-space dedicated for family personal items and mementos.
Visual and spatial transition area between the public space and the room to psychologically remind people they are entering a new and different space.	'Privacy'	Different floor colour at doorway to help the supporter prepare to enter the space quietly.
Addition of **more types and quantities of birth assistance materials** to ensure lots of physical support for woman and supporters.	'Physical Support'	Soft small mats for kneeling, duplicates of birth tools so the supporter and the woman could both be physically supported.
Addition of presence of **adjustable blinds**	'Light'	Window blinds or curtains that all users are welcome to use, to create the individualised lighting needs for the woman, and allowing the supporter to have a role.
Amend 'food and drink available 24 hours' to facilitate **higher quality provisions**.	'Accommodations for Companions and Birth Attendants'	Clarify type and quality of food (vending machine, cafeteria, home-like food in a nearby kitchen).
Information area to remind/educate about what is happening during labour and birth.	'Accommodation for Companions and Birth Attendants'	Posters, brochures or accessible books to remind or inform supporters about the range of normal stages of labour, possible birth positions and other easy to access educational materials.
'**Positive distracters'** to provide supporters who may not have an active role a means to help pass time	Additional characteristic added to 'Aesthetics' Domain	Positive distractions, such as crafts, nature videos, mobiles, TV with headphones, games or brain teasers or similar non-intrusive activities.

Chapter 8: Reflections and conclusions

This chapter reflects on the 'childbirth supporter study' and on the experiences of myself as the researcher and on the participants' experiences. These conversations are offered in part towards establishing the trustworthiness of the ethnographic, participant-observation study undertaken, analysed, interpreted and presented in this thesis. Further insights are provided as to the credibility, transferability, dependability and confirmability of the findings; criteria suggested by Lincoln and Guba (1985) as a means to assessing trustworthiness in qualitative research. The strengths and any weaknesses of the study are explored. The contribution of the research findings to the larger evidence-based design and midwifery research landscape are discussed and recommendations for improving the design of birth units are made.

Overview of the Thesis

This research used an applied exploratory approach to address the question, "How does the current design of birth spaces in resource rich countries, accommodate and facilitate the role of the woman's birth supporter?" This study was nested within a larger study that used video ethnographic research conducted in Australian hospital birth units in 2012 where the labour and birth experiences of six women and their supporters and carers was filmed (Harte et al., 2014).

One family's experience was chosen from the larger cohort for analysis in this study, as it provided the richest data set in which to observe the supporters role. The 'childbirth supporter study' revealed supporters' experiences are complicated, and made even more complicated by a lack of understanding about the needs of supporters based

on the birth space design. The supporter was needed, yet not welcomed by the physical space, which rarely supported the supporter or facilitated their support role navigation.

Reflections on the Findings

The findings from this study indicate that the supporters' ability to make safe and comfortable nest-like spaces for the woman was a primary role. Interior design that permits adaptations and ability to control aspects of the ambient environment was identified as important to these supporters. Further findings from this research suggest that if the physical design of the birth room was optimal, it could facilitate role negotiation and cooperative support by communicating a welcoming and empowering message to woman's supporters. The birth environment could and should facilitate childbirth supporters' roles in all forms, so they can provide and locate: instrumental aid support (such as provisions for rest, nourishment and self-care, or a place where the labouring woman could lean, e.g. a mantel piece that would invite women's upright mobility, thereby freeing up the supporter for other support roles), informational support (such as an area with posters communicating ways the supporter could be involved) and emotional support (such as seating alcoves allowing passive supporters to feel part of the labour process but not necessarily intimately involved). From these findings it is suggested that supporters who feel supported by the built environment may be better able to provide continuous, cooperative support birthing women require and desire.

Reflections on Research Conduct

This thesis began with a systematised review of peer-reviewed publications. This review identified a large body of general evidence-based healthcare design research, a smaller body of physical birth unit design research and a very limited body of research addressing childbirth supporters' in the physical birth environment. What limited literature exists indicated that childbirth supporters are needed and wanted

during childbirth and are beneficial for the woman in terms of improved outcomes for both the mother and the baby (Hodnett et al., 2013). Importantly, the review identified that supporters do not seem to be appropriately supported by the physical birth environment and that more research is needed to make informed evidence-based design suggestions. The review concluded that there is considerable scope for research to better understand how architectural features and interior design features influence childbirth supporters in healthcare situations.

The ethnographic study design, participant recruitment process and data collection and analysis procedures are described in detail in Chapters 3, 4 and in the publication by Harte et al. (2014). As primarily researcher-midwives, the team was accustomed to listening and respecting the woman and family as part of ongoing ethical sensitivity (Burns et al., 2012). However, the use of video ethnographic methods for this research presented particular challenges because birthing women were considered by the relevant human research ethics committee to be an especially vulnerable population. Filming women during labour when they may be unclothed or in pain or where staff malpractice could occur, was considered an area where particular ethical principles might be compromised and concerns about litigation arose in the form of paternalistic reactions. The challenges met by the research team included needing to gain ethical approval at multiple sites. A detailed analysis and discussion of these issues and challenges was presented in Chapter 5. The example of this study's ethical journey may contribute to the larger group of researchers who may face similar challenges in explaining ethnographic or other exploratory qualitative research to ethical review panels who may not share the same research background. The Harte et al. (2015) paper of our reflection on the ethical review process and the associated challenges contributes to a larger discussion of what makes a participant 'vulnerable'.

We argue that participant power and control over the research process, for instance through an on going consent process, can be created to address concerns about vulnerability in institutional ethical reviews.

Subsequent to the ethical approval and the relationship development phase, the intensive fieldwork occurred during the labour and birth experience of the 'childbirth supporter' study woman Felicity and her supporters, Frances and Martin and Felicity's two sisters. The data generated from Felicity's labour resulted in one hour of edited footage (edited to summarise 15 hours of activities), video-cued interview transcripts and field notes as previously described in Chapter 3 and Chapter 4.

This study was grounded in a video-ethnographic conceptual framework as informed by the Birth Territory theory and the Safe, Satisfying Birth conceptual model, which provided concepts to examine the interrelationships between the childbirth supporters and the physical birth unit environment, as highlighted in Chapter 4. As the field observations occurred, it became clear that a more finely tuned analytical approach informed by additional theory was needed. To enhance the analysis process, the inclusion of symbolic interactionism aimed to better recognise the participants' own 'voice' as the critical component in understanding the participant's experiences within the physical birth environment. Together these three conceptual and theoretical underpinnings (Birth Territory theory and the Safe, Satisfying Birth hypothesis; ethnography; and symbolic interactionism) framed the research with an ethnographic lens, placed it within parameters of established theory while grounding it in real world physical birth settings through foregrounding the participants' interpretations of their interactions with the space.

Personal reflections.

This section is a personal reflection of my experience as video-ethnographic researcher for 'the childbirth supporters study', as a continuation of the researcher-reflexive process. I started as an outsider to the research as I was not a family member, friend or staff at the hospital, but an observer with a camera, whom none of the family had previously met. I understood the nature of trying to 'relax' in medicalised environments and the norms of physiological labour, as I have a working knowledge of midwifery from previous learning and had given birth to my child in a similar setting. I experienced the smells of their favourite oils, heard the nature sounds of their selected music, watched Felicity as she moved and coped with labour pains and sat in quiet awe of Frances' fortitude and love for her daughter. I could feel the love disguised as worry and the resulting tension and disturbance when Martin, the husband supporter, would "pop back in and … go 'what's going on, are we there yet?". I appreciated being able to maintain a quiet, calm presence without over intruding, to watch the unfolding process of supporters supporting the woman they loved. Even though I had started as an 'outsider' – perhaps because I honoured their experience with ongoing sensitivity or perhaps because of the intimacy and intensity of being in their birth environment – I felt I was accepted as the family's 'alongside' research companion (Carroll, 2009) when I quietly reassured Martin, during the middle of the night, and chatted with Florence about my interest in designed spaces. When we visited for the video-cued interviews, I cooed over the new baby and gratefully accepted a cup of tea. I was made to feel welcome and valued, as I hoped I made them feel during the shared research process.

Felicity and her supporters' reflections.

When asked for their feelings about their involvement in the study, Felicity and her supporters who were interviewed (her mother and husband) expressed gratitude at

being involved in the study, as they originally had hoped they might receive special attention by having a researcher present with them for the duration of the labour. Having my presence during the entirety of labour may well have made them feel 'accompanied' and not alone, despite minimal verbal interactions between us. I was as unobtrusive as I could be, sitting on the floor in the doorway of the small storage room, or on a stool in the corner, taking notes, filming and watching.

Felicity was especially grateful for her supporters' presence:

> I felt really lucky that I had … more than one support person there, because I didn't realise that the midwives don't stay in the room with you the whole time. They leave because they might have somebody else to look after or whatever. They've got other things to do. I didn't realise! I thought the midwife would be with me the whole time! I am so grateful, happy that I had my own support people there because I wasn't alone. – Felicity

Each of the supporters was able to contribute valuable insight into their own relationship with the space and the development of their support needs and roles during the video-cued interviews. For instance Martin shared the original plan with us,

> It was hard with all the female energy – to cut in…that was the only time [at the point of video we were watching – towards end, leaning on bed] I could cut in … I wasn't going to be there. I was going to be at the pub. It all changed.

Martin struggled to find a place to be, to channel the complex emotions involved in the experience and to seek a way to become 'useful', as many supporters have said in the literature. He was appreciative to have the opportunity to follow up his

experience with us, by watching the video and discussing the many issues he faced with the design of the space and solutions that seemed obvious to him,

> …sometimes when I went in and … [Felicity] wanted to move, 'move out of the way', go to the corner and there is not really a place to – what are you going to do, just hang like this off a machine, 'hey, how's it going?' So logically you would have a little area, maybe just a few square metres near the entrance, where people can go in and out without having to cross over to get to this place. It would be just near the door.

Supporters should not have to feel afraid, as Frances said she did,

> There's just equipment everywhere you know…Even when I looked at it actually scared me. Because I sometimes think 'I'm going to walk back and reverse into it or knock it'…I felt like I always have things within my peripheral vision but I didn't feel safe that if I have to walk back, I know that I'm not going to knock something.

The participants' voice, meanings and interpretations of the study provided the backbone for the study and allowed connections to practice to be forged.

Reflections on the Theoretical Framework

The theoretical framework grounding the childbirth supporter study incorporated both the data gathering phase and the data analysis phase and has been shown as pertinent to the original research question: How does the current design of birth spaces in resource rich countries, accommodate and facilitate the role of the woman's birth supporter? The use of a video-based ethnographic approach as the prime data

generation method facilitated a safe, intimate view into a lived-experience. This data collection method also provided a theoretical platform for the data analysis phase by providing opportunities to revisit the labour experience on numerous occasions, with a variety of perspectives, perhaps unavailable via other theoretical research approaches.

The importance of the inclusion of the Birth Territory theory, contributing the concepts of territoriality, power and jurisdiction, was evident in the thematic findings. The findings demonstrated the supporters' need to exert a level of control over the space, establish their role in the labour experience (as either active or passive supporter) and feel sufficiently safe and empowered to generate support for their own needs. The Safe, Satisfying Birth hypothesis highlights the importance of the interactions between stress and communication between the women and the staff, with the childbirth supporter study demonstrating how the physical space can either inhibit or facilitate the ability to communicate and moderate perceptions of stress.

