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## IDENTIFICATION OF THE ARCHITECTURAL DESIGN VARIABLES TO REINFORCE INTIMACY IN BIRTH SPACES

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### ABSTRACT

Numerous studies indicate that, in the architectural spaces intended for birth, there are certain design factors that subjectively influence women at the time of childbirth, and that cause psychological and physiological changes in them. In particular, the design of the environment can help to reduce the mother's stress levels, restore the naturalness that is inherent to the moment of childbirth, and perhaps avoid unnecessary medical interventions: supply of oxytocin, performance of a cesarean section, etc.

The scientific literature during the last 10 years studies which are the design factors that most influence women at the time of childbirth and contrasts the experiences of women who have given birth in different environments: in their own homes, in conventional hospital rooms, in hospital multisensory rooms, in Labour-Delivery-Recovery rooms (LDR) in a birthing center, etc. There is evidence that stress in these women decreases when subjective aspects are achieved such as the feeling of safety, of retreat, of silence, of home, of freedom of movement, together with functional aspects like the possibility to accommodate the environment to different movements/postures, to have control and adapt the temperature and lighting levels, etc. Among all of them, the search for intimacy is a very relevant and recurring factor in the related literature. This article aims to be a

bibliographic review of the most relevant articles from the last 10 years, which deal with how the design of the birth environment can favor the subjective perception of intimacy.

### KEYWORDS

Childbirth environment; labour; privacy; intimacy; design

### 1. INTRODUCTION

If we look at nature, any female that is going to bring her offspring into the world, regardless of the animal species involved, will look for the most peaceful and secluded place, where she feels protected and safe, to settle down for this intimate moment (Lothian, 2004). In mammals, the feeling of fear causes hormonal changes that inhibit the natural birthing process. Therefore, the fact that in the first half of the 20th century women began to shift the places for birth from their homes to health centres (hospitals or birthing homes), is due to the fact that these places were safer (Lothian, 2004), but also to the belief that they could receive the best care possible there. In the case of Spain, at the beginning of the 20<sup>th</sup> Century, the mortality rate was 546.7 mother deaths per 100,000 live births, with a continuous decline due to socioeconomic

improvement in the following years, dropping to a rate of 7.15/100,000 in 2000.(Rodríguez-Ferrer et al. 2024).

The medical advances in developed countries with the aim of minimising risks for both mother and baby, have now become a double-edged sword, with the impression of turning childbirth into an excessively technical process, in which mothers have the impression of losing privacy and their capacity to make decisions.

In recent decades, together with the rise of social movements that demand the humanisation of childbirth, together with the empowerment of women over their bodies and their babies during this process, more attention is being paid to restore the naturalness inherent to childbirth, avoiding unnecessary medical intervention, and focusing mainly on the search for intimacy, freedom of movement and accompaniment of mothers giving birth, aspects that are influenced by the design of the spaces for birth

Numerous studies have shown that there are certain design factors in birth settings that subjectively influence mothers at the time of birth, leading to psychological and physiological changes in women (Stenglin, 2013). In particular, the design of the environment can help to reduce mother's stress levels, restore the naturalness of birth, and perhaps avoid unnecessary medical interventions: provision of oxytocin, caesarean section, etc. (Gould, 2000; Duncan, 2011; Wrønding et al., 2019; Mondy et al., 2016).

To improve the quality of architectural interiors for birth, it is important to attend to the point of view of the users, pregnant women, attendants and midwives, from the very early stages of the design process. Literature in the last 10 years collects and studies experiences of women who gave birth in different settings: in their own homes, in conventional hospital rooms, in multi-sensory rooms within a hospital, in rooms integrated within birthing houses, etc., and some studies analyze the design features that have the greatest influence

on women at the time of birth. Papers reviewed show that stress levels in women decrease when subjective aspects are achieved, such as the feeling of safety, seclusion, silence, homely feeling, freedom of movement, ability to adapt the environment to different movements/positions, ability to control and adapt the levels of lighting/darkness, etc. (Lothian, 2004; Lepori, 1994; Rados et al., 2015; Bellini et al., 2013). However, the search for privacy seems to be an important and recurrent factor in the related literature.

## 2. OBJECTIVES

The aim of this review is to carry out a literature review of the architectural design variables that most influence the perception of intimacy and privacy in care spaces for childbirth. To this end, we have analyzed the results obtained in studies published in the last 10 years.

## 3. METHODOLOGY

The existing literature on design factors that influence women during childbirth comes from various disciplines such as obstetrics, nursing, midwifery, architecture, anthropology, sociology, etc. From the articles reviewed, we have analysed similar conclusions drawn from various empirical studies, normative guidelines, user surveys and polls, and architectural criteria.

