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Examining the content validity of the Birthing Unit Design Spatial Evaluation Tool (BUDSET) within a woman-centred framework

PRÉCIS

This study examined the content validity of a new tool designed to measure the features of the hospital birth space.

ABSTRACT

Background: The environment for birth influences women in labour. Optimal birthing environments have the potential to facilitate normal labour and birth. The measurement of optimal birth units is currently not possible as there are no tools. An audit tool, the Birth Unit Design Spatial Evaluation Tool (BUDSET), was developed to assess the optimality of birthing environments. The BUDSET is based upon four domains (Fear Cascade; Facility; Aesthetics; Support), each comprising design principles which are further differentiated into specific assessable design items. In the process of developing measurement tools, content validity must be established.

Aim: To establish the content validity of the BUDSET from the perspective of women and midwives.

Design: Mixed-methods study with a survey assessing agreement with BUDSET items and in-depth interviews. Survey results were analysed using an Item-level content validity index (I-CVI) and a Survey-level validity index (S-CVI). Interview data were analysed using a directed content analysis approach.

Settings: The study was conducted in two locations; a major maternity hospital and a midwifery research centre, in Australia.

Participants: 10 women and 2 midwifery academics

Findings: The survey revealed content-related validity varied according to the BUDSET domain with the domains of Facility and Support established as content valid by most participants. The domains of the Fear Cascade and Aesthetic were less strong particularly among pregnant women. Interview data analysis provided content valid evidence of both the Fear Cascade and Aesthetic domains. A further four subthemes of Fear Cascade were also identified. These were, foreign space, medical-hospital-emergency, being sterile/clinical, and protecting the woman from the environment. Content validity evidence for facility and support domains was also established.

Conclusion: This study has established the BUDSET is content-valid for assessing the optimality of birthing environments. Some further refinement of the tool is now possible.

KEYWORDS:

Midwifery; Natural Childbirth; Labor, Obstetric; Facility Design and Construction;
Environment Design

INTRODUCTION

The environment in which health care occurs has substantial effects on patient health and safety, care effectiveness and morale.^{1,2} The environment for birth is no exception. Recent studies have highlighted the links between environment and a positive experience in labour and birth^{3,4} and the importance of the space for staff wellbeing.⁵ Consideration of the birthing environment may be a strategy to help reverse climbing obstetric intervention rates and promote normal birth.

We developed an audit tool, the Birth Unit Design Spatial Evaluation Tool (BUDSET), to assess birthing unit environments, aid in the design of new facilities, and as part of a wider study to explore whether optimal birth unit design influences outcomes for mothers and babies.^{6,7} This part of the study aimed to explore the content validity of the BUDSET.

CONTENT VALIDITY

When an instrument measures what it intends, the instrument demonstrates content validity.⁸ This can be examined through the accumulation of evidence and theory, which then substantiates the validity of the proposed purposes of the measurement tool.⁹ In the process of obtaining evidence of content validity, the researcher is attempting to satisfy the extent to which the content of the tool represents the conceptual domain.⁹ The chief method of examining content validity is through expert analysis of the tool. The selection of participants to critique the tool is determined by the participants' knowledge of the subject matter. Participants who have knowledge of the structural development of instrument measurement techniques are recommended to be included as 'expert' reviewers.¹⁰ The construct of 'expert' is crucial to the underpinning of this research as it follows the recommendation that 'members of the target population' be involved.¹¹ An 'expert' is an individual who has specialist knowledge with the construct of interest, theory or problem which underpins the instrument content.¹⁰ Having a range of differently defined experts of the field of enquiry increases the likelihood of developing an instrument that is well-constructed and content-valid.¹⁰ Therefore, the study recruited a heterogeneous sample from three participant groups (Table 1). The sample selection was determined by the participants' occupational knowledge of the subject matter (midwives from a hospital) and the requisite for individuals with instrument construction knowledge (midwifery academics

with knowledge of midwifery practice, research and instrument development). The construct of 'expert' is crucial to the underpinning of this research as it follows the recommendations that 'members of the target population' be involved.¹¹ As such, pregnant and postnatal women were included as experiential experts.¹¹ All three participant groups were positioned equally in terms of their contribution to the content validity.