The ability to analyse the complex array of data (video footage, interview transcripts, and field notes) generated through this study was supported with the symbolic interactionism perspective. The use of the symbolic interactionism perspective facilitated a space in the analysis process to connect, combine and compare the interactions between all of the 'players' – the people, the objects and the physical space and the meanings that were attributed to these interactions by the participants.

In terms of the efficacy of the theoretical framework, as bookended with the results of this thesis' literature review, a clear link between a lack of appropriate physical design in resource-rich countries' hospital birth units and lack of apparent support or direction for childbirth supporters can be suggested. This thesis' literature review found that there are inconclusive findings on how the birth environment may facilitate *any* supporters' role, but shows that the physical environment *does* influence

supporters' perception and/or behaviours. Bringing aspects of ethnographic understanding, coupled with concepts such as territoriality, power and jurisdiction, followed through with a symbolic interactionist approach, leads us into evidence that can be translated into real-world design recommendations.

Moving the Evidence into Practice

The research findings detailed in Chapters 6 and 7 contribute to the knowledge base about how the built birth environment influences supporters' experiences and roles. The participants' interpretations of the events were a central focus of the analysis and findings. The analysis maintained a focus on the childbirth supporters – based on the two supporters' interpretations, but also from observations and interpretations from the woman, the three midwives, the researchers and from the video recordings. Thematic findings suggest supporters' experiences are complex and are not supported by the physical space of the birth unit; they experience 'an unbelonging paradox' of being needed, yet uncertain and in the way during 'tenuous nest building' activities. The space felt foreign and conveyed mixed-messages perhaps compounding societal expectations to be cooperative, supportive and take care of their own needs – with limited positive guidance from the physical birth environment.

Aligning with the existing literature, supporters were found to be in need of support themselves, highlighted in the 'supporting the supporter' theme. The physical design of the birth unit can facilitate support for supporters by focussing on meeting supporters' needs in instrumental ways, such as the addition of sufficient quantities of birth support tools, or addressing informational and emotional needs. Spaces designed to facilitate privacy within togetherness, such as window bench seating, have been shown to be desirable for childbirth settings (Shin et al., 2004) and are endorsed by these study findings. Designed birth spaces that facilitate many 'openings' for

supporters to navigate their roles are the final recommendations from this 'childbirth supporter study' analysis, in the theme 'role navigation'. For example, to facilitate active role engagement, the space around a birth tub should be sufficient in size to accommodate the caregiving staff and the presence of the supporters, while also being comfortable with soft edges and a bench on the perimeter. This would facilitate the opportunity for the supporter to find a role, by either actively supporting (for instance by providing ice chips), or simply being there for the woman.

The final piece of evidence arising from this thesis, as presented in Chapter 7, was the cross-validation and refinement analysis between the identified themes and the domains, characteristics and design observations that define the Birth Unit Design Spatial Evaluation Tool (BUDSET). The focus of this analytic reflection was to validate the efficacy of BUDSET in terms of supporters' experiences. The BUDSET had already been validated for the *woman* as the centre of the assessment, but not for the *supporters*. The cross-reference analysis for the themes and BUDSET strengthened and extended both the 'childbirth supporter study' findings and the BUDSET instrument. The thematic results were validated when they were all identified as integrated in the BUDSET. When compared to the thematic results, it was identified that more than half of BUDSET domains were congruent to meet supporters' needs based on the physical birth environment.

In identifying domains that did not address supporters' needs, two new groupings for supporters' needs were recommended. Supporters have needs both (1) 'as supporter' and (2) 'as an individual'. The BUDSET covers the needs of the supporter as an individual, but lacks in supporting them as active supporters. If these two sets are used as a framework, the BUDSET could better integrate supporters' needs throughout the domains. From this analysis, eight suggestions were identified. These suggestions

were either additional characteristics or refinements to existing characteristics, which would strengthen the validity of BUDSET for assessing childbirth supporters' needs in the built birth space (see Table 10 from Chapter 7). Examples of the recommendations include: bulletin boards and shelf-space dedicated for family personal items and mementos; soft small mats for the supporter to kneel near the woman, most often beside the birth pool or bath; duplicates of birth tools so the supporter and the woman could both be physically supported; and positive distractions, such as window views, nature videos, mobiles, fish tanks, or similar non-intrusive activities, as recommended previously in Chapter 7. If implemented, these refinements may improve the ability for the BUDSET tool to assess the physical birth environment's influence on the childbirth supporter(s), while also improving the assessment from the perspective of the woman.

These findings reflect and add to the existing evidence base about the relationship between the role and needs of supporters and the physical birth unit environment. Through the video-ethnographic, thematic analysis process and the cross-validated analysis, the generated evidence was translated into a set of suggestions to improve the physical birth unit environment for childbirth supporters. Key recommendations include: spacious, yet not cavernous, space to accommodate multiple supporters; easily accessible storage space for woman and supporters' belongings; a family alcove near the entrance; medical equipment hidden behind aesthetically pleasing screens or cabinets; flexible furnishings; and nourishing food and drink easily available. The development of new design components to improve the experiences of childbirth supporters', as derived from this rich and dynamic video-ethnographic case study, adds to the evidence base of physical birth environment knowledge.

Design Recommendations

The culmination of the thematic evidence, supported by the extension of the themes onto the existing validated birth space audit tool BUDSET, has revealed a host of design recommendations that may help translate this thesis into hospital or birth centre design practice. Design recommendations to facilitate supporting the childbirth supporters, as identified by the thematic analysis and video-ethnographic rich description, are detailed in this chapter. Table 11 reveals design recommendations in relation to each subtheme and theme identified in the analysis of the data and includes such elements as easily accessible storage that would facilitate a welcoming space and provide options for the 'tenuous nest-building' equipment the family may bring with them; and hidden medical equipment that would minimise the impact of the technology that makes up the technocratic environment and its mixed messages about the safety of birth. The inclusion of mantels at different heights, with a soft wall space for the woman to rest her head, would encourage active movement for the woman and support the physical work of the supporter. Designing in comfort options for the supporter, such as soft walls or edges on the side of tubs, would encourage them to stay for long durations in potentially challenging positions. Other recommendations include comfortable but moveable furnishings and numerous options to facilitate personal choice, especially attuned to sensory stimuli, such as adjustable lights, music and volume control and olfactory stimulation; all of which would improve the supporter's experience of being able to control the environment in order to provide optimal support.

Table 11: Design Recommendations

Theme	Subtheme	Design recommendation addressing subtheme
		The design recommendations that may better accommodate and facilitate the childbirth supporters' needs, as revealed by the thematic analysis are:
Unbelonging paradox	Tenuous nest-building behaviour	• Spacious, yet not cavernous, space to accommodate multiple supporters, as the birthing woman wishes. • Easily accessible storage space for woman and supporters' belongings. • Aesthetically pleasing colours in the room, including pleasant images - positive distracters - for people to view.
	Elusive privacy	A family alcove near the entrance to the room, to allow the presence of concerned outsiders.
	Technocratic environment conveys mixed-messages	Medical equipment hidden behind aesthetically pleasing screens or cabinets.
	Lack of control	• Comfortable and moveable furnishings to support actively shifting women and supporter dyads. • Options to facilitate personal choice, such as: o adjustable lights; o music and volume control; o olfactory options, such as oil burners; o temperature control; o windows and blinds to control daylight and air; o tactile options such as soft pillows for squeezing; o space for personalisation and privacy screens that can be opened or closed.
Role navigation	Role navigation – social interactions	• Readily available built-in physical supports such as: o grab bars or mantels, at varying heights; o soft wall spaces to rest heads against; o pull ropes; o birthing balls; o beanbags; o mats and squat stools.
	Role navigation – space, place & activity	Specific design recommendations for birth tubs are outside the scope of this article. However, from the supporters' perspective, the following is recommended: o railings to support women's access; o steps in and out at a predictable distance; o soft edges on which supporters may lean; o seats along the perimeter; and conveniently located cup holders. o Tub size should consider facilitating a supporter in the tub; yet remain suitable for access by the medical caregivers.
Supporting the supporter	Supporters' instrumental aid needs	• Comfortable places to rest or sleep, located within proximity to the woman. • Nourishing food and drink easily available. • Easily accessible toilet facilities.
	Supporters' informational and emotional needs	Posters or brochures within sight, such as birth position options, physiological labour norms and tangible birth support activities.
These design recommendations are intended for conventional hospital birth units, however, they may also be applicable in alternative birth units.		

Implications for practice.

The research and findings presented here will be of interest to evidence-based design researchers, architects, interior designers, planners, decision-makers, hospital managers, maternity staff and a wide range of others who appreciate the complexities of healthcare design and seek to gain new insight. This thesis contends that the physical design of birth unit environments needs to provide more guidance for childbirth supporters. This can be achieved through thoughtfully designed spaces that incorporate spacious design, flexible furnishings, adjustability of features such as temperature and lighting, increased perception of familiarity and ability to personalise the space and the presence of hidden, yet accessible, medical equipment. A superficial redecoration of the birth environment is not sufficient for meeting the needs of families experiencing a normal, healthy life-activity. This research appeals for more systemic design changes that go beyond the traditional birth environment focus on the birthing woman and caregivers and give appropriate support to the active or passive supporter.

Establishing Trustworthiness

Both the Birth Unit Design (BUD) study and the 'childbirth supporter study' were designed and implemented with research trustworthiness and rigour as central tenets. Means for assessing the trustworthiness and rigour of the study are discussed in this section. For post-positivist, naturalistic, inquiry-based research, such as the video-ethnographic 'childbirth supporter study', the concepts of credibility, transferability, dependability and confirmability are considered imperative (Lincoln & Guba, 1985).

Credibility inquires if the study design was sufficient to answer the research question. Because the research question was an exploratory, descriptive question inquiring, "What is happening or has happened?" (Yin, 2012, p. 5) regarding the

childbirth supporters' experience in a physical hospital birth environment, it can be argued a single-case study is a credible research approach.

Multiple methods to establish credibility were conducted in this research. The first two were prolonged engagement and persistent observation techniques, which are ethnographic hallmarks and well suited for asserting credibility (Lincoln & Guba, 1985). As I spent time before, during and after the event with both Felicity and her supporters, I fulfilled a requirement to establish both the prolonged engagement and persistent observation technique. Both myself and the other research team members (for the BUD and the 'childbirth supporter' studies) were familiar with birth and labour experiences via either personal experience as mother, supporter or father, or professionally as midwives. As "the context [was] already a part of [my] experiential portfolio" (Wallendorf & Belk, 1989, p. 71), I was able to focus on a single aspect of the event (design influence) reasonably quickly. Wallendorf and Belk (1989) also suggest that by combining both "perspectives of action (informant explanations of their actions to the researcher) … [and] perspectives in action (observations of actual behaviors)" (p. 71), the childbirth supporter time frame was suitable for interpreting patterns of behaviours.

Triangulation occurred across sources and methods. The multiple data collection methods were: direct observation, field notes during observation and interviews and video footage. Interviews with multiple participants as cued by the video footage permitted both triangulations across methods and across sources; the differing perspectives and interpretations by the informants enhanced the trustworthiness of the data.

