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Ambiance as a Key for a Better Birth Experience

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Abstract. This research provides insights into childbirth as a sensitive experience, from the perspective of its user, "woman in labour," as well as from the perspective of the event itself, "the childbirth," and the birth space, with its spatial and ambiantal configurations. By adopting an in-situ approach, we conducted a spatial and ambiantal characterization of two childbirth different contexts; Tunis and Grenoble. Along this work, we used various methods such as ethnographic observation and semistructured interviews with mothers and midwives, when following visits to the birth spaces in Grenoble. Our experimental protocol was refined by introducing the capture of emotions, notably through the analysis of electrodermal activity variation, for the case of the Maternity and Neonatology Center in Tunis. In correlation with observations and interviews, the analysis of electrodermal activity reveals the mother's emotional state. Subsequently, we undertook a transposition and synthesis of significant ambiantal situations encountered in the birth space in Grenoble and Tunis, during labour phase of childbirth. Six ambiantal situations-types are identified and distributed across two dimensions: luminous and kinesthetic. The results of this research are extremely useful to guide the choices in design of birth space while at the same time considering the well-being of woman in labour. We will end with an ambiantal project that proposes interventions on spatial quality by introducing an ambiantal dimension to the birth space.

Keywords. Birth space, ambiance, woman in labour

1. Introduction

The quality of space is a highly sought-after aspect in the design, execution and practice of any architectural project. This evaluation considers various factors of diverse nature, influenced by both the structure itself and the preferences of its users. These factors include physical elements such as light, temperature, smells, sounds, colours, textures, and more, all of which impact the user's well-being. They act as sensory stimuli for the space's users, engaging their body and senses in the interaction with the environment.

Building on the importance of space quality, architecture transcends mere visual aesthetics to provide a sensory experience [1]. Its essence lies in what can be termed "lived space." The quality of space is manifested through emotional connections to space, materials, light, sounds, and even smells. Perceiving this quality involves a complex

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interplay of sensory faculties. Architecture incorporates a "sensitive" dimension as it engages the entire body in its experience. Consequently, the quality of space is a concept that is related to senses and perception. The sensitive experience refers to the notion of ambiance. Ambiance can be seen as a support from which the sensory world is shaped on a daily basis [2]. It acts as the synthesis of multiple perceptions experienced by an individual in a particular environment [3]. Ambiance embodies a transversal and interdisciplinary notion, signifying a sensitive interaction between reality and its representation [4].

In essence, ambiance embodies the interaction of physical phenomena, the built environment, and the user's sensory perception. It engages our senses and varies based on individual perception. In this context, Peter Zumthor suggests that architectural quality is closely tied to the atmosphere generated by a building [1]. Therefore, assessing space quality in architecture is fundamentally linked to its ambiance. To better comprehend this concept, we explore the diverse sensitive experiences that individuals encounter. Ambiance encompasses a range of factors, including the built environment, sensory forms, and social forms. It is only present when there is an interaction between physical signals and the user's perception, emotional state, as well as their social and cultural representations [5]. In simpler terms, this perception of the "sensitive experience" is formed through the interplay of the following elements:

- Space: as the generator of this phenomenon, possessing measurable and quantifiable features.
- The individual: as a subjective, unique, and diverse being, who experiences the world through their senses and carries a social and cultural dimension.

Therefore, to grasp ambiance, we need to consider the context in which the human experience is situated. From this perspective, ambiance involves the degree of coherence between the situation in the architectural space ("what is experienced") and users' expectations in terms of organisational and symbolic aspects ("what is expected").

Throughout this article, ambiance will be explored as a crucial factor in determining birth space quality. Evaluating it involves adhering to architectural standards regarding technical and functional requirements. While complying with standards is essential, surpassing them opens up additional, more sensitive, and perceptible avenues for the design process.

2. Birth space

In this article, we focus on the birth space, particularly on its "specific" user, the woman in labour during the childbirth experience. Childbirth has always been a significant, natural event for women and their families. Various disciplines, including sociology, psychology, medicine, anthropology, and midwifery, recognise the importance of the spatial dimension in childbirth. However, changes in childbirth practices and environments have influenced women's perceptions, expectations, and experiences.

In the medical-obstetric discourse, space is seen as a neutral and sanitised container, where birth event is treated as a medical procedure [6]. Consequently, every woman giving birth in a hospital is treated as a patient [6]. Technological and medical advancements aim to make childbirth safer, but they also make it more complex. In some instances, women in labour or their families view hospitals as places of confinement, prompting a preference for alternative birthing settings [7]. A Danish study titled "Fish

Can't See Water: The Need to Humanize Birth," published in the International Journal of Gynecology and Obstetrics, highlights how the over-medicalization of childbirth dehumanises the experience and often leads to invasive obstetric interventions [8]. Consequently, hospital delivery rooms are often sterile, medicalized environments equipped with devices emitting stressful noise, surgical-style lighting, and a characteristic hospital smell. This ambiance frequently induces stress, disrupting the sense of security and tranquility necessary for a smooth childbirth experience.