<Insert Table 1>

THE BIRTH UNIT DESIGN SPATIAL EVALUATION TOOL

The BUDSET was developed through a qualitative process that is described elsewhere.^{6,7} A comprehensive literature review was undertaken including a review of the results collected from the UK's National Childbirth Trust survey¹² and the amalgamation of Fahy, Foureur and Hastie's concepts of theory and practice known as *Birth territory and midwifery guardianship*.¹³ Reviews were undertaken of various national and international maternity units and targeted informant discussions with architects, midwife clinicians and researchers provided expert information to the developers of the tool.

The BUDSET consists of a set of domains that are theorised to generate optimal birthing environments to augment childbearing women's experiences and satisfaction, decrease fear and anxiety, and be more conducive to normal labour and birth. These domains are the 'fear cascade', 'facility', 'aesthetic' and 'support'. Each domain has a series of characteristics (Table 2). These characteristics are further divided into the items which assess the design features of a birthing room. For example, in the domain of the fear cascade, within the characteristic of privacy, there is an item 'entry door screened so women cannot be observed from the doorway'. These specific items take the abstract domain into the bricks-and-mortar of a measurable environment. The BUDSET measures whether these items are present with a total score calculated for each domain and an overall score for the facility.

<Insert Table 2>

The *fear cascade* domain is based on the premise that if women feel less fear, the labour process will be enhanced and less medical intervention will be required, thus potentially

improving women's experiences and outcomes.¹⁴⁻¹⁶ The fear cascade theory was developed in an attempt to understand the mechanisms which disrupt normal birth, where maternal anxiety and fear increase adrenaline levels arising from an unfamiliar and overtly technical birthing environment.¹⁷ The fear cascade theory positions high maternal adrenaline levels as instrumental to disturbing physiological processes through decreasing endogenous oxytocin levels and uterine blood flow, which create uterine inertia and fetal distress; the two main reasons for obstetric intervention during labour.¹⁴

The *facility* domain relates to the provision of physical facilities and space. Physical facilities that optimise women's comfort and mobilisation, and provide access to water immersion, are helpful in decreasing pain and facilitating normal mechanisms of labour and birth.¹⁸⁻²¹

The characteristics of the *aesthetics* domain include light, colour, texture, views of nature and femininity positing that the aesthetic environment has a bearing on women's feelings and wellbeing during labour and birth. Other studies have shown that more natural environments (as opposed to bright, noise-filled places) have positive effects on emotions²² and health,²³ and sounds and images of nature can lessen anxiety.²⁴ Hence, a more pleasing aesthetic environment may promote relaxation and facilitate normal birth.

Lastly, the *support* domain includes the availability of food and drink for women and accommodation for their support partners as important, as these may impact on outcomes for women. Support in labour is essential to women's wellbeing and birth outcomes.^{25,26} While these care characteristics may not be thought of as design, if the facilities are not included in the architectural design, then the service cannot be provided.

METHODS

Two settings were involved; a major maternity hospital and a midwifery research centre, in Sydney, Australia. To generate richness of data for content validity evidence, mixed methods for data collection and analysis were used. The study recruited a small, purposive heterogeneous group of participants within the two settings, following the research methodology of content validity studies.^{27,28} Two groups were from the hospital and the third group from the research centre. The hospital participants were clinical midwives from

a “Midwifery Group Practice” (MGP) (Table 3) and five pregnant and five postnatal women (Table 4). The midwives were purposively recruited for their experience in birthing units in hospital and for their role in recruitment of the women participants from their caseload.

<Insert Table 3>

<Insert Table 4>

The Human Research Ethics Committee of the Area Health Service granted ethical approval for the study. After provision of information sheets and an explanation of the research, both verbal and written consent were obtained.