Credibility was also conducted by formal and informal debriefing with an assortment of peers; some were familiar and some unfamiliar with the study. This

process of providing explanations of the research in process "served to sharpen [my] interpretations as well as to see whether they "played" to a new audience" (Wallendorf & Belk, 1989, p. 74). The last method for assessing credibility was to conduct member checks, which occurred by viewing the video footage while interviewing participants regarding what was happening for them, based on the built environment. A key participant in the 'childbirth supporter study' was asked to read a version of the thematic data analysis with this response: "I read through it…I think your observations were spot on. I hope it will make a difference and be helpful in future design! … I think it's a brilliant study and I'm so glad to be apart of it." – Felicity.

It is a common concern that using video as a data gathering technique changes the way participants behave in naturalistic settings (Laurier & Philo, 2006). However, this assertion is unproven by studies examining use of video recording in medical situations (Penner et al., 2007; Pringle & Stewart-Evans, 1990). A video camera present for research purposes appears to be a non-reactive method for data generation, perhaps due to participants' early desensitisation to the camera.

One technique for building credibility is the use of a negative case analysis, which uses purposive sampling to seek out an instance, as Wallendorf and Belk (1989) say, that would be "most likely to not confirm the emerging hypothesis" (p. 73). This remains to be tested in relation to the other five women who used different settings, as it was beyond the scope of this project. However, this thesis research has established the template for analysis for the large and complex dataset.

To achieve transferability, the findings reported here have been written to provide a thick description (Geertz, 1973), in what Lincoln and Guba (1985) describe as a process "essential for enabling transferability judgments" (p. 214). The thick description approach, which is illustrated in this article via exemplar quotes and

naturalistic writing, invites the reader to evaluate the extent and truth of the phenomenon under investigation and how it may resonate with other environments, circumstances and people (Lincoln & Guba, 1985). Informed by Lincoln and Guba (1985), Wallendorf and Belk (1989) suggest for in-depth descriptive ethnography, such as this study, "that if other researchers are concerned with the applicability of the findings in another context, they should do research using similar methods in another time or place and then compare" (p.76).

For assessing study dependability, the reader is referred to audit trail exemplars in Tables 3, 5 and 6, which show illustrative excerpts of the raw data from the field notes, interviews and video footage and the coding and analysis process. Lincoln and Guba (1985) propose that providing evidence of raw data, data reduction and analysis, data reconstruction and synthesis, and process notes are important to assert dependability.

Closely connected to dependability is confirmability, the "degree of neutrality or the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation, or interest" (Cohen & Crabtree, 2006, para. 1), which can be addressed by identifying key researcher characteristics. I am a design-behaviour researcher with a working knowledge of midwifery. Two research team members for the 'childbirth supporter study' are academic midwives (MF and AS) and one is a design academic with a research focus on distributed human-non-human agencies in human practice settings (SS).

Another method proposed to ensure confirmability is a reflexive practice. This was implemented throughout the research process and is described in detail in Chapter 3. Lastly, the audit trails and triangulation techniques previously described are

considered by Lincoln and Guba (1985) and Wallendorf and Belk (1989) to be suitable tests for confirmability.

Limitations of the Study

In the context of this research, one family's childbirth experience via video footage, video-cued interviews and personal observations, although appropriate and ample for video reflexive ethnographic research design, with a depth of data richness and varied data sources, is also a potential limitation. With two supporters' interviewed and a total of four supporters observed, three midwives and 15 hours of in-person observation and resultant one hour of edited video, this childbirth experience generated a huge amount of data for analysis. The analysis methods used identified themes that provided a detailed picture of how the physical birth unit influenced the multiple supporters in this case study. The findings presented in this thesis may resonate with a wide range of people involved in childbirth settings. However, the findings presented here are not necessarily generalisable. The lack of generalisability is not considered a limitation in qualitative research, nor as Walsh and colleagues claim, is generalisability the final mark on measuring good quality qualitative research (Walsh & Downe, 2006).

It is not considered a limitation that only two of the four supporters participated in the video-cued interviews. This is because the interview transcripts provided only one layer of data used to analyse this experience. The two sisters, who were unable to be interviewed, contributed to the results due to their behaviours, positioning and roles in the video and field note data. Their participation in the study was a useful and dynamic contribution by highlighting the need for the physical space to be large enough and flexibly designed appropriately to support multiple supporters. Additionally, their presence in the field notes and video footage contributed a deeper understanding of the connections between stress, communication and the interactions between the family and

the staff. Most importantly, their participation in their sister's labour provided a strong support base for their mother, who was the primary active supporter for the duration of the labour.

Another potential limitation of the study is the gendered nature of the supporter experience. Because the main supporter in this thesis was a woman, and the family believed that 'birth was women's business', some of the observations and identified themes may not similarly manifest if the main supporter was male. For instance, 'tenuous nest-building' may be an activity that originates from the birthing woman, but is easily understood and translated by a female supporter. This can be examined with further analyses of the other BUD cohort families using the analysis template originated by this thesis research.

Future research

With a range of detailed, descriptive and real-world design suggestions generated from this research, several avenues for future research are available. Based on the recommendations listed in Table 11, research designed to test the validity of these recommendations would be beneficial. 'The childbirth supporter study' created a data analysis template that may be beneficial for future video-ethnographic research in childbirth settings. In conjunction with thematic analysis, the use of the BUDSET domains as a point of reference to study physical birth environments can be used for both video-based research and perhaps for a variety of other research methods. For example, the first characteristic in the 'fear cascade' domain is 'space: arrival'. The BUDSET observations feature the woman and her supporters' experience in arriving and wayfinding to navigate to the birth unit. Design-behaviour studies that assess and measure wayfinding routes are becoming increasingly more technologically savvy, such as the option for participants to use wearable mobile augmented reality devices that

superimpose digital information onto a user's glasses to examine wayfinding behaviours in complex settings, such as hospitals (Kim, Wang, Han, & Wang, 2015).

In complex healthcare settings, a wide variety of research designs should be considered to facilitate understanding of how the design elements interact with each other. By conducting interdisciplinary studies, such as the Birth Unit Design (BUD) study, which harnessed input from architecture, midwifery, communication, public health, industrial design and interior design disciplines, the perspectives for examination may all join together to provide an optimal birth environment.

It is imperative to consider all perspectives on how the physical environment influences staff interactions with the birthing women and supporters, how the woman and supporter interact, how the designers and architects who design the space are guided, and how hospital managers can operate a cost effective *and* woman, baby and supporter centred birth unit facility. Counting the vast range of interior design features that could be examined, and the numbers of methods for conducting such analysis, the work of design-behaviour researchers interested in examining physical childbirth settings is almost limitless. This 'possible futures agenda', however, should be tempered by the need to recognise that individual physical design features are not independent from the surrounding socio-cultural environment. Thoughtful, well-designed research on physical design for birth environments needs to recognise and appreciate the complexities of these important places and the integral role of the supporter in facilitating safe, satisfying birth for the woman.

Conclusion

In summarising this study, it has been found few hospital birth spaces appear to have considered the need to provide appropriate accommodation for birth supporters within the birth room. Childbirth supporters who do not feel welcomed and supported

by the physical attributes of the built birth space experience an 'unbelonging paradox', being needed, yet feeling uncertain and in the way. This feeling was exemplified in this study, when the design and layout of the birth unit used by Felicity and her supporters was experienced as foreign and not welcoming. Although the family was expected to come in, be calm, continuously supportive and take care of their own needs, the physical space essentially provided no guidance to allow for this.

The findings presented here add to existing knowledge of designed birth space by accentuating childbirth supporters' specific needs in this context. It is argued, that if the woman is to have a truly positive birth experience, the design of birth units must take into account the needs of all users of the space, including, not only women, midwives and obstetricians, but also the women's supporters.

The insights gained from this study can make a valuable contribution to our understanding of how to better design optimal birth spaces to accommodate childbearing women and their chosen birth supporters. Realising these design recommendations in healthcare design guidelines and translating them into design practice will better facilitate the important support role.

Appendices

Appendix A: Reviewed Literature

Table A1: Included in review: Systematic, meta-synthesis, mixed, narrative and general reviews

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Hodnett et al. 2012, Canada	What are the effects of care in alternative versus conventional hospital birth setting?	Standard Cochrane review.	n = 9 articles	Alternative versus conventional birth unit environments	Reduced likelihood of medical intervention, increased likelihood of spontaneous vaginal birth, increased maternal satisfaction and greater likelihood of continued breastfeeding at one to two months with alternative settings, but findings are confounded with model of care.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Hodnett et al. 2013, Canada	What is the evidence regarding continuous, one-to-one intrapartum support as compared to non-supported 'traditional' labour care?	Standard Cochrane review.	n = 22 trial reviews n = 15,288 women met criteria and usable outcome data	Presence of continuous, one-to-one support during the intrapartum period.	Supporter presence showed: increased spontaneous vaginal birth, reduced pain relief, reduced dissatisfaction. Shorter labours, reductions in: caesarean births, instrumental vaginal births, and local analgesia. Reduction in low-Apgar score. Supporter provided by neither part of the hospital staff nor a person from the woman's network was deemed more effective. Clinically meaningful results are reported for both women and infants, with no known harm. "All women should have support throughout labour and birth" (p. 2).
Johansson et al. 2015, Sweden and Australia	Develop greater understanding of fathers' experiences during labour.	Qualitative meta-synthesis.	n = 8 articles n = 120 fathers from studies	Traditional hospital setting.	Supporters should actively prepare for the support role during childbirth, explore expectations and benefit from being supported – however fathers who desire to not participate should have that desire respected.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Steen et al. 2012, UK	What are the views and experiences of fathers' active engagement as supporters during labour?	Qualitative meta-synthesis.	n = 23 articles	Typical hospital birth settings.	Fathers occupy an undefined space as supporter during childbirth resulting in feeling like "not-patient, not visitor". They need support, inclusion and preparation.
Bohren et al. 2015, USA	How are women treated during childbirth around the world?	Mixed-methods systematic review.	n = 65 articles	Physical environment conditions: "'dirty', 'noisy', 'disorderly', or 'overcrowded'" or strewn with waste or medical equipment on floor (p. 13/32) .	Women mistreated. Poor physical conditions of facilities. Restricted birth positions. Birth supporters were frequently not allowed in birth room.
Dijkstra et al. 2006, The Netherlands	What are the relationships between physical environment stimuli in hospital settings and the outcomes and well-being for patients?	Systematic review.	n = 30 studies	Sunlight, windows, odour, seat configurations, audio, presence of nature, spatial layout and televisions.	When combined, physical design variables contribute to the hypothesis that the physical environment affects patients' well being. But specific design recommendations are inconclusive.
Srivastava et al. 2015, India	What are factors influencing women's satisfaction with maternity care in developing countries?	Systematic literature review using narrative synthesis approach.	n = 54 articles	Hospital birth settings in developing countries.	Determinants of women's satisfaction ranged through the intertwined factors of physical environment, human resources, supplies, interpersonal behaviour, privacy and other variables.
Bartels 1999, UK	What are fathers' experiences of childbirth?	Literature review.	not reported	Hospital birth rooms, worldwide	Experience stress during labour and need support. Midwives play a role in how the childbirth experience is perceived.
Dellmann 2004, Australia	What are fathers' experiences during childbirth?	Narrative literature review	n = 52 articles	Hospital birth room and birthing units in birth centres.	Men experience wide-ranges of emotions, can feel excluded, are confused about their role, and need support during labour.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Perez-Botella et al. 2014, UK	How has salutogenesis been defined and used in maternity care research?	Scoping review of theory.	n = 8 articles	Salutogenesis factors that view women during childbirth from a model of believing health is a continuum, and that labour and birth is healthy, not pathogenic.	Salutogenesis has been rarely used in childbirth research. A wider application of salutogenesis theory may help shift emphasis from pathology to normal healthy physiology of birth.
Ulrich et al. 2008, USA	What is the evidence-based healthcare design state of knowledge focused on three major outcomes: patient safety, other patient outcomes, and staff outcomes?	Literature review.	not reported	Physical design features that affect patients in hospital settings, which may or may not overlap with well women during the childbirth process.	Does not review any maternity birth setting. Well-designed physical environments influence safety in hospitals and facilitate healing for patients, and improve work settings for staff. More than 60 pages of environmental stimuli synthesis.