As a response to the excessive medicalization of childbirth, various associations, midwives, and many mothers or expectant mothers advocate for a return to more natural methods. This movement has prompted a reassessment of hospitals as suitable venues for childbirth. The concept of natural childbirth gained traction in several European and North American countries in the late 1970s, with the first birth centre established in 1975 in the United States (New York), followed by Germany and the United Kingdom in the 1980s. In the United States, the development of birth centres (also known as "Freestanding Birthing Centers") has been significant. Therefore, childbirth is deeply influenced by spatial and social factors, molded by the unique social and spatio-temporal conditions that define this experience [6]. These conditions, which delineate the birth space, impact the emotional state, well-being, and perception of space and surroundings for the woman. This shift in childbirth experiences underscores the significance of the spatial dimension in shaping the overall birthing experience.

Architectural space is shaped by various experiences and their interpretations, influenced by both the user and the ongoing event. As a result, childbirth practices give rise to diverse spatial contexts. Initially, the woman in labour's experience is influenced by both the event itself and her perception of the space. Childbirth involves her body interacting with spatial elements. Additionally, as a spatio-temporal event, women in labour encounter different spatial environments throughout the process. This interaction emphasises the surrounding ambiance. These experiences are unique to each woman, prompting us to identify common traits linking specific spatial parameters to sensory childbirth experiences. Thus, our goal is to identify typical ambiantal situations that contribute to the woman's well-being during childbirth (Figure 1).

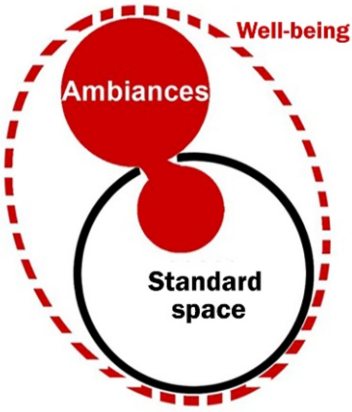

Figure 1. Injecting ambiance into standard space.

3. Method

In our study, we use both quantitative and qualitative methods. We analyse various factors, such as spatial features, perceptual activity, the behaviour of women in labour, and stress signals, to explore deeply the birth space, its ambiantal situations and its affordances [9]. We also investigate how to improve its qualities to provide a soothing ambiance during the birth event.

3.1. Study corpus

The study corpus deployed during this research consists of birth spaces that welcome the woman in the labour phase of childbirth. This research will examine two study contexts and cultures: Tunis (Tunisia) and Grenoble (France).

In Grenoble, we selected three birthing spaces representative of three medical models related to the act of birth [6] (Figure 2):

- The technocratic model is represented by the maternity of the University Hospital Centre (CHU).
- The holistic model is exemplified by the birth centre "La Maison".
- The maternity of the Mutualist Hospital Group (GHM), which represents the intermediate model between the technocratic and the holistic

Figure 2. CHU delivery room – GHM nature room – “La Maison" birth room.

Each birth space represents a distinct area of research and experimentation concerning the sensitive experience of women in labour.

In the case of Tunis, we choose the Maternity and Neonatal Centre of Tunis (Figure 3), which is the only technocratic model available in the country. It is the oldest specialised public birth space in Tunisia and the first in terms of capacity and types of care offered.

Figure 3. Delivery room at the Maternity and Neonatology Centre in Tunis.

Having four different study sites, extending between Tunis and Grenoble, will enrich this research and strengthen the results. Conducting the study in different contexts necessitated the use of different research and exploration methods.

3.2. Study time

Childbirth, as an event, is composed of three temporal phases that punctuate it: the labour phase, delivery, and postpartum. Each phase is inscribed in a spatio-temporal framework that defines it. This article aims to explore and analyse the sensitive experience of the woman in labour during the labour phase.

3.3. target population

The target user profile for this study is women in labour. Based on preset criteria, we choose women to follow during labour and interview at each study site.

In Grenoble, we interviewed mothers who had given birth ($n = 8$) in one of the birth spaces mentioned and had agreed to share their experiences with us. Those interviews were valuable and helped recreate their sensitive experiences by providing both feedback and ambiance reactivation.

In Tunis, we closely observed expectant women ($n = 22$) during childbirth events and captured their emotional states. After giving birth, we interviewed them. In addition to ambiance reactivation, we also captured real-time ambiance during this experience.