The birthing rooms in the study site were in a typical labour ward which was built within the past five years. These rooms have non-dimmable fixed lighting, a mechanical hospital bed, neonatal resuscitation unit, medical gases and equipment and a separate bathroom annexed on to the birthing room for each room. In Australia, not all birthing rooms incorporate a bath or pool into their design. However, most of the bathrooms in the research setting had a bath, larger than a domestic bath. All rooms have a shower, sink and toilet.

The MGP provides intrapartum care in the labour ward. MGP midwives have a philosophy of supporting and promoting normal birth within a caseload model of continuity of care. The pregnant women were recruited between 26 to 31 weeks pregnant to ensure data collection could occur when pregnancy viability was potentially secure and distant enough from the birth for coordination of the interviews. The postnatal interview time frame was from 3 to 6 months post-partum. The aim of this was to assist women in presenting a balanced perception of their experience as they can reflect and avoid any falsely optimistic interpretation of the birth experience, engendered by feelings of relief and euphoric reactions, if assessment is held too close to labour and birth.²⁹ First time mothers were chosen to minimise the multiple variables which would be a consequence of having a prior birth. We included pregnant women to examine whether these women considered the location of birth and whether it held any significance. One of the underlying tenets of the BUDSET is fear and anxiety leading to altered physiological responses in the labour and birth

process. This study wanted to examine both how women anticipated the birth environment during pregnancy, as well as the actual experience of it from the postnatal perspective in order to examine whether anticipatory fear and anxiety about the birth room was a consideration. The rationale for including pregnant and postnatal women was also to explore the perspectives from women anticipating the birth environment and from women having experienced it. The two midwifery academic researchers were scholars who had worked within varying birthing environments, had initiated research about maternity care provision, had familiarity with research instrument construction techniques and were not associated with the development of the BUDSET.

All data were collected and initially analysed by one researcher. Data were collected at one point of collection, consisting of a survey, completed by the three participant groups. The survey was administered prior to the interview to ascertain the participants' perceptions prior to any bias from the interview, as well as to provoke some thoughts about the birth environment for the interview. The survey asked the participants to rate the relevance of each BUDSET item for an optimal birthing room using a Likert scale. Data were also collected from individual, face-to-face, audio taped interviews with the midwives and women. Interviews were undertaken to explore the participants' perceptions about the content, values and ideas expressed in the BUDSET. Interview data were transcribed verbatim.

The item-level content validity index (I-CVI) and the scale-level content validity index (S-CVI) were calculated. I-CVI relates to the content validity of the individual items of the BUDSET, whereas S-CVI refers to the content validity of the entire BUDSET. I-CVI is calculated as the proportion of experts assigning a rating of either *quite relevant* or *highly relevant*. I-CVI of each item was estimated by counting the number of experts who rated the item as *quite relevant* and *highly relevant* and dividing that number by the total number of experts. This gives the proportion of experts who considered the item as content valid. I-CVI should be 0.78 or higher for item acceptability when there are six or more judges.²⁷ S-CVI is computed in this research using the S-CVI/Ave (average) method, used when the number of experts exceeds two;³⁰ and was done by counting the number of items rated as a *quite relevant* and *highly relevant* by all the experts and dividing that number by the total number of items.

Data were analysed using qualitative content analysis. Due to the semi-structured nature of the interviews, each interview differed from each other in terms of wording and sequencing. However, distinct patterns common to all the interviews emerged in the analysis process. The qualitative content analysis followed Hseih and Shannon's definition that it is a "research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (p. 1278).³¹ Due to the existence of prior research and the creation of a theoretical framework that was the BUDSET, the interview text was analysed using a directed content analysis approach³¹. The BUDSET principles were used to determine an initial coding scheme to explore the participant's perceptions of the birth environment, used when the goal of the research is to validate or extend the conceptual or theoretical framework. This method has been referred to as deductive category application³² used when the goal of research is to validate or extend the conceptual or theoretical framework.³¹ This strategy involved reading the transcript and highlighting all relevant text that represents perceptions upon birthing environments. The next step involved coding all highlighted passages using the predetermined codes generated from the four BUDSET domains. Any text that could not be categorised with the initial coding scheme was given a new code, and the data from this helps to extend the prior theories or offer a contradictory perspective of the phenomenon. Data were not forced into the existing framework.³³ Data analysed as relating to the initial codes were further explored to identify subcategories to further refine the initial theory. Following the initial analysis, the themes were examined by two other members of the BUDSET research team prior to final description of data findings for clarity and validation of the analysis process.