Table A2: Included in review: Randomised controlled trials

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Westreich et al. 1991, Canada	How does the birth environment influence the fathers' helping and affectionate behaviours during childbirth?	Randomised clinical trial subset of a larger trial, assessing outcomes based on two different birth settings including questionnaires, observations – time sampling method on a precoded checklist during labour.	n = 114 couples	Traditional hospital birth setting as compared to alternative birth setting ("attractively decorated…with a brass double bed, hanging plants and an adjacent early labour lounge" (p. 198-199).	Fathers in traditional setting displayed more active help behaviours than did those in the alternative setting. Speculated that this was overcompensation related.
Duncan 2011, UK	Does visual and performing arts influence, in a clinically significant way, labour length or requests for pain medication?	Randomised controlled trial.	n = 32 (control) n = 26 (intervention)	Visually stimulating and aesthetically pleasing folding screen; warm earth tones colours and cool blue colours one on either side; placed in front of medical equipment for intervention group in hospital setting.	Screens had measurable benefits on reduced length of labour and reduced requests for pain medication.
Hodnett et al. 2009, Canada	Pilot trial for Pregnant and Laboring in an Ambient Clinical Environment – is 'ambient room' acceptable to the women and their care providers?	Pilot randomised control trial, using questionnaires, medical records.	n = 62 women in either control (standard) or intervention group (ambient) room.	Removal of the standard hospital labour bed and the addition of technology to promote relaxation and sense of calm and a woman's mobility for labour ('ambient room')	Generally evaluations were positive from both women and caregivers. Future studies should evaluate adequately powered randomised controlled trials for the ambient room.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Lavender et al. 1999, UK	What factors did women think were important during her childbirth experience?	Randomised controlled trial, using questionnaire and qualitative analysis of answers to open question.	n = 412 women (randomised to three-arms timing for intervention determined by labour length on partogram)	Traditional teaching hospital.	Interrelated factors were: support, being informed, decision-making, and control. Active or passive supporters were both deemed beneficial and valued. Control was understood by the woman to be either self-control or external control.
Hofmeyr et al. 1991, South Africa	How does cooperative support affect labour and the transition to parenthood, including breastfeeding ?	Randomised controlled trial, using two pretest posttest interviews, medical records.	n = 97 to control group (no support) n = 92 participants in intervention group (received support)	Traditional hospital birth environment and non-familiar, non-professional childbirth supporter-volunteers, from the local community.	Supporters improved women's perceptions of self-competence, labour, ability to confidently transition to parenthood and successful beginning breastfeeding. Supporters' lack of hospital-relationship and lack of personal-relationship with the woman dimension is significant, as it may have reduced the 'performance' or 'investment' characteristic for both the woman and the supporter.
Browning 2000, Canada	Music therapy intervention during labour as coping strategy during labour.	Qualitative interviews and randomised control experiment. Control = labour support only Intervention group = music therapy and labour support	n = 11 pregnant women	Sensory positive audio distracters – personal choice of anxiolytic music.	Self-selected relaxing music during pregnancy and labour was reported by women to assist in stress management and reducing perception of pain.

Table A3: Included in review: Quasi-experimental or experimental

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Andrade et al. 2015, USA & Portugal	Relationship between physical design and reduce level of perceived stress?	Experimental randomised allocation to 8 possible conditions (simulated hospital room) - between-subjects design experiment.	n = 217 students	Space and chairs, Internet, phone near bed, sleeper sofa TV w/ 40 channels, DVD/VCR combo, space for photos from home, plans, paintings of nature Adjustable lighting and temperature controls, windows that can open, refrigerator	Physical design of hospital room affects stress via design elements that foster social support and positive distracters.
Dunne et al. 2014, Australia	Is the measurement tool (Birth Companion Support Questionnaire) to assess women's perceptions of supporters' presence during labour reliable and valid?	Cross-sectional study assessing and completing questionnaire tool.	To review instrument n = 6 midwives n = 10 postnatal women To complete instrument n = 293 women	Measurement tool to assess women's perception of social support received during labour.	The tool was validated as appropriate. Women desire the presence of supporters during labour.
Foureur et al. 2011, Australia	Is the Birth Unit Design Spatial Evaluation Tool (BUDSET) audit tool able to measure the optimality various physical aspects of birth environments?	Quantitative pilot assessment, audit tool.	n = 8 hospital birth settings n = 5 trained auditors	Some design features include: • Fear Cascade (such as, space in reception area and birth room, privacy, and noise control) • Facility (such as birth bath, en suite bathroom facilities) • Aesthetic (such as light, colour and texture); and	The BUDSET revealed a range of Optimality Scores for the audited birth units, which "provides a way to assess the optimality of birth units and determine which domains may need improvement" (p. 36).

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
				• Essential Support elements for women and families (such as accommodation for supporters).	

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Gawlik et al. 2015, Germany	Is Salmon's Item List (a validated assessment tool for mothers' birth experience) applicable to fathers' birth experiences?	Longitudinal pilot study – Salmon's Item List questionnaire.	n = 88 fathers	Hospital birth setting to measure father's multidimensional feeling and experiences during and after childbirth.	Reduced version may be applicable for assessing fathers' experiences, especially the four factor dimension ('fulfilment', emotional adaption', 'emotional experience' 'physical discomfort').
Gungor et al. 2007, Turkey	How does Turkish fathers' presence during labour and birth influence the labour support experience and nurses' experiences?	Experimental and prospective design using Perceptions of Birth Scale, observations, Father Interview Form.	n = 25 women in control group (father not permitted to participate) n = 25 women in experimental group (father allowed to participate)	Hospital birth setting in Turkey.	Women benefit and prefer the presence of a supporter/their husband during labour. When the maternal caregiver gives support to both woman and man, the fathers' active participation rate is high.
Newburn et al. 2003, UK/ (see also Singh et al. 2006, UK)	What design features did women want in their physical birth environment, and did the physical environment make a difference to their labour experience?	First of two national surveys conducted 2 years apart.	n = 1944 postnatal women	Hospitals, both obstetric and midwife led, free-standing birth centres and homes Physical environment features, top 5 features women deemed important were: (clean room, able to move freely, not being observed, privacy, continuity of the room, comfortable seats for supporter).	Physical environment as interconnected with caring people influence birth experience. 94% of women thought the physical environment affected how easy or difficult it was to give birth. Physical design that inhibited the type of birth the woman wanted include: lack of privacy, clinical feeling, too small of a space, hospital bed (too hard and not adjustable or comfortable), lack of control of temperature.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Rudman et al. 2007, Sweden	What affects women's satisfaction with childbirth along distinct domains: intrapersonal care, information and involvement in decision-making in relation to the physical birth environment?	Cluster analysis using longitudinal population-based survey.	n = 2605 women	Design factors included in survey were sounds, lights, equipment. Survey did not include: features influencing privacy, cleanliness, security, proper temperature regulation and facilities for visitors to eat and drink.	Evaluating women's satisfaction in a multi-dimensional pattern approach allows for richer picture of care evaluation, but also revealed a more negative satisfaction level.
Shin et al. 2004, USA	How do interior physical design features foster perception of hominess within a hospital birth environment?	Likert rating scale.	n = 35 women	Line-drawing simulation of variations on birth environments for design features: • family alcove • entrance transition • openness toward inside • openness toward outside • spatial continuity • display surface • operable windows	Hominess is flexible and allows freedom of choice, family-centred experience, rather than an illness, thereby enabling a sense of control to facilitate a sense of privacy and territoriality. Strongest influences on perceived hominess were interior windows and a transition area. Privacy by fostering personal control over visual access and exposure to others; ability to personalise and adjust surroundings.
Singh et al. 2006, UK (see also Newburn et al. 2003, UK)	What do women want regarding facilities and design of childbirth settings?	Second set of surveys conducted to combine with previous research from 2003.	n = 2620	See Newburn et al. 2003 for more details.	Confirmed first study - 87% of women felt the physical environment affected how easy or difficult it was to give birth. Unavailable but desired features: unclean room, clinical rather than homey atmosphere, lack of en suite toilet, lack of lighting control, lack of soft support equipment (such as bean bags) and lack of ability to move around freely.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Symon et al. 2011, UK	What are woman and partners experiences, as a couple and as individuals, during the childbirth experience as influenced by the physical environment?	Postnatal survey.	n = 515 couples	Hospital birth settings: midwifery-led units and obstetric-led units: Spaciousness; cleanliness; toilet facilities; freshness of air; temperature; "being looked-after" (for example furnishings and food)	Fathers experience exclusion/role confusion. Supporters felt positive about experience, but significantly less positive than woman about their satisfaction with the birth environment. Supporters' dissatisfaction was greater when in the midwife-led unit, but not significantly. Supporters found the setting more 'Institutional' than did their partners. Both partners found the midwife-led unit to be more 'calming' than the obstetric-led unit and also less 'cramped'.
Thompson et al. 2012, Australia	What are women's informational needs in decision-making about where to experience childbirth?	Descriptive cross-sectional survey with open-ended responses regarding decision-making about where to birth.	n = 146 women	Designed features: aesthetics ("niceness") ability to be mobile during labour welcoming space for supporters/children permitted in space/control over number of staff in room availability of labour aids (birth balls, aromatherapy, visualisation tools) adjustable lighting music playing equipment	Most important factors for decision making regarding which birth facility to chose, for women were: • policies permitting supporters, • recommendations, • mobile during labour, • aesthetic quality, • availability of NICU, • postnatal care/support • policies regarding medical interventions • access to water immersion

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Diemer 1997, USA	Are there differences between father-focused discussion and traditional childbirth preparation classes?	Quasi-experimental. Control group = traditional classes. Intervention group = experimental father focused discussion group. Four scales used to measure stress, coping, social support and spousal relations and one questionnaire used.	n = 83 couples	Childbirth preparation classes on father's support.	Fathers coping and social support skills are enhanced by childbirth preparation of either type, especially when social network skills are emphasised.
Ford, 2009, UK	How to measure multidimensional constructs of perceptions of control and support in birth.	Two studies: interviews and completion of measurement tool.	n = 10 women interview for measurement development n = 402 postnatal women	Physical environment was one of 5 sub-themes comprising "Factors influencing women's perceptions of control" (p. 247).	Interviews guided development of 33-item questionnaire with 3 components: internal control, external control and support by healthcare professional