3.4. Experimental protocol

To better understand the sensitive experience of women in labour during childbirth, a multidisciplinary experimental protocol is applied. It focuses on three levels: a spatial characterization, an ambiantal characterization, and the capture of the emotional state.

Initially, we conducted spatial characterization work. The aim is to understand the architectural space through existing graphic documents and texts. However, these documents remain insufficient to properly grasp the space's complexity. In order to address this, empirical work has been conducted to supplement the lack of spatial data. This requires in-situ documentation and the use of graphic representation tools such as architectural surveys and photography.

Secondly, we conducted ambiantal characterization, focusing on capturing the sensitive experiences of women in labour. It is noted that sensitive phenomena, which characterise the event of childbirth, can be identified during an ethnographic observation. It requires some immersion in the situation in real-life conditions. The duration of ethnographic observation varies from one woman to another, depending on their childbirth experience, ranging from 6 to 18 hours. This gave us the opportunity to approach the user and better focus on their practices. Ethnographic observation alone is inadequate to fully capture the sensory experience. Therefore, semi-structured interviews were used to uncover aspects of the experience that were not observable through observation alone. Interviews with mothers after childbirth reveal their feelings, their perceptions of the ambiance space, as well as their perceptions of the birth event. The interview consisted of four categories based on: the temporal dimension, the spatial and ambiantal dimensions, the emotional dimension and the social dimension (table 1). This survey of mothers primarily focused on the various ambiance parameters (sound, smell,

light, etc.) and the spatial component (layout, ergonomics, etc.). The women surveyed helped us better understand their spatial behaviour.

Table 1. The categories of the semi-structured interview

Open question	Temporal dimension	Spatial and ambiantal dimension	Emotional dimension	Social dimension
How did your childbirth go (from the first contractions until leaving the birth space with your baby)? Describe what happened in the birth space.	Labour phase – Delivery – postpartum	Delivery room, dimensions, light, sound, temperature, colour, water, odour, air, fluidity, movement, furniture, materials, outdoor space, access, reception, maternity room	Contraction, pain, emotion, stress, joy, fear, feeling	Husband, midwife, baby, doctor, nurse, family, privacy, other mothers

We conducted all the interviews in Tunis between May and September 2018, and in Grenoble from October to December 2017. Interviews were conducted at the Maternity and Neonatology Center in Tunis, and in the homes of women in Grenoble. The duration of each interview ranged from approximately half an hour to 1 hour. All interviews were recorded and later transcribed verbatim. In addition, these two methods will be used to identify typical ambiantal situations for a better birth.

For analyzing transcribed interviews, we use the method known as "the table and scissors" [10], which is a text processing tool enabling the deconstruction and restructuring of narratives. First, we divided the women's words into coherent columns of meanings. This means gathering similar pieces of text in columns based on their content, guided by the redundancy and contradiction of the same "image". Those significant "images" that emerged represent ambiantal situations relating to the spatial experience of women in the birth space.

Thirdly, it's valuable to capture the emotions of women during labour. These measures allow us to objectively assess their emotional state and generalise the results. This involves quantifying a woman's emotional reactions to her surroundings during labour in a specific situation using electrodermal activity (EDA) measurement. To achieve this, we used an Empatica®E4 embedded biophysiological sensor (Figure 4), which is a bracelet attached to the wrist of the woman in labour during childbirth. This sensor allows us to visualise and analyse data in real-time situations. Electrodermal activity is used to measure the skin's electrical activity and then to quantify a person's emotional excitement [11]. Attempts to explain how to measure an emotion crystallized in the works of Boucsein [11]. He highlighted the interest in using EDA. The measurement methods of EDA were developed by Picard at the MIT Media Lab [12]. She correlated EDA with stress levels and developed its sensors. Over time, research in this area has shifted from simple EDA measurement methods to modeling emotional states such as joy, anger, and fear, considering the user and the situation [13]. This method represents an objective way to assess the woman in labour's emotions through her skin's conductance. Variations of the EDA are captured in this experiment. They are big during strong emotions like stress, anxiety, fear, joy, excitement, etc. They decrease once the emotional state passes [14]. However, it's important to note that pain is a part of childbirth experience and can significantly influence EDA measurements. During our observation and experimentation, we made efforts to eliminate any moments coinciding with pain, instead focusing on analyzing moments where women verbalized their interest in spatial and ambiantal parameters.

Figure 4. Empatica® E4 sensor, its data collection software "E4 manager," and its real-time visualization application (www.empatica.com).

The correlation of these three levels helps identify the different ambiantal situations that promote well-being in the birth space.