This literature review is limited to those publications that specifically address the issue of privacy in the design of birthing spaces. Journal articles, excerpts from books, news items, guidelines, and dissertations from any field or practice have been included. In this way it aimed to run the widest gamut of perspectives.

The Scopus and Web of Science databases were used to search for literature related to the feeling of intimacy in birth care spaces. The search was carried out using the

keywords: childbirth, labour, delivery, privacy, intimacy, design, and environment. More than 75 articles related to the design of birth spaces were found, with 4 of them being the most relevant because specifically addressed the issue of how to foster a sense of intimacy for users.

## 4. RESULTS

These 4 papers are discussed below, in chronological order of publication:

### 4.1. Paper 1. *Designing out the fear cascade to increase the likelihood of normal birth*

This is a study by Maree Stenglin and Maralyn Foureur published in 2013. It seeks to expand on what we now understand as the theory of birth territory (Fahy, 2008; Fahy et al., 2011) through the theoretical tool *Binding* (Stenglin, 2004, 2007), drawn from the field of semiotics. This article is interesting for showing how, through design, existing spaces can maximise women's sense of safety during childbirth. This paper has been taken into account because the feeling of safety is closely linked to the feeling of privacy, intimacy and protection.

The starting point of this study is the two types of spaces defined by Fahy (2008): *the surveillance room*, which evokes the fear cascade, and *the sanctum*, the safe place. According to Fahy and colleagues (2011) birth territory is subdivided into two key areas: jurisdiction (which is primarily a social concept), and the physical terrain (concerning physical space). At the same time, the physical terrain is represented as a line where the *surveillance room* and *the sanctum* would occupy opposite ends (fig. 1) (Fahy et al., 2011).

Stenglin and Foureur (2013) develop their study using the theoretical tool *Binding*, based on how women feel within the birth space. They create a new scale by defining

four types of spaces according to the sense of safety they evoke: spaces that evoke a sense of safety and comfort are positioned in the middle of the Binding scale, while spaces that evoke insecurity and fear are placed at the extremes (fig. 2):

There are two choices for spatial security: Bound and Unbound spaces. A Bound space is womb-like. It envelops around the occupant firmly, evoking feelings of comfort, privacy and protection (...) One of the important things about Bound spaces is that they not only provide a safe and secure environment, they also offer a quiet space ideally suited to inward reflection and contemplation (...) Thus the sense of protection, safety and shelter one feels in a Bound space helps dissipate anxiety and enables the woman to let go of fear and shift the focus of her attention inwards... Unbound spaces also maintain a relationship of security with users but do so by loosening the degree of enclosure around the occupant. This lack of restriction evokes feelings of openness and freedom, hence the use of the term Unbound (...) There are also choices for insecurity, which lie at the two extremes of the Binding scale. At one end are feelings of insecurity evoked by spaces that make users feel too exposed, vulnerable, at risk (Too Unbound); at the other are feelings of claustrophobia evoked by spaces that enclose users too tightly and make them feel constrained, suffocated, smothered (Too Bound). Significantly both choices for insecurity, the Too Unbound and Too Bound, evoke feelings of fear and apprehension. (Stenglin and Foureur, 2013: 820-21)

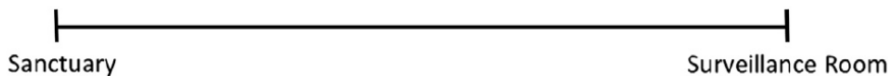


Figure 1. Birth Territory (Fahy, 2008; Fahy et al., 2011)



Figure 2. Binding scale (Stenglin and Fourier, 2013)

Bound spaces are homely designed, and emphasise the privacy, confort and control of the woman. Therefore, “the more comfortable and familiar the environment is for the woman, the safer an more confident she will feel” (Fahy et al., 2011: 221). Unbound spaces are large and uncluttered. They need a large opening to have contact with the external spaces, promoting the sense of freedom and openness.

Binding is a multi-sensory tool, as all the senses play an important role in ensuring the safety of the individual. Not only visual perception is important, but also the stimuli that reach us through the other senses. A sense of safety through smell is achieved by asking women to bring their own quilt or duvet. Acoustic privacy is also very important, which can be achieved through absorbent materials in the construction of the building, but also in the design of the surfaces, where natural materials such as wood or cork, rather than reflective materials such as plastics or metal, will prevail.

Of course, the feeling of safety offered by the same space for each woman depends on cultural and individual aspects that have not been taken into account in this study. Fahy et al. therefore recommend that midwives and mothers-to-be collaborate beforehand “to create each individual’s appropriate space” (2011).