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Hodnett et al. 1986, Canada	What are the influences of certain person-environment interactions on pregnancy outcomes, specifically labour length?	Two group, non-randomised pretest-posttest prospective study design using 2 interviews and one standardised measurement scale.	n= 80 women who planned home birth n = 80 women who planned hospital birth	Home birth setting. Hospital birth setting.	Because of individual differences and desires, it is recommended that decisions about type of birth environment to chose should be left to the individual.
Janssen et al. 2006, Canada	Does the scale Care in Obstetrics: A Measure for Testing Satisfaction (COMFORTS) measure women's satisfaction of interdisciplinary care in hospital setting?	Focus groups and literature review used to develop questionnaire.	n = 415	Traditional hospital setting (such as support person was comfortable, adequate lighting, spacious room and adequate for needs)	One of 6 sub scales was physical environment in hospital settings, rating women's satisfaction with childbirth – scale needs further validation, but is shown to have potential for use in birth settings.
Khresheh 2010, Jordan	Does a female relative as supporter affect childbirth outcomes?	Descriptive non-randomised comparison.	n = 226 women total n = 107 intervention group (female relative)	Comfort, praise and reassurance provided by untrained female relative.	Childbirth support from female relative significantly decreased both pain medication requests and significantly increased mothers' satisfaction.
Senarath et al. 2006, Sri Lanka	How is Sri Lankan mothers' satisfaction with childbirth in hospital?	Cross-sectional, descriptive using stratified random sampling to select participants for exit interviews based on structured questionnaire.	n = 446 mother-newborn pairs	Five Sri Lankan hospitals.	Quality of care determined by many factors, the related physical environment factors were: cleanliness, sanitary facilities and availability of beds. There was higher satisfaction with physical environment for mothers whose ethnicity was Moor or Tamil. Inconclusive if the higher satisfaction was based on ethnicity or physical environment.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Symon et al. 2008a, UK	What is the role of interior design on birth environments, specifically in terms of satisfaction and staff perceptions of work performance?	Questionnaire – multi-item developed for the purpose of the study & focus groups.	n = 559 women n = 227 staff	Obstetric-led, midwife-led– hospitals; old and new; large teaching units and medium sized general hospitals	Background and detailed descriptions of methods employed for study.
Symon et al. 2008b, UK	See Symon et al. 2008a	See Symon et al. 2008a Focus on results regarding space and layout.	See Symon et al. 2008a	• "Mothers' perceptions of space • Space for mothers to move around • Storage space for mothers' belongings • Mothers' communal lounges • Staff perceptions of unit layout." (p. 110).	Mixed results regarding space and layout - spaciousness is subjective, but being able to have control over space and use the space positively was deemed more important. Feelings of spaciousness or tidiness both corresponded to women's increased satisfaction with space.
Symon et al. 2008c, UK	See Symon et al. 2008a	See Symon et al. 2208a Focus on control and empowerment via the environmental variables.	See Symon et al. 2008a	Temperature, lighting, ventilation and noise	Women typically unaware of ability to control environmental variables, with lighting being most frequently mentioned. Conflict between midwives and women ability to control environmental stimuli for example the temp (women meet own needs and not newborn's). Midwives desired greater control over temperature, lighting and ventilation.

Table A4: Included in review: Exploratory, descriptive, and/or interview methods

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Bäckström et al., 2011, Sweden	How first time fathers described the support they requested or received during labour	Open-ended interviews.	n = 10 first time fathers	Swedish labour ward in a hospital setting	Need to support supporters during labour. If fathers feel helpless, they can panic and interfere.
Chandler, 1997, Canada	What are first-time fathers' expectations and experiences of their presence at their partner's labour?	Descriptive, exploratory before/after interviews, journals and non-verbal behaviours recorded.	n = 14 first-time fathers	Hospital birth settings.	Supporters need support during labour. Fathers often hide their true feelings.
Chapman, 1992, USA	What is father's experience during labour and delivery?	Grounded theory approach. Semi-structured interviews and observations during labour.	n = 20 couples	Hospital birth settings.	Three roles were identified: coach, teammate and witness. Most of the participants played the role of witness. Roles were navigated based on "degrees of understanding and mutuality."
Dalke et al. 2006, UK	What is current practice regarding use of colour and lighting in existing hospitals?	Multi-method audits including observations and interviews.	n = 20 generic sections of hospitals.	Colour design inherent and inseparable from materials, finishes, including "light and paint to art, from aesthetics to functionality" (p. 343).	Inconclusive and contradictory colour application guidelines. Recommended: Personal lighting control: nature views; positive visual distracters. Colour orange found acceptable in maternity units. Reduce 'visual noise'– clutter and hide unused equipment, but facilitate positive visual distracters.
Douglas et al. 2004, UK	What are patients' perceptions and attitudes regarding design hospital space in terms of patient needs?	Qualitative, exploratory semi-structured interviews	n = 12 in maternity setting n = 50 total across 4 hospital units (elderly, medicine and surgery units)	Hospital setting in terms of 'patient-friendliness'.	Need for: personal storage; privacy; single rooms; personal toilet facilities; better facilities and more space for supporters and visitors, space and activities for children; aesthetics; more privacy and intimacy with family; cleanliness and good security.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Hallgren, 1999, Sweden	What are the expectations and experiences of childbirth preparations and childbirth in terms of midwifery reflection?	Qualitative interviews.	n = 11 men, interviewed 3 times each	Hospital birth setting.	Reality can differ from expectations and the degree to which men are 'vitally involved' before and during labour, seemed to buffer stress and feelings of helplessness. Fathers' need support.
Harris et al. 2002, USA	What are sources of environmental satisfaction for hospital patients?	Telephone interviews with recent patients at one of four hospital units.	n = 380	Six hospital settings, including birth unit (and medical, orthopaedic and surgical).	The physical environment significantly contributes to overall satisfaction. There did not appear to be any differences in environmental stimuli preferences across all four units.
Hauck et al. 2008, Australia	What is women's experience of labouring in a Snoezelen room?	Qualitative exploratory design using in-depth interviews.	n = 16 women who recently experienced a Snoezelen room during labour	Snoezelen room is an indoor physical space - adaptable and personalisable sensory stimulation (for instance sensory stimulation.	"Distraction; relaxation; comfort; environmental control; choice of complementary therapies; and safety in a home-like atmosphere" (p. 460). Supporter's response was shown to influence the woman's impression of Snoezelen.
Somers-Smith 1999, UK	What are first-time mothers expectations regarding the support they expect and hope to receive? And what are the thoughts and feelings of the male partners and satisfaction with how they felt they managed?	Two sets of semi-structured antenatal and postnatal interviews.	n = 8 couples	Typical hospital birth setting.	Supporters were wanted and women felt satisfied with their supporters. Fathers reported the experience was stressful and felt unsure about their role and anxious. Possibility of a "vicious circle: the woman makes support demands the partner cannot meet; he becomes visibly stressed, and this in turn adds to the woman's stress and consequent demands" (p. 107).
Walsh 2006, UK	What are the socio-cultural-political experiences with childbirth process within a freestanding birth centre?	Ethnographic exploratory study.	Women, midwives and maternity-care assistants at the birth centre.	Free-standing birth centre	It is suggested that intuitive nesting-related behaviours and a 'becoming mother' matrescence' process during childbirth can be mediated both relationally and via the physical environment.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Carlton et al. 2005, USA	What factors influence women's decision making about desire to have medicated or non-medicated labour?	Qualitative ethnographic interviews.	n = 33 postnatal women who had changed their mind	Hospital birth setting.	Strongly suggested that medicalised birthing environment may influence decision making about pain-medication in labouring women.
Erlandsson et al 2011, Sweden	How does a fathers' experience at a complicated labour extend his support role?	Open-ended narrative interviews using content analysis.	n = 15 fathers	Hospital birth setting.	Fathers should have 24/7 access to birth settings after complicated labour.
Essex et al. 2008, UK	Who are mothers without supporters and are women without supporters at increased risk for adverse outcomes?	Millennium Cohort Study – large-scale survey in UK (computer assisted personal interviews and self-completion interview).	n = 16,610 natural mother-infant pairs	Hospital birth settings throughout the UK.	Mothers without supporters may be a useful marker for high-risk mothers.
Fridh et al. 2009, Sweden	What is the family's experience of caring for someone who dies in an intensive care unit, based on the physical environment?	Phenomenological-hermeneutic interviews.	n = 17 close relatives	"Strange" hospital environment, "unfamiliar technology" and crowded, non-private conditions were a focus	Loved one's dependence on medical equipment was more frighting than physical environment for supporters. Need for opportunity to be together, yet private. Stress of situation outweighs the influence of physical environment at the outset, but later may have influence.
Hammond et al. 2014, Australia	How to midwives feel when working in each birth setting?	Descriptive exploratory critical realist using photo-elicitation semi-structured interviews.	n = 16 midwives	Six different types of birth room images (representing traditional and alternative physical birth environments).	Midwives describe their hidden feelings that the physical birth environments influences their practice and influences their interpersonal relationships
Longworth et al. 2011, UK	How do fathers describe their roles, expectations and meanings of being supporters?	Heideggerian phenomenological interviews.	n = 11 first-time fathers	Typical hospital birth setting.	Suggests midwives are a pivotal factor in getting the father to feel more satisfied in their role. Father's felt 'on the periphery' of events, despite wanting to be involved.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
MacLaughlin et al. 1983, USA	How do first-time fathers who had not attended childbirth prep classes compare with first-time fathers who had attended childbirth prep classes?	Descriptive analysis, use of pretest posttest interviews based on the same questionnaire. Then compared with a previous study using the same methods.	n = 11	Typical hospital birth setting.	Both sets of fathers have similar needs: understanding, achievement, deference, and nurturance. Neither group placed much importance on their own physical needs (hunger, thirst, sleep) during the labour, but expressed need for emotional support.
Noseworthy et al. 2013, New Zealand	What is an appropriate relational decision-making model of midwifery care?	Qualitative prenatal and postnatal interviews.	n = 8 woman-midwife pairs (sometimes supporter)	Typical hospital birth setting.	Complexity of interrelationships (including physical environment) on decision making for women in childbirth.
Premberg et al. 2011, Sweden	What are the experiences of first-time Swedish fathers' during childbirth?	Phenomenological lifeworld approach, using re-enactment method interviews.	n = 10	Typical hospital birth setting.	Fathers experience a widely ranging series of emotions (including euphoria and agony). Fathers need to be valued and supported.
Savage, 2006, USA	How do first-time expectant mothers' learn about childbirth?	Phenomenological, feminist approach using two in-depth interviews and journals.	n = 9 first time mothers	Typical hospital birth settings.	The socio-political-cultural paradigm remains a strong undercurrent in women's knowing about birth.
Sengane 2009, South Africa	What are the experiences of black fathers during their role as childbirth supporter?	Phenomenological, exploratory, descriptive study using unstructured interviews.	n = 10 fathers total n = 5 who had been supporters n = 5 who had not been supporters	Typical hospital setting.	Lack of information fostered nervousness, fear, anxiety and helplessness, but fathers also felt delight and excitement. Some of the non-supporters wished they had been there, although others accepted cultural taboo. Supporters need support.

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
White 2007, New Zealand	What are the experiences of fathers who witness traumatic births?	Descriptive phenomenological study using participants' choice of narrated experiences (responded verbal one-to-one or audio taped; or written letter or email).	n = 21 fathers	Typical hospital setting.	Fathers are vulnerable to developing post-traumatic stress disorder (PTSD) after witnessing a traumatic birth. All the fathers experienced distress/ Some experienced long-term mental anguish and psychological sexual scarring.