SURVEY RESULTS

As there are 84 items in the BUDSET there is not the scope to discuss individual content validity results in this paper. The survey data established as a whole, the BUDSET is content valid. This was established through the responses from postnatal women, midwives and midwifery academics and when the data from pregnant and postnatal women were combined. However, the pregnant women, alone, did not establish content validity, since the S-CVI was 0.89, which is less than the 0.9 required for S-CVI to be reached (Table 5). The I-CVI of the survey data showed that the items of the fear cascade and aesthetic domains

were least likely to be found relevant to an optimal birthing room, mainly by the women, whilst those items in the facility and support domains were more likely to be considered relevant and to be established as content valid by all participant groups. All the items in the facility domain were found to be content valid by the postnatal women, midwives and midwifery academics whereas four of the 13 items were deemed as content invalid by the pregnant women (these were, bars on walls at various heights; a place for supporters to rest or lie down; two-sided access to the bath and adequate space within toilet and shower room). In the support domain, the postnatal women and midwifery academics considered all items valid; the midwives considered all but one (that is, presence of play room and/or provisions for siblings) were valid and the pregnant women deemed that four of the 12 items were not relevant to an optimal birthing room (these were, access to a refrigerator with ice; access to food vending machines; access to a toilet and shower outside the birth room; and, presence of play room and/or provisions for siblings).

<Insert Table 5>

The survey data found that the items of the fear cascade and aesthetic domains were least likely to reach content validity by all participant groups, though mainly by the women. The facility and support domain items were more likely to reach content validity by all participants. However, the interview data found contrasting findings to this, as described in the next section.

INTERVIEW FINDINGS

The interview data provided rich evidence of the fear cascade with the content analysis enabling further differentiation of the concept following the development of four subthemes: 'being in a foreign space', 'medical-hospital-emergency', 'being sterile/clinical', and for the midwife 'protecting the women from the environment'.

'Being in a foreign space'

Both women and midwives were acutely aware that the birthing environment was a foreign space and this impacted on a woman's experience. Foreign space is distinguished as an

element of the fear cascade domain due to the relationship between fear and the unfamiliarity of the birthing space. This is evident in these quotes:

‘I have to be prepared to be in quite an unfamiliar place and keep myself comfortable there somehow’

‘At home I felt relaxed... But when we got to the hospital I felt anxious. I felt safer at home. I still felt safe because I knew the midwives were there. I felt safe with them but not, I don’t know’.

One characteristic of the fear cascade domain was privacy. The association of the hospital birthing room to a public space and the home as a private space and the perceived adverse effect that this can endow upon labour processes was evident from both midwives and women. One pregnant woman hoped for privacy so as to concentrate in labour saying:

‘I think it important to have just complete privacy of whatever I am going to be going through. I don’t want people walking in and out. I don’t want anyone else to be able to hear me or see me. I just want to be able to focus on what I’m doing without those distractions. I think hospitals are busy places and it is not easy to get privacy.’

‘Medical-hospital-emergency’

This theme refers to the perception of the birthing environment as related to the hospital and the medical sphere so that birth becomes a quasi-emergency or emergency rather than a normal-natural event. This sense of medical emergency was deemed as mismatched to labour and birth, which was considered by most to be a natural process. The high technological design of the birthing rooms appeared to create feelings of stress and anxiety in the women, even for a few of the pregnant women who merely anticipated the birthing room environment in this way. Notions of security and safety were not always linked to physicality. The women spoke of the reassurance of knowing the resuscitaire, operating theatre and neonatal intensive care unit were provided, but they did not want them to be visible, since this suggested the potential for emergencies. One postnatal woman said:

‘I think the message of the hospital at the moment is ‘we’ll do it for you, you don’t need to do anything, just leave it with us, you haven’t got very far in the set amount of time that we have said, therefore let’s whisk this baby out’. I don’t think there is an acknowledgement that it is a really important part of the process for women to give

birth. Having all that equipment there sends a message - something could go wrong'. Therefore, I'm going to need to have that because something is going to go wrong".