#### 4.2. Paper 2. *Intimacy and privacy during childbirth. A pilot-study testing a new self-developed questionnaire: the childbirth intimacy and privacy scale.*

This study by Melinda Rados et al. in 2015 explores what role intimacy and privacy play in the birth process. It goes even further: they wanted to know if the stress women showed at that moment was related to intimacy and privacy. To do so, they surveyed a control group of 88 mothers 72 hours after birth in two hospitals in Budapest. The results were used to generate the Childbirth Intimacy and Privacy Scale (CIPS). The CIPS is a questionnaire that includes questions on the main aspects of privacy, both social and physical, and some aspects of intimacy at the time of birth.

In this paper, Rados et al. (2015) highlight that the place of birth should provide privacy and intimacy for women to feel safe not only during labour and delivery, but also with the newborn:

They need a place, where they feel unembarrassed to do whatever they wish, such as vocalising, moving around freely, taking a birthing position of their own choice, etc. The possibility of being able to be alone intimately with the newborn (and the father) right after delivery, in a



way that the baby is not separated from the mother to be cleaned and dressed, creates a satisfying experience(Rados et al.,2015:18).

In order to delimit the terms privacy and intimacy, so that the CIPS can contain the appropriate questions, they draw on the study by Leino-Kilpi et al. (2002), which defines four types of privacy: "informational, physical, social and psychological".

*Physical privacy* is the most obvious of all: it seems logical that women should be in individual rooms during labour and delivery, due to the intimate nature of the actions that take place during the birth process (gynaecological examination, perineal massage and, of course, the birth itself).

*Social privacy* refers to the mother's capacity to control access to the room during the birth process and to decide how many people stay with her. Midwives play a very important role here, as they are in charge of making sure that no one disturbs the mother. This type of privacy has a lot to do with intimacy, as defined by Rados et al. (2015):

The dimension of social privacy is the one mostly matching the concept of intimacy, as it is defined as closeness and belonging to another person. The same trusting relationship between mother and caregiver is inevitable for appropriate care in the birthing room(Rados et al.,2015: 18).

*Informational privacy* has to do with how the hospital manages the information given or received by patients. Finally, *psychological privacy* is a more ambiguous field, as it is closely related to the personal history of each woman.

In the present study, the results of two surveys to the control group were analysed. One of them is the Perceived Stress Scale

(PSS), which assesses the mothers' level of stress in the face of unexpected events during childbirth. Rados et al. (2015) consider that stress at the time of birth can come from two types of sources: physical and social. Changes in the birth environment, especially room changes, can negatively affect the natural birthing process. On the other hand, stress that has a social origin comes mainly from the manners provided by caregivers when they do not convey calmness and care for the privacy and comfort of the mother.

The second survey is the CIPS, which addresses issues related to intimacy and privacy. In general, the highest scores, issues that most influence mothers' intimacy and privacy, were obtained in the following situations: when the companion did not take photos or videos; when the birth attendants cared for women with patience; when the birth attendants were the same during the entire birthing process; when people in the birthing room made women feel secure; when women did not feel embarrassed in the presence of the birth attendants; and when the mother stayed in the same room for the entire birth process.

The lowest scores, aspects that do not have a strong influence on mothers' intimacy and privacy, were obtained for the following items: there was a private individual-use bathroom adjoining the birthing room; the ability to choose freely the position to deliver; people knocking on the door before entering the birthing room.

It was found that some of the values obtained in both surveys varied greatly depending on the mothers' age and marital status, with single mothers and first-time mothers under 30 reporting higher perceived stress. The CIPS questionnaire point out six components among the different dimensions of privacy and intimacy during labour and delivery.

The first component might be interpreted as 'Patience/Social

Privacy/Security', the second as 'Freedom/Letting Go', the third component covers 'Physical Privacy', the fourth 'Physical Safety', the fifth 'Hygiene' and the sixth 'Being Observed'. Rados et al. (2015)

Finally, the relationship between PSS and CIPS was studied, and it was shown that the two are inversely related: the lower the sense of intimacy and privacy, the higher the level of stress; conversely, the higher the sense of privacy and intimacy, the lower the level of stress.

#### 4.3. Paper 3. *Optimal settings for childbirth.*

The principal investigator of this study and the following, Nicoletta Setola (University of Florence), is one of the founding members of the Global Birth Environment Design Network (<https://www.gbedn.org/>), a group of researchers around the world focused on the study of birth environment design, seeking to improve birth spaces in ways that also improve the practices and experiences of women giving birth.