Table A5: Included in review: Non-empirical knowledge reviews

First author, Year, Country	Research question	Study design	Participants	Environmental design influences and/or setting	Results
Buckley 2003, Australia	What is undisturbed birth process, in terms of the neuro-hormonal cocktail and the neo-cortex.	Non-empirical knowledge review.	No participants.	"Atmosphere" – no bright lights, quiet room with no conversations, feel safe and unobserved, private and no need for woman to use rational thinking.	Environment where woman feels sense of safety and privacy to increase chance of easy and safe birth in terms of neuro- hormonal cocktail, ability to follow instinct, and have social support to allow undisturbed birth. Hide or cover clock and technical equipment.
Draper et al. 2013, UK	How does medicalised environment (both physical and socio-culturally) influence fathers' transition to parenthood?	Theoretical review of ethics of involved fathers in medicalised settings.	No participants.	Hospital birth settings.	Suggests medicalisation of transition to fatherhood due to medicalised environment and too much burden on caregivers to support supporters.
Fahy et al. 2006, Australia (see also Fahy, Foureur and Hastie, 2008)	To describe and explain the Birth Territory theory.	Theory development and case study examples.	n = two clinical stories from hospital birth setting	Geographical 'place' including furniture and accessories in the birth unit - 'sanctum' on one end of spectrum, 'surveillance room' on the other	Introduces theory of "Birth Territory and presents the key concepts: firstly, 'terrain', with its sub-concepts of 'sanctum' and 'surveillance room'; and secondly, 'jurisdiction' including sub-concepts of 'integrative power', 'disintegrative power', 'midwifery guardianship' and 'midwifery domination'" (p. 45).
Lepori 1994, Italy	How can birth spaces be designed to ensure the woman's security from a medical/technology standpoint, while also facilitating the woman's innate needs for active mobility during labour?	Non-empirical knowledge review and analysis of traditional birth setting.	No participants	Traditional birth settings	Birth spaces traditionally design to support interventions, not the woman. New model described. Means for women to support all limbs. Spiral direction. 'Domestic' is not colours or furnishings, but a space that allows women to freely chose what feels best to her in a flexible, supportive way.

Lothian 2004, USA	Why is it important women's privacy is protected against unnecessary interventions or stimulation in terms of hormonal processes?	Non-empirical knowledge review.	No participants.	Typical hospital birth setting.	Catecholamine levels and fetal-ejection reflex explained. On one level women may feel safe choosing a hospital setting as it is equipped to handle any untoward events, yet her subconscious and feeling self often have a different reaction. Supporters need to trust birth and the woman, and create a safe bubble to maintain her privacy.
Romito 1986, Italy	How have hospitals responded to women's requests for more humanised birth environments?	Non-empirical review of practice and research.	No participants.	Typical hospital birth setting.	Response by hospitals to women's requests to humanise childbirth environments has been via surface changes rather than authentic.
Stenglin et al. 2013, Australia	How are facilities and design of childbirth physical environment maximised to facilitate "safe, sanctum-like environments that meet the changing needs of women as their labour unfolds" (p. 819)?	Non-empirical knowledge and theory review.	No participants.	Surveillance and sanctuary in the design of birth environments.	The Binding scale explains the range of bound/unbound space to move birth environments towards a safe sanctum that also permits freedom of movement. Designed sensory experiences may be one avenue for implementing adaptations or new designs for birth environments.

Appendix B: Published Paper: Harte, J. D., Leap, N., Fenwick, J., Homer, C. S. E., & Foureur, M. (2014). Methodological insights from a study using video ethnography to conduct interdisciplinary research in the study of birth unit design. *International Journal of Multiple Research Approaches, 8*(1), 36-48.

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

J Davis Harte, Nicky Leap, Jennifer Fenwick*, Caroline S E Homer and Maralyn Foureur
University of Technology Sydney, Ultimo, NSW, Australia; *Griffith University, Meadowbrook, QLD, Australia

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

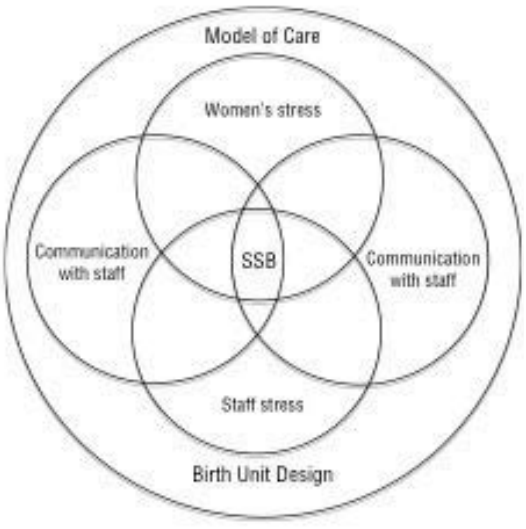

Figure 1: Safe, satisfying birth (SSB) conceptual model. Reprinted from Foureur et al. (2010). Copyright (2010) with permission from Elsevier

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, 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

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

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

[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).

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

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 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

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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Appendix C: Published Paper: Harte, J. D., Homer, C. S. E., Sheehan, A., Leap, N., & Foureur, M. (Prepublished July, 24, 2015). Using video in childbirth research: ethical approval challenges. *Nursing Ethics*.

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Using video in childbirth research: Ethical approval challenges

J Davis Harte, Caroline SE Homer, Athena Sheehan, Nicky Leap and Maralyn Foureur
University of Technology, Sydney, Australia

Abstract
Background: Conducting video-research in birth settings raises challenges for ethics review boards to view birthing women and research-midwives as capable, autonomous decision-makers.
Aim: This study aimed to gain an understanding of how the ethical approval process was experienced and to chronicle the perceived risks and benefits.
Research design: The Birth Unit Design project was a 2012 Australian ethnographic study that used video recording to investigate the physical design features in the hospital birthing space that might influence both verbal and non-verbal communication and the experiences of childbearing women, midwives and supporters.
Participants and research context: Six women, 11 midwives and 11 childbirth supporters were filmed during the women's labours in hospital birth units and interviewed 6 weeks later.
Ethical considerations: The study was approved by an Australian Health Research Ethics Committee after a protracted process of negotiation.
Findings: The ethics committee was influenced by a traditional view of research as based on scientific experiments resulting in a poor understanding of video-ethnographic research, a paradigmatic view of the politics and practicalities of modern childbirth processes, a desire to protect institutions from litigation, and what we perceived as a paternalistic approach towards protecting participants, one that was at odds with our aim to facilitate situations in which women could make flexible, autonomous decisions about how they might engage with the research process.
Discussion: The perceived need for protection was overly burdensome and against the wishes of the participants themselves; ultimately, this limited the capacity of the study to improve care for women and babies.
Conclusion: Recommendations are offered for those involved in ethical approval processes for qualitative research in childbirth settings. The complexity of issues within childbirth settings, as in most modern healthcare settings, should be analysed using a variety of research approaches, beyond efficacy-style randomised controlled trials, to expand and improve practice-based results.

Keywords
Australian ethical process, birth unit design, childbirth, ethical approval challenges, midwifery, video-ethnography, women's experiences of labour and birth

Corresponding author: J Davis Harte, University of Technology, Sydney, PO Box 123, Broadway NSW 2007 Australia.
Email: [redacted]@gmail.com

Introduction

Childbirth is a physical and social experience, with communication and social support being essential components for positive outcomes.[1] The environment in which childbirth occurs influences the social nature of the experience, and there is evidence to support 'home-like', comfortable environments for birth.[2–5] Most women in Australia and other westernised countries give birth in hospitals, in environments that are not usually home-like or conducive to supporting the normality of childbirth.

Evidence suggests that, for women in labour, admission into hospital environments may contribute to a 'fear cascade'[6] which could inhibit pain-reducing hormones and increase cortisol and stress-hormones.[7] The environment in which labour and birth occurs could then influence both the physical outcomes and also the quality of communication between women and care providers and between care providers. Our research has been interested in this interplay between hospital birth rooms and the quality of communication and support provided by the care providers (usually midwives) to women and their families, and we sought to further explore the relationships in an ethnographic study called the Birth Unit Design study.[8] The aims of the study were to investigate, using video-ethnography, how the physical space of the birth environment might impact on communication and experiences of women, their supporters and healthcare providers, primarily midwives (Box 1).

Box 1: From the Birth Unit Design study brochure distributed to potential participants.

The goals of the research are to provide increased understanding on which to base future birth unit design and to determine if the physical birth space has an influence on:

- Communication between women, supporters, midwives and other care providers
- The physiology of labour and birth
- Women's experiences and satisfaction

In July 2010, we applied to the local Human Research Ethics Committees (HRECs) for ethical approval. The Australian HREC system is akin to the Internal Review Board (IRB) in the United States, the Research Ethics Board (REB) in Canada and the Research Ethics Committee (REC) in the United Kingdom. As is required, we applied for ethical approval to the local HREC prior to commencing the study. Approval, however, was not granted until 8 months later, following protracted negotiations with the HREC and major modifications to the research design.

The aim of this article is to explore the complex issues around: the duty of ethics committees to 'protect' childbearing women; women's rights when participating in research involving their labours and births; and the challenge of 'fitting' ethnographic research into an HREC paradigmatic view of childbirth in institutions. We aim to provide reflection on our ethical approval experience that will be of use to HREC committees and researchers who use video-ethnography in vulnerable populations in the future. Initially, we will describe the Birth Unit Design study before explaining the process of obtaining HREC approval for the study.

The Birth Unit Design study

The Birth Unit Design study was a qualitative, descriptive observational study that used video-ethnography and interviews as data-collection methods. The aim of the study, as conveyed to the HRECs, was to explore

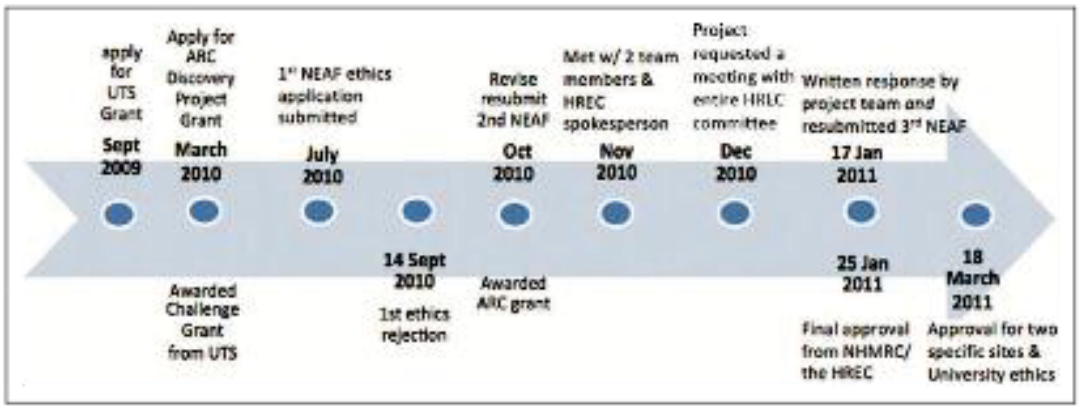

Figure 1. Birth Unit Design study grant and ethics application timeline.

the relationship between the physical design of institutional birth spaces and the behaviour, experiences and communication between birthing women, their supporters and midwives. Our premise was that most typical birth units increase maternal stress levels and may therefore influence the neurophysiology of birth, leading to slow labour, uterine inertia, foetal distress and a range of interventions, including an increased rate of caesarean section.[9] Our goal was to increase understanding of how future birth unit design might reduce stress and increase the likelihood of straightforward and more satisfying birth experiences – for women, their supporters and healthcare providers.[6,9–13]

A comprehensive description of the research methods is described by Harte et al.[8] We intended to recruit up to 12 women with uncomplicated pregnancies who were due to give birth in either a standard hospital labour ward, or a birth centre unit located within a hospital. We aimed to film each woman's experience from entry to the hospital, throughout labour and birth and for a short period after the birth of the baby. This would involve the woman, her supporters and healthcare providers consenting to being filmed. Although this was an interdisciplinary study involving researchers from architecture, public health, communication and midwifery, midwives who were most familiar with the environments and the process of labour and birth were to undertake the filming.