Conversely, one woman actively sought a high-level tertiary hospital for personal reasons and was reassured by the medicalized nature of the birthing rooms. She said:

"The equipment just made me feel reassured that it was there. Knowing that after my friend did have her baby die during birth, just knowing they have got everything here you know, the best chance of nothing bad happening".

'Being sterile/clinical'

The words 'sterile' and 'clinical' surfaced frequently amongst all the interviews. This theme is largely aesthetic in nature, as the bright lights, white paint, white sheets, vinyl floors and metallic surfaces evoke this aesthetic. It is included within the fear cascade theme as it was not perceived as neutral by the participants who regarded it as imparting an impersonal and intimidating presence. Some women commented the room was:

"Sterile, bright, clinical... My vision was that it was white, bright, not soft and comfortable".

And another reflected: "I was leaning on the bed, but it's a stainless steel hospital bed, which I understand in an emergency but for comfort and security, it just felt very clinical".

This woman, although acknowledging that other woman may desire a different aesthetic for the birth environment, did not feel the same way about the sterile aesthetic:

"I didn't really care that it was all light and stark and looked like a hospital, but maybe some people might want it to look more homely. You sort of, you know, that money is not. So you don't expect it to look all fancy and exactly perfect. You're just happy it's clean and has the right equipment and that sort of thing".

'Protecting the woman from the environment'

The last theme emerged from the midwives' many comments about how they protect women from elements of the birthing environment. This revealed that the setting was not perceived to be in an optimal state. Midwives reported that they spent a lot of time

adjusting the rooms to protect women from the impact the medical/technological equipment could have upon their fear responses. Other examples of midwifery protectionism were revealed when they did not show women standard birthing rooms during prenatal tours but directed them to larger, more domestic rooms that were further away from the staff desk. Midwives reported that they wanted women to labour and give birth in a safe environment, devoid of unwelcome distractions and intrusions. One clear example came from the midwife who ushered labouring women through the back door of the unit so they were not exposed to the busyness of the unit.

Facility

This theme incorporates equipment which aids physical support of women. It comprises of a design shift from the bed as central, to encourage maternal ambulation. Optimal equipment included birth stools, bean bags, gym mats, exercise balls, chairs, pillows, wall bars, mantel pieces, benches, a bath/pool and an accessible bathroom. The facility domain was important to women and midwives. One pregnant woman said:

“I hope that there is flexibility for me to walk around and control that and direct any movement. It depends on what the room has to offer as well”.

One postnatal woman said:

“The en-suite was what saved me, so I would walk between the toilet and the mattress on the floor”.

The provision of facilities other than the bed are important for supportive practices which attempt to displace the prominence of the hospital bed. One midwife said:

“I never use the bed. I don’t ever put women on the bed. I just don’t think it’s a natural place for them to go”.

The birthing bath was important for most of the participants, women and midwives alike. Also, the future accessibility and choice of the facilities was meaningful to the pregnant women. This pregnant woman said:

“Bath, shower, yeah I definitely want to have that available. My midwife was taking me through the birth suite and I think that most of the rooms have a spa of some sort. I thought that’s quite important for me”.

Aesthetic

Women and midwives frequently recalled the whiteness and brightness of the environment. The bright lights, paint and metallic finishes, the medical aesthetic all seemed to coalesce into the participants' perceptions of a white birthing space which was viewed negatively, the opposite of soft, warm, secure and comfortable. It created feelings of fear and anxiety in many of the women and midwives also felt that these aesthetics contributed to fear and anxiety.

Despite these key interview results, nowhere are the findings more contradictory between the survey and interview data than in the aesthetic domain. Women said about the birthing environment:

"It was white, bright, not soft and comfortable".

However, a midwife commented:

"Dark little caves tend to be where the women feel comfortable".