This article, written in 2018, studied two Italian buildings as examples of birth architecture: The 'Margherita' Birth Centre in Florence and the Maternity Home 'Il Nido' in Bologna. The spaces of these two buildings have been analysed from a 'salutogenic perspective'. In other words, the design has taken into account psychological aspects of the users, as well as physiological aspects and perception through the senses. It is particularly interesting how the design of both buildings seeks to preserve the intimacy of the users.

The 'Margherita' Birth Centre is a circular building that belongs and is placed next to the Careggi University Hospital, connected to it by a corridor. It has two floors in the form of a cloister. The more public areas, consultations and areas for birth preparation and post-natal activities, are located on the ground floor. The first floor is more private. It is configured in three concentric rings: the outer circle is a wide corridor with large windows allowing views and natural lighting; the intermediating contains five rooms for labour, delivery and post-natal activities. The central circle is occupied by the midwife's hub/desk, as the heart of the building (fig. 3. Left).

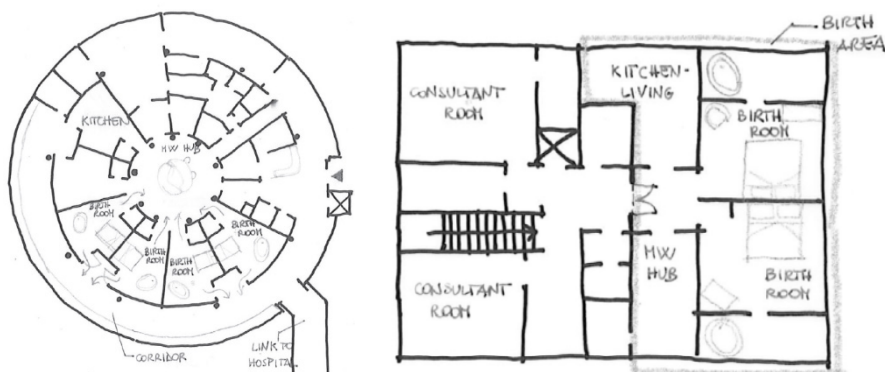


Figure 3. Left: Architectural plan of the Margherita Birth Centre (Setola et al., 2018). Right: Plan of second floor of Il Nido Maternity Home (Setola et al., 2018)

The Maternity Home “*Il Nido*” is an isolated two-storey villa, 15 minutes from the nearest hospital. As in the ‘Margherita’ Birth Centre, the ground floor is dedicated to the more public rooms, while on the first floor are the more private spaces, which are divided into two areas separated by a door: the first area is dedicated to consultations (led by midwives); the second to the birth process (fig. 3.Right).

In both buildings, the rooms for childbirth have a bed that looks like a ‘normal home-bed’. These beds are not placed in the centre of the room, but in a marginal area, in a corner. This is intended to increase the free area for women’s movement and to create a more intimate place. Finally, in both buildings, special care is taken in the design of the entrances to the birthing areas by strategically placing the doors. This creates ‘filters’ between public and private spaces that guarantee the privacy and intimacy of labouring women.

#### 4.4 Paper 4. *The impact of the physical environment on intrapartum maternity care: identification of eight crucial building spaces.*

This study, conducted by Nicoletta Setola et al. in 2019, is relevant for two reasons. Firstly, the existing literature is analysed to see what has been investigated on birth environment design. This review classifies the information extracted from the selected articles in three tables. The first table shows the main characteristics of these studies, and what type of built space, or what characteristics of the birth environment they focused on. The second table describes in more detail the features of the built spaces listed in the first table, and their influence on ‘behaviours, experiences, practices and interventions’ (Setola et al. 2019). Finally, the third table lists the built environment features relevant to set design criteria for birth environments.

On the second hand, with all the information duly classified, the study identifies eight items, referring to the built space of

birthplaces, as being the most influential aspects on women, and therefore requiring further investigation. These are: (1) unit layout configuration, (2) midwives’ hub/desk, (3) social room, (4) birth philosophy vectors, (5) configuration of the birth room, (6) dimension and shape of the birth room, (7) filter, and (8) sensory elements. Among these, the two that relate to intimacy are (5), (6) and (7).

Regarding the *configuration of the birth room*, as moving from one place to another during the labour process increases anxiety and stress levels in laboring women (Rados et al. 2015), the birth room must be able to accommodate the different activities that will take place during labour and delivery. It must also be able to accommodate and respond to the changing needs of the laboring woman, her companion and midwives. To this end, the birth room must be flexible to be able to configure different layouts of the space and different atmospheres throughout this process.