The recruitment plan was that a research-midwife would explain the purpose of the study to potentially eligible women during their 36-week antenatal clinic visit. The process of how participants could grant consent would be explained during this initial conversation and revisited at regular intervals to ensure an ongoing consent process.

The proposal was that filming would focus on how the physical space of the room and the objects within it were used by the woman, her supporters and caregivers and would explore verbal and non-verbal communication within those spaces. Two research team members were to coordinate the filming and recording of field notes, to include usual ethnographic observations, such as: use of the space and objects, acts and activities, events and time frame and responses and feelings of the participants and the researchers.[14] Video footage would then be shared with the woman, her supporters and caregivers in subsequent separate interviews, eliciting reflection on the experience as influenced by the physical environment.[8] The Birth Unit Design study received national competitive funding in late 2009 (Figure 1). We then began ethical approval processes in July 2010, which will be described in the next section.

The HREC approval process in Australia

Gaining ethical approval from a review panel with specific training in ethics and research provides assurance to researchers and research participants that the study will not contravene their rights as autonomous

individuals and that the research will be conducted and reported on ethically. In Australia, these ethical principles are clearly articulated in the *National Statement on Ethical Conduct in Human Research*,[15] published by the National Health and Medical Research Council (NHMRC) and was referenced by us and by the HRECs in their reviews of our research.

The HREC process requires researchers to complete an application form that seeks responses to questions about the design and conduct of the study that may have ethical implications. Developed by the Australian Governments' NHMRC, the National Ethics Application Form, or 'NEAF', is a 'dynamic, interactive, web-based tool for researchers of all disciplines to complete research ethics proposals for submission to Human Research Ethics Committees (HRECs)' (para. 1).[16]

For research conducted in a health facility, a Site Specific Approval must also be obtained for each subsequent facility the researchers wish to access, with the approval tabled with the coordinating HREC committee for a designated health service area. The first NEAF approval we received applied to one of the two area health services.

University ethics approval was also required 'to ensure that people carrying out research under the auspices of the University are committed to high standards of conduct and practice and to the maintenance of their own reputation and that of the University' (para. 1).[17]

Our experience of the process

The research was planned to take place in two area health services, located within hospitals, so we first applied for the Australian HREC approval via the NEAF process. Of the three HRECs we worked with (one main NEAF HREC, one site-specific hospital and our university), the main NEAF HREC was the one with whom we encountered the most challenges.

Each submission of the NEAF presented us with issues. The first impression we received was that our study was not deemed scientific. We used the strategy of resubmitting with rephrased 'quantitative' language in order to address these concerns. During the second phase of clarification, however, it became clear to us that these scientific concerns may have stemmed from poor understanding of ethnographic methods. We addressed this by describing in more detail the proposed benefits and standards of ethnographic research, as well as emphasising the grants and peer reviewed publications received for the study (see Table 1). During the third clarification phase, the underlying currents of paternalism and litigation rose to the surface in, what can be argued was, an overprotective stance for both the participants and the institutions, as based on the written and verbal communications from the HREC.

After the second of three rounds of written and verbal questions from the HREC, we sought a face-to-face meeting with them. This meeting heightened numerous concerns, which revolved around how we would attend to filming potentially litigious acts, such as staff error and whether it was appropriate to film if women were unclothed. Additionally, concerns were expressed about how we would: ensure privacy, create anonymity, gain informed consent, ensure participants could communicate their desire to withdraw from the study, address potential data insufficiency and ensure a researcher would be present to film. We saw these as reasonable questions in support of ethical qualitative research, however, many of these issues had previously been provided in our application; the questions seemed to us to correspond to a lack of contextual understanding.

After three resubmissions, we finally received approval; we were then required to repeat the process of applying for approval via the Site Specific Application process with the second area health service. Finally, we applied for host University HREC approval, which was quickly granted. In accordance with the university ethics protocol, the study finally received full approval from all three HREC bodies in March 2011 (HREC/10/HAWKE/135 and SSA/10/SG/190); this was 8 months after the ethics application process had begun.

Table 1. Peer review process details for Birth Unit Design study.

Review process	Funding body/peer review journals	Objectives/criteria	Timeframe
First grant review	The University of Technology Sydney (UTS) panel, for an internal Challenge Grant.	• Provide seed funding to encourage innovative research in a multidisciplinary, collaborative manner between researchers from traditional disciplines. • Excellence and degree of innovation of the project, especially in terms of collaboration across disciplines and potential for the project to garner outside funding, as well as the potential for the research to contribute to issues of national significance (Kostulski, personal communication, 23 May, 2013)	6 months: Applied – Sept 2009 Awarded grant – March 2010
Second grant review	Australian Research Council (ARC) (Australia's highest-status research organisation) Discovery Project grant. The 'College of Experts' is drawn from a multitude of disciplines in the Australian research community – from higher education, industry and public sector research organisations. They are drawn together flexibly to form groupings of expertise to meet particular needs at different times. Members of the ARC College are appointed for periods of between 1 and 3 years.[18]	• Support excellent fundamental research by individuals and teams • Enhance the scale and focus of research in the National Research Priorities • Assist researchers to undertake their research in conditions most conducive to achieving best results • Expand Australia's knowledge base and research capability • Foster the international competitiveness of Australian research • Encourage research training in high-quality research environments • Enhance international collaboration in research[19]	7 months: Applied – March 2010 Review by the College of Experts – August 2010 Awarded grant – October 2010
Publications	Foureur et al.[6,12], Sheehy et al.[13]		

Composition of the principal HREC

The principal HREC (hereafter referred to as 'the HREC') who reviewed our application was composed of 19 individuals. The majority were from a quantitative, clinical or medical-specialist background, which is common in hospital-based committees. This 'preponderance of institutional and scientist members' (p. 294)[20] on ethics review boards is not unique. The Australian HREC must also have members who are either lay-people or religious ministers. There is no specific requirement for experience or expertise with qualitative research or with the particular issues associated with research with labouring women or birth settings.

Understanding and addressing the HREC issues

To analyse the HREC submission process, we shall discuss our perspectives on the HREC's issues with our submission drawing on literature describing similar experiences of researchers in other contexts. We shall then explain how we addressed each concern.

The HREC litigation-related concerns

The HREC was concerned about what we would do if, during filming, 'serious unexpected event(s)' were to occur. Our initial response that 'we would stop filming' did not satisfy the HREC. We elaborated,

> In the case of a serious event, filming will cease, however, any footage accidentally made will not be erased. The aim of this research is not to capture obstetric interventions or emergency situations. In our practice, emergency situations are precipitated by maternal and fetal indicators that the normal process of labour and birth [has gone] awry. That said, practitioners generally have warning prior to emergency situations of birth. (p. 17)[21]

The HREC expressed concern that the woman or families might want us to keep filming if an emergency arose during labour and appeared to find it hard to accept that, as researchers and midwives used to working in this environment, we would respect the interactions between the caregivers and the families and cease filming if such an event were to occur. Other researchers who have conducted video-research in birth settings have also had to deal with HRECs' litigation-related concerns during initial research stages.[22]

Multiple site approval

This study was being undertaken at two sites; therefore, we had to receive ethical clearance from two site-specific HRECs. The primary reason for selecting these sites was because they had been part of a prior audit, which contributed to the Birth Unit Design Spatial Evaluation Tool (BUDSET): a tool developed and tested to 'assess the optimality of birth units and determine which domain areas may need to be improved' (p. 43).[6]

The HREC advised that we should have a random sample of sites. This suggested to us that the committee might not fully understand common ethnographic research methods. Purposive sampling is an important method for qualitative research to ensure a specific range of data, rather than using a random sample, such as is used with cause and effect quantitative-type experiments.[23]

Many have suggested streamlining the multiple site ethical process[24,25] to allow an approved application to gain approval at subsequent sites without having to repeat the entire process; this had yet to occur in our local ethics-review area. Although we did not encounter additional problems at the second site, the application and approval process to gain ethical clearance remained cumbersome, daunting and inefficient, as reported by other Australian researchers.[24,25]

Addressing the HREC's concerns

In order to address the HREC's concerns, we resubmitted the project three times, with changes in terminology and amendments to inform and reassure the HREC as to our intentions. This process required extended time and resources that had been planned for commencement of the research and had financial implications for the research project. It involved salaried research assistant time for several months in order to attend to the rewriting and resubmissions, as well as material resources (e.g. multiple copies of documents), which can, in some cases, total tens of thousands of printed pages, such as in large multi-site studies.[26]

In our assessment, the HREC's concerns were often directly related to their poor understanding of video-ethnography. Furthermore, committee members appeared not to understand the basic woman-centred interactions that occur between a midwife and a birthing woman, or indeed that the birthing woman is an autonomous, self-determining individual, capable of making her own decisions.

Additionally, it is important that research investigating complex healthcare problems, such as those in childbirth settings, utilise the wide range of research methods available beyond that of reductionist randomised controlled trials. As Kessler and Glasgow state, 'such trials are limited in their ability to address the complex populations and problems we face' (p. 637).[27] Indeed, there is a growing realisation of the

importance of supporting, as Klassen et al. describe, 'behavioral and social science perspectives in clinical research, the formation of interdisciplinary research teams, and use of multi-faceted approaches' (p. 377).[28]

De-identification as a compromise

Offering a de-identification process and coding or changing of participants' names to maintain their privacy and anonymity addressed some HREC concerns. All participants were offered the option to have video footage edited to blur their faces (or body parts); three of the six women and 1 supporter of 28 total participants selected this option, given that it was offered. No participants initiated this pixilation process.

De-identification in visual research is an area of further challenge within the ethics process. As Jordan states, 'anonymization of research photographs of identifiable individuals is technically and ethically problematic for researchers' (p. 446).[29] Wiles et al. concur stating, 'ongoing tensions [exist] between, on the one hand, research participants' rights and researchers' desire for participants to be seen as well as heard and, on the other hand, researchers' real and perceived ethical responsibility to safeguard participants' (p. 41).[30]

This modification to the footage could be viewed as a reasonable requirement to help build trust with the participants and ensure ethical behaviour (e.g. allowing individuals to express their autonomy). It may, however, have resulted in considerable consequences for our research. A blurred face in the video footage inhibits accurate analysis of facial expressions. Pixilating participants' faces altered our ability to assess some non-verbal communication, such as eye contact, facial expressions and glances. As Mehrabian[31] formulated, 55% of meaning derived from interactions is in facial expressions. These tensions were juggled by taking detailed field notes while honouring our offer to pixilate faces or body parts as requested. We join others, such as Lowrance,[32] who claim 'serious privacy and confidentiality impediments continue to hamper research' (p. 5), such as amending research to 'protect' participants as the risk is deemed greater than is actual.