One pregnant woman discussed how the aesthetic of the hospital was at variance to the ability for relaxation:

"You never expect to walk into a hospital room and have it all carpeted or flower pots everywhere, looking like a bedroom at home, but to try and get it as near to that as possible. For people to get relaxed in, so it doesn't feel clinical, like you are surrounded by four concrete walls, painted white, with no warmth about them at all, just giving you that clinical feeling".

Support

With the translocation of birth from the home to the hospital that occurred last century, birthing women have been transformed into patients and their family relegated to minor supportive roles. If companions are accommodated for and made to feel welcome, then this is an institutional recognition that they are welcomed into the birthing arena and that the woman needs to be surrounded by her chosen birth attendants in order to feel safe and nurtured. One pregnant woman anticipated that food would not be available for her partner and commented:

"You have to remember to pack food for your other half because they don't get fed".

One midwife felt that what was provided was inadequate:

“The couches are way too small. No one could sleep on them. It’s like a doll’s couch”.

These requirements are seldom considered as part of design, however if such facilities are not included in the design then services to support women’s valued birth companions cannot exist.

DISCUSSION

The core principle of the BUDSET is that the design, structure and aesthetic layout of a birthing unit and room can impact upon the psychological and physiological processes of labouring women through the initiation of the fear cascade, thus affecting normal birth.³⁵

The findings suggest that the domains and characteristics in the BUDSET resonated with the women and midwife participants. The disparity between the survey and interview data, where the aesthetic and fear cascade domains were not found to be universally content valid in the survey data but found highly relevant in the interview data, may be due to the opportunity for situated recollection of the birthing environment that the in-depth interviews gave participants as opposed to the itemised evocation of the birthing room through the survey. Additionally, participants were not design-trained, and may not have recognised the significance of the separate design elements that when combined, form a room’s total aesthetic.

The incongruities between the interview and survey data deserve mention in considering which data source is superior for content validity. Exploration of content validity through measures of complex constructs requires thorough conceptualisation of the construct in order to assess whether the measurement tool is capturing the full content of the domain. Qualitative enquiry, such as interviews, can confer the comprehensive conceptualisation needed.³⁵ The combination of the subjective nature of various aspects of the birthing environment (fear cascade and aesthetic domains) and the complexity inherent in the topic under exploration, warranted close inspection of the interview data for verification of evidence of content validity. The interview data supported the domains of the BUDSET and the survey data offered closer examination of the 84 individual items in the tool. The survey data provided information to the BUDSET research team as to which items within the tool’s characteristics need revision or alteration.

A further reason for the incongruity between the survey and interview data is that the aesthetic and fear cascade domains can be interpreted as more subjective domains and the facility and support domains as more objective. Therefore, what design feature one participant will consider will reduce her fear and what aesthetic feature is considered pleasing may not be a shared view. This was displayed by one of the participants who felt protected by the medical equipment in the birthing unit, as to her, this signified safety. This was largely due to her previous experience which involved a friend whose baby died during childbirth in a hospital she reported was not well equipped. However, other women in the study spoke of the birthing environment as being foreign, medical and sterile and as a place designed for medical procedures, emergencies and operations. Rather than discount the woman who was comforted by the medical environment, the effective design of birthing rooms which provide these resources and yet conceal them is an option to meet the needs of all user groups in the hospital birth environment.

This foreign quality of the birthing environment has been previously described in a postnatal setting. Lock and Gibb's³⁶ phenomenological study explored five postnatal women's experiences of the power of 'place'. They found that women describe their postnatal experience in hospital as though it brought them into a foreign place, with the women experiencing alienation and disempowerment as a consequence. In our study, women discussed the lack of services available to accommodate their partners which could compound the feeling of the hospital environment as a foreign place.