Flexibility in the birth room configuration can contribute to a feeling of privacy and safety which, together with the ability to move around are essential for women in labor (Franck & Lepori, 2007; Hammond, Homer, & Foureur, 2017; Igarashi, Wakita, Miyazaki, & Nakayama, 2014; Lawrence et al., 2013; Lepori, 1994; Stenglin & Foureur, 2013; Walsh, 2006) to support the physiological birth process. (Setola et al., 2019:24)

Regarding the *size and shape of the birth room*, the size of the room is closely linked to the configuration of the room, as it determines the possible adaptability of the space. In addition, the shape of the room should be appropriate: narrow and elongated rooms offer less flexibility, while more square rooms allow for different room configurations and are suitable for the creation of different atmospheres.

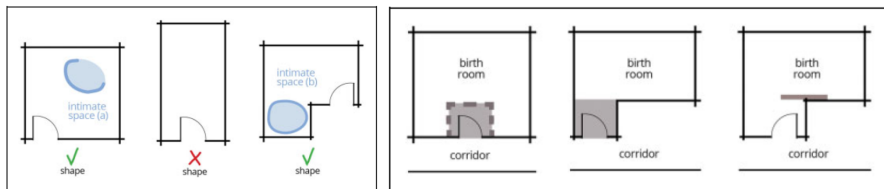


Figure 4. Left: Different shapes of the birth room and the presence of intimate spaces created by a mobile furniture (a) or identified with the corner (b) of a room with a particular shape. (Setola et al., 2019). Right: Different type of interface (filter) between the birth room and the corridor. (Setola et al., 2019)

Furthermore, the shape, favoring flexibility, also makes it possible to obtain the more intimate space many authors speak of, which is essential for childbirth (fig. 4. Left). This space should evoke the concept of a nest, a cozy, and protected space in the room where the woman feels undisturbed, safe, and focused on the changes taking place as the birth progresses, and therefore, the space allows the physiological process to proceed through "good hormone orchestration" (Foureur et al., 2011; Hammond, 2015; Jenkinson et al., 2014; Lothian, 2004; Odent, 2003; Stenglin&Foureur, 2013). (In Setola et al., 2019: 25)

Regarding the *filter*, to preserve the private and intimate character of the birth rooms, it is necessary to create a transition between them and the corridor or other public spaces. This requires a 'filter', which acts as an interface to promote a quiet and calm atmosphere inside the room (Forbes et al., 2008; Foureur & Hastie, 2008; Foureur et al., 2011; Jenkinson et al., 2014). The position of the door is equally important, as it should prevent elements such as the bed or bathtub from being seen from the corridor and preserve the privacy of the users (Forbes et al., 2008; Foureur & Hastie, 2008; Foureur et al., 2011; Sheehy, Foureur, Catling-Paull, & Homer, 2011) (fig. 4. Right).

## 5. CONCLUSIONS

The objective of this article was to make a literature review of the most relevant articles from the last 10 years, which deal with how the design of the birth environment can favor the subjective perception of intimacy. From the articles analysed, we have selected 4 of them that are more relevant to address this issue.

Results of the selected papers indicate that a sense of privacy, which often goes hand in hand with the sense of safety, is indispensable for the normal birth process. Privacy depends not only on the characteristics of the environment, but also on the practices of the health carers attending the women at the process of labour and delivery. Therefore, the design of birth environment should take into account not only the opinions/feelings of the women giving birth, but also those of the staff attending to the women and the needs of the processes to be carried out in those spaces.

Some of the characteristics of the building spaces that most influence the feeling of intimacy during the birthing process are the following:

- The spaces should be for individual use due to the intimate nature of the processes developed within them.
- The birth areas should be away from the traffic of other hospital users, including the users of the obstetric area.

- There should be spaces where the birth process is carried out completely: from beginning to end, including the first care (cleaning and examination) of the newborn; changing from one space to another generates stress and uncertainty on the giving-birth women.
- Labour-delivery-recoveryrooms should be appropriate in size and shape, and should entail an impression of cozyness, like a nest or a womb, where women feel safe and undisturbed, so that they can focus on the birth process.
- Intimacy is also achieved through the possibility of moving/adapting the furniture, light, sound, etc. to the needs of each woman at any moment.
- The spaces for birth must be protected from noise.
- Access to the birth space should have intermediate 'filters': a transitional space between the corridor or public area and the room or more private area.

Although research on the elements of the birth environment that help to foster a sense of intimacy during the birth process has made significant progress, there are still gaps where more research is needed, for example on the size and shape of rooms and on the design of filtering elements between more public and more private spaces.

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