Some visual researchers object to anonymising images, such as pixilating faces, as they perceive the participants' voice and rights to be diminished in such cases. Some even perceive anonymised images as appearing 'criminalised' and disturbing to look at.[30] There is a recent account of an Australian HREC believing the use of facial pixilation might 'change the visual narrative and as a result decrease the validity of the research' (p. 320).[33] De-identification as a compromise may not be such a straightforward solution. The idea that blurring faces will solve ethical challenges may not be sufficient. Perhaps attentive use of images during dissemination may be more appropriate. Nutbrown, in her research with young children, states that 'through continued questioning of the pictures we use, and vigilance over how we use such photographs in dissemination, we can still avoid the need to blur children out by masking their faces thus limiting our interpretation of their meanings' (p. 11).[34]

Modifications to 'thank you' gift for participants

The main provisos we agreed to in order to satisfy the HREC were that, in addition to offering pixilation, the baby's birth could not be filmed for research purposes, nor could the baby's birth be filmed to give as a gift to the woman and her supporters. (Our previous intention was to offer this as a 'thank you' gift.) These stipulations appeared to originate from the HREC's concerns about video footage usage in potentially litigious circumstances. Our view is that the modifications may have played a role in deterring participants who might have desired to have a filmed version of their baby's birth. This hallmark occasion recorded for posterity could be considered an appropriate thank you for participation.[35] The researchers saw the 'risk of coercion' from providing parents this video footage as negligible. From our experience in practice, it was thought participants would have enjoyed receiving a film of their baby's birth; personal birth films having

become commonplace in contemporary birth culture. Our compromise, allowed by the HREC as appropriate, was a 'welcome to the baby' film instead, which was to be taken shortly after the baby's birth, showing the parents greeting their new baby and offered to them as a gift.

Informed consent in the context of video-ethnographic research

The HREC asked for clarification regarding our proposed informed consent process. Again, we saw this as a suggestion that the HREC had a poor understanding of video-ethnographic methods. We offer here our explanation of the ongoing consent process, with the hope that this may prevent delays for others facing the same difficulties in obtaining ethical clearance for the use of video in ethnographic studies.

Unlike quantitative studies with set procedures, where a one-time upfront consent process is sufficient, with video-ethnographic studies, the consent is best acquired in an ongoing process.[36,37] In our case, it began with intentions of the study; how we would be in the room with the camera (including showing pictures of ourselves with the camera, so that the potential participants would be familiar with what the research would 'look' like); and what would occur during the filming and interviews. We explained that if any of the participants at any time wished to stop their participation, it would be an option to do so without any repercussion or hesitation on our part. This was reiterated after the birth and again during the interviews. The interviews were conducted at the participants' choice for location (for instance, their own home), where they were invited to reflect on their experiences, using stimulus video clips from the labour. This ongoing consent process, respect for participants' preferences and reciprocal relationship-building are considered essential elements to reflexive ethnographic research, especially in private settings such as birth units.[38]

Assessing the research merit as part of ethical considerations

It would be unethical for HRECs to approve any study that was not well designed and that would therefore be unable to produce meaningful results. For this reason, HRECs must be able to judge the study design's merits, as well as consider whether ethical principles have been addressed. It seems, however, that hospital-based HRECs in Australia may not always fully understand the nature of qualitative video-ethnographic research.

The potential challenge of getting ethical clearance for qualitative research has previously been recognised. For example, Richards and Schwartz reported that, 'A major reason for advocating guidelines for qualitative health services research is the growing evidence that medical research ethics committees have difficulty assessing ethical issues arising in relation to qualitative studies' (p. 136).[39] In Australia, the NHMRC provides advice and a protocol in an attempt to alleviate some of this burden for HRECs: 'Section 1.2: Where prior peer review has judged that a project has research merit, the question of its research merit is no longer subject to the judgement of those ethically reviewing the research' (p. 10).[15]

We had been awarded two competitive peer reviewed grants from peer review committees. It is possible that, if the HREC had accepted our study's research merit based on these previous peer review processes, as the NHMRC recommends,[15] our approval might have been granted more expediently and many restrictions that were placed on the methods we used may have been avoided.

Who was the HREC protecting?

While it may have appeared that the HREC's decision-making process focussed on the women's needs, in reality their decisions often prioritised the needs of the healthcare providers and the health services. At times it seemed that they were focussed on the litigious possibilities of filming birth. A persistent apprehension about litigation appeared to be prioritised over the potential needs of birthing women undergoing

straightforward, uncomplicated labour and birth, that is: a sensory rich environment in which women can find privacy and safety, without undue distractions that take her away from her undisturbed birthing zone.[10] The HREC's considerations for 'minimising risk' had a different translation into practice from our own, as midwives and designers. We join others in asserting that birth environments should not automatically favour the caregivers' perceived surveillance needs, but balance clinical needs with women's needs for privacy and safety – for both the physical and the intangible inner self.[10,40,41]

The extended time period for ethics approval and the required modifications to the study design are a concern because, arguably, they were due to the methodological preferences and prior experiences held by some HREC members who reviewed our application.

In addition, we suggest that the HREC adopted what can be perceived as a paternalistic approach towards protecting childbearing women, who they perceived as a vulnerable population, unable to make decisions for themselves about how and whether they wanted to participate in our research. In our estimation, the HREC's protective efforts towards the participants became overprotective, which may have inhibited the research quality and the childbearing women's rights to make autonomous choices around participation in this particular study. In our opinion, in studies such as ours, women, their supporters and the midwives who attend them will quite readily state 'that's enough' if they wish to retract their consent. We agree with Raudonis, that 'Health care providers must tread a fine line between appropriately protecting vulnerable populations and paternalistic decision-making supposedly made in the patient's best interest' (p. 242).[42]

This issue of paternalism from ethics committees is an area of ongoing tension, especially in visual research, as Wiles et al. suggest,

> It is important that researchers using visual data engage in debates about ethical research practice and issues of paternalism and agency in order that visual research is used in ethically appropriate ways that help to further our understanding of the social world. (p. 51)[30]

Researchers working with hospital-based ethics committees also commonly perceive paternalistic tendencies, creating unnecessary challenges for conducting ethical research. As Parnis[36] states, 'Cutcliffe's (2002) argument that an element of paternalism that exists across the attitudes and actions of ethics committees can have a "direct impact on the empowerment of certain groups of people" (p. 204) fits with our experience' (p. 694). The perception of paternalism also resonates with our experience.

Discussion

We faced particular issues in obtaining HREC approval for the Birth Unit Design study. In particular, we were undertaking a video-ethnographic study, which is not well understood by hospital-based researchers who usually come from a positivist paradigm.

Ethnography and ethical approval

Ethnographic studies are challenging to describe before they are conducted as they are undertaken while immersed within a specific social context, with many factors yet to be discovered during data collection.[14] HRECs often desire accurate predictions for research; however, ethnographic researchers cannot provide these due to the flexible nature of human experiences.[43] It can, therefore, be challenging to discern 'which rules and ethical guidelines apply to the social study of medicine' (p. 1745).[43] In this light, the issues to be considered for gaining ethical approval for clinical trials versus those for ethnographic research need to be differentiated.[39]

In a 2011 study, ethnographers were surveyed on issues experienced in the ethical approval process in the United States, Canada, Australia, New Zealand and the United Kingdom.[44] A salient finding was the

ethnographers' perceptions regarding requests by ethics committee for research protocol modifications; these were commonly deemed detrimental or neutral to the research outcome and/or protection for the participants. Ethnographic ethical challenges may be compounded when the population invited to participate in the research – in our case birthing women – seems to be considered by the HREC as vulnerable, thereby unintentionally excluding them from research and, in doing so, possibly even causing harm from exclusion.[45,46]

Moving forward in a constructive way

We support others' proposals for the improvement and streamlining of HREC processes in Australia, which might include: creating an ethnographic-specific HREC;[47] ensuring HREC's members' expertise diversity; or providing a wider range of training, to include assessment for ethnographic and exploratory studies.[18,48] Moreover, reflecting on and analysing the ethical review process can be useful for social science research. The HREC may have more easily understood our research if there had been more members on the committee who were familiar with ethnography, descriptive, exploratory studies or, especially, studies involving video-ethnography.

There are many forms of HRECs composed of members with a wide expertise range. Yet, the challenges repeatedly faced by video-ethnographers,[49] indicates a need for systemic change in HRECs ability to understand a variety of research methods.[50] We suggest it is a shared responsibility to improve ethics and research outcomes. Researchers can work to draft more HREC friendly procedural applications, while HRECs can broaden understanding for video-ethnographic research methods.

We suggest that there should be timely discussions between HREC members and researchers about what constitutes both the 'vulnerability' and agency of participants, and how this should be addressed – particularly within the context of childbirth research. The aim would be to ensure that the ethical approval processes are rigorous and yet not held up unnecessarily.

Conclusion

Due to an array of reasons, human ethics committees often have a poor understanding and appreciation for video-ethnographic studies. We argue this misunderstanding results in institutional overprotection: one which views birthing women incapable of making flexible, autonomous decisions and results in significant delays and, likely unnecessary, compromises by the researchers. Impeded ethical clearance is a problem that can be addressed with various straightforward solutions. Hospital-based ethics committees need to get more skills and knowledge in qualitative, exploratory and ethnographic studies.

Research conducted in hospitals and healthcare settings must accommodate such places' complexities. Non-linear and complex aspects, actors and factors within these settings require a methodological range to study how to improve outcomes. Single quantitative studies that are neat and tidy will not always work. Therefore, qualitative studies are needed, especially video-ethnographic methods trying to explore underlying aspects and influences. Our Birth Unit Design study is one example of this.

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Conflict of interest

The authors declare that there is no conflict of interest.

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Appendix D: Posters and Presentations

Harte, J. D., Foureur, M., Sheehan, A. & Stewart, S. (2015). The influence of Australian hospital birth unit design on women's birth supporters. In N. Fernando & G. Allen Barker (Eds.), *Proceedings of the 46th Annual Conference of the Environmental Design Research Association*. Paper presented at the 46th Annual Conference of the Environmental Design Research Association: BrainSTORM: Dynamic Interactions of Environment-Behavior and Neuroscience, Los Angeles, CA, (p. 249). Madison, WI: The Environmental Design Research Association (EDRA).

Harte, J. D., Foureur, M., Sheehan, A. and Stewart, S. (2014, June). The influence of hospital birth unit design on women's birth supporters. Paper presented at the 30th Triennial Congress of the Confederation of Midwives, Improving Women's Health Globally The International, Prague, Czech Republic.

Harte, J. D., Foureur, M., Sheehan, A. and Stewart, S. (2013, Oct). The birth unit design's influence on women's birth supporters. Poster presented at the 18th Biennial Conference The Australian College of Midwives, *Life, Art and Science in Midwifery*, Hobart, Australia.

Harte, J. D. and Foureur, M. (2013, May). 'Exploring the influence of Birth Unit Design on communication in maternity care', Guest presentation for UTS: Midwifery as Primary Healthcare, Graduate Diploma class, Course Number 92631, Sydney, Australia.

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