Desiring a birthing room to be a private space is seen in other research into birth environment, such as that of the National Childbirth Trust in the United Kingdom. The third most important feature of the birthing environment in the UK study related to privacy and not being overlooked by or be within the sight of other people.¹² A fear of a lack of privacy in a hospital setting is a reason why women chose home as the location for birth in another UK study.³⁷ Other reasons included wanting to be surrounded by their own environment and belongings, the association with hospitals as being for sickness, death and dying, the negativity linked with the likelihood of being looked after by strangers and their wish of

avoidance of feeling anxious and intimidated.³⁷ The woman in the BUDSET research chose the hospital to give birth in, however, Edwards' themes resonate with our findings.

The provision of birthing room resources together with concealment of the clinical environment was deemed important to the participants in this study. This was also a finding in an analysis of women's experiences of using a multiple sensory stimulating birth environment called the Snoezelen room.⁴ The Snoezelen room, originally designed as a leisure activity for the mentally impaired, was extended for use in labour to enhance relaxation through a combination of design elements incorporating all the senses. Dominant themes from women using this room were distraction, relaxation, comfort, environmental control, choice of complementary therapies and safety in a home-like setting. This focus on augmenting women's states of relaxation has as one of its foundations a reduction of fear in women in labour. This supports the conceptual structure of the fear cascade domain of the BUDSET.

Women rated the physical facilities as important during labour. The provision of birthing aids was perceived as highly beneficial to help women cope physically and mentally. In particular, postnatal women focussed on how they coped through the use of birthing balls and mats. This was also found in Hauck et al's⁴ study where women's stories narrated the process of labour and how they managed it, rather than a focus on outcomes such as analgesia or type of birth. Similarly, a survey by the National Childbirth Trust in the United Kingdom¹² into the physical environment demonstrated that the second most helpful feature to facilitate birth was access to a birth pool or a large bath; seven out of ten women reported that it was highly important to have a private toilet; two-thirds of women felt it a high priority to have bean bags, pillows and mats, however, fewer than half of women said these resources were available.

This study was a content validation study and the methodology included purposive sampling, appropriate sample size and analysis of the birth environment through the conceptual framework of the BUDSET. The aim of this study was to refine the BUDSET to further its development. However, several limitations have been considered. Firstly, the recruiting method was purposive from a midwifery-led caseload model of care in a tertiary

referral hospital. Findings from the small number of participants are not generalisable to other settings. Nonetheless, these women were attending a mainstream hospital system and while they wanted a normal birth, for the most part they are similar to many women giving birth in Australia. Australian maternity units are not dissimilar to many units in other developed countries. It is likely that the BUDSET domains and principles inherent in birth unit design will have resonance in other countries.

Secondly, including different groups of participants could be a limitation. Pregnant women were recruited in order to examine whether the birth environment was a consideration for them in their pregnancy, that is, contributing to anticipatory fear. The content validity evidence in relation to the fear cascade domain were supplied mainly from midwifery and postnatal participants, with less from pregnant women. However, the pregnant women did reference to the facility and support domains in comparable frequency to the postnatal women. This may reflect the incomplete experience of antenatal women with the hospital birthing environment at the time of interview or that these participants are more focused upon the pragmatic design features of the birthing environment. Future research into the birth environment must recognise the limitations of including participants who merely anticipate the construct under examination rather than have direct experienced.

Thirdly, participants were given the BUDSET survey prior to undertaking the interviews which may have influenced their ideas about the birthing environment. Responding to satisfy the interviewer is a risk with all qualitative research. The participants' language emerged freely and uninhibitedly in the interviews and they referred to the survey, making remarks about it where it resonated with their experience and where it did not relate to them.

CONCLUSION

The BUDSET assesses four domains that are theorised to generate optimal birthing environments that aim to reduce fear and facilitate normal birth. The study found variances between the survey and interview data with a finding of strong survey evidence for the 'facility' and 'support' domains whilst the 'fear cascade' and 'aesthetic' domains were less strong. However, interview data strongly supported that the women and midwife participants find that birthing room design elements that address fear cascade and aesthetic constructs, as well as facility and support elements, were highly relevant to optimal birthing rooms. Where the inconsistency or variance between the survey and interview results exists, these findings are being used to further develop the BUDSET. Further research in this area is necessary to explore the confounding factors of model of care and place of birth by examining the perceptions of women in models of care other than midwifery led caseload models and maternity care providers other than the midwifery participants, such as obstetric doctors and midwives from other models of care, in this study. The BUDSET project continues beyond this study with research about to commence into the influence of design on communication in maternity care through observation and video-filming of women in birth units with varying BUDSET scores and therefore differing levels of optimality of design.

The development of the BUDSET and its dissemination amongst healthcare architects and maternity healthcare professionals will hopefully lead to the incorporation of its design principles into the refurbishment or redevelopment of birthing units. Optimally designed birthing spaces would enable midwives to practice to the full scope of their abilities, and give women and their support people the comfort they deserve when experiencing labour and birth.

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Table 1: Definition of expertise of participants reviewing content validity of the BUDSET

Sample group	Characteristic of expertise
Women using MGP service	<ul style="list-style-type: none"> • Experiential expert.
MGP clinical midwives	<ul style="list-style-type: none"> • Achieved registration as a midwife. • Documented clinical experience with the target population.
Midwifery academics	<ul style="list-style-type: none"> • Initiated research on the topic area (maternity care provision). • Published papers on the topic area (maternity care provision). • Have expertise in research instrument construction techniques.
Source: (Davis, 1992, p.194 ¹²).	

Table 2: The domains and assessable characteristics of the BUDSET

<i>Domain</i>	<i>Characteristic</i>
Fear Cascade	Space – Arrival
	Space – Outside
	Space – Reception
	Space – Birthing Rooms
	Sense of domesticity
	Privacy
	Noise control
	Universal precautions
Facility	Physical support
	Birthing bath
	En-suite facilities
Aesthetics	Light
	Colour
	Texture
	Indoor Environment/airflow/smell
	Feminine Symbols
Support	Food and drink for woman
	Accommodation for companions and birth attendants

Table 3: Demographic profile of Midwifery Group Practice midwives

	Demographic variable	MGP Midwives (n=10)
Age	25 to 35 years	3
	>35 years	7
Educational background	Post-graduate midwifery	6
	Hospital trained	4
Duration of Practice	0-5 years	2
	5-10 years	2
	10-15 years	3
	15-20 years	1
	>20 years	2

Table 4: Demographic profile of pregnant and postnatal women in the study

	Demographic variable	Pregnant women (n=5)	Postnatal women (n=5)
Age	25 to 35 years	4	4
	>35 years	1	1
Educational background	High School Certificate	1	nil
	University Degree	4	5
Relationship	Married	3	4
	With partner, living with partner	2	1
Country of birth	Australia/New Zealand	4	2
	United Kingdom/Europe	1	3

Table 5: S-CVI of BUDSET results as a comparison across participatory groups

PRINCIPLES	DOMAIN	PREGNANT WOMEN	POSTNATAL WOMEN	COMBINED WOMEN	MIDWIVES	MIDWIFERY ACADEMICS
Fear cascade characteristic	Space arrival	Y	N	Y	Y	Y
	Space outside	N	N	N	Y	Y
	Space reception	N	N	N	Y	Y
	Space birthing rooms	N	N	N	N	N
	Sense of domesticity	N	N	N	Y	Y
	Privacy	Y	N	Y	Y	Y
	Noise control	Y	Y	Y	N	Y
	Universal precautions	N	Y	Y	Y	Y
Facility characteristic	Physical support	Y	Y	Y	Y	Y
	Birthing bath	Y	Y	Y	Y	Y
	En-suite facilities	Y	Y	Y	Y	Y
Aesthetic characteristic	Light	Y	N	N	Y	N
	Colour	N	N	N	N	Y
	Texture	N	N	N	N	N
	Indoor environment	Y	Y	Y	Y	Y
	Femininity	N	N	N	N	Y
Support characteristic	Food and drink for woman	Y	Y	Y	Y	Y
	Accommodation for companions and birth attendants	N	Y	Y	N	Y
Overall S-CVI reached		No (0.89)	Yes (0.91)	Yes (0.91)	Yes (0.93)	Yes (0.97)