Our study shows how an ambiance (light, colour, odour, sound, materiality) can influence women in labour, and how an architect can design space taking into while considering these parameters. In this paper, we will present the results of some cases that are representative of all those studied, focusing specifically on the effects of ambiance parameters such as light and kinesthetic.

4. Results

Based on visits, observations, and semi-structured interviews with women, this study established an inventory of specific situations experienced throughout the birth event. These situations depend on several components: the spatial dimension (physical characteristics of space), the psychological dimension (the mother and her perception of the event), the social dimension (sharing), and the temporal dimension (different phases of childbirth).

The analysis of women's stories and in situ observations in the four birth spaces studied contributed to a better understanding of women' feelings during the event, as well as their preferred ambiance and those they rejected. During this experience, the woman invests in the space, using its affordances [9] and reacting to its stimuli. These stimuli vary depending on the type of birth space. The analysis of visits and interviews revealed the repetition of certain ambiantal situations and their impact on the perception of space and the event [15].

In this article, we present representative cases of ambiantal situations experienced by women during the labour phase. We will explore the luminous and kinesthetic ambiance, examining how they are designed to fulfil the physical and emotional needs of women in labour during this event.

In this study, we have identified four typical luminous ambiantal situations and two typical kinesthetic ambiantal situations (table 2).

Table 2. Ambiantal situation-types

Columns of meanings	Ambiantal situations	keywords
Luminous ambiance	Light modulation	Adjust, control, little softer, little brighter, reduce, increase, intensity of light…
	Dim light	Quite dim, a lot of privacy, subdued, turned off, little natural light, dim ambiance, sleeping, resting, relaxing, quite, dark, not too much

		enlightened, indirect lighting, little black, little dark…
	Ambiance filtering	Door open, skylight, double façade, auvant, barrier, indirect lighting, curtains, cannot see, little light, cocoon…
	Glare	Much artificial light, bothered, surgical light, hurt, illuminated light, light on…
Kinesthetic ambiance	Postures	Natural room, amenities, balls, pillows, seat, suspension, stretch, moved, walked, bathtub, stood on, wall, standing, on all fours, on knees, on the floor, mattress…
	Immobility	Monitoring, sensors, gynecological posture, lay in bed…

4.1. Lighting Ambiance

Light is undoubtedly a crucial component of architectural design in general, but its significance is heightened in hospital spaces. Far from being merely physical data, light is considered a fundamental building material, shaping the space and modulating its ambiance.

4.1.1. Ambiantal situation 1: "Light modulation"

In the three birth spaces at Grenoble, the lighting ambiance in the delivery room can be controlled and adjusted, allowing the woman in labour to decrease or increase the intensity of artificial lighting to create a comfortable ambiance. This is demonstrated in the delivery room at the Maternity of the University Hospital Centre (Figure 5). Most women are satisfied with this feature as it enables them to create their own atmosphere.

W1: *"The lighting... we can adjust it to be a little softer or a little brighter. I can control the light and decrease it".*

This control over lighting becomes crucial as the ambiance is often kept low and dim, fostering a sense of intimacy for the woman in labour. It's a soothing ambiance, also described as dark in certain situations.

4.1.2. Ambiantal situation 2: "Dim light"

Sometimes, the woman in labour prefers to turn off all lights to sleep. They highlighted the importance of this subdued lighting, emphasising its role in providing privacy.

W4:*" The light was good because it was quite dim, so it provided a lot of privacy, which is important in a place like this... And afterward, everything is very subdued."*

Often the women expressed a preference for dim lighting, noting its importance for resting and relaxation after physical exertion.

W3: *"I preferred to sleep; I asked for all the lights to be turned off. And then, there was only that little natural light coming in—a dim ambiance. The windows are about 30 to 40cm high, maximum 50 cm, along the wall facing the bed. It's an ambiance for sleeping, resting, and relaxing, and it's not bad even if it's open; we can put curtains up. Natural light is quite important for resting after physical exertion."*

4.1.3. Ambiantal situation 3: "Ambiance filtering"

Moreover, the presence of natural light contributes to the calming ambiance, providing a sense of connection to the outside world. The natural lighting can be filtered through the partially open door, allowing the woman in labour to maintain a filtered sense of

privacy by keeping the room dark and the door slightly ajar. In this way, both the light and other ambiance parameters (primarily sound) are filtered. The woman in labour seeks this light filtration to create a comforting environment.

W1*: "We can leave the door open, which actually acts as a light well. And we place a stool so that even if someone passes by, they cannot see what's happening here. So, it's a light well, and it doesn't feel like being confined. A little light like this creates a cocoon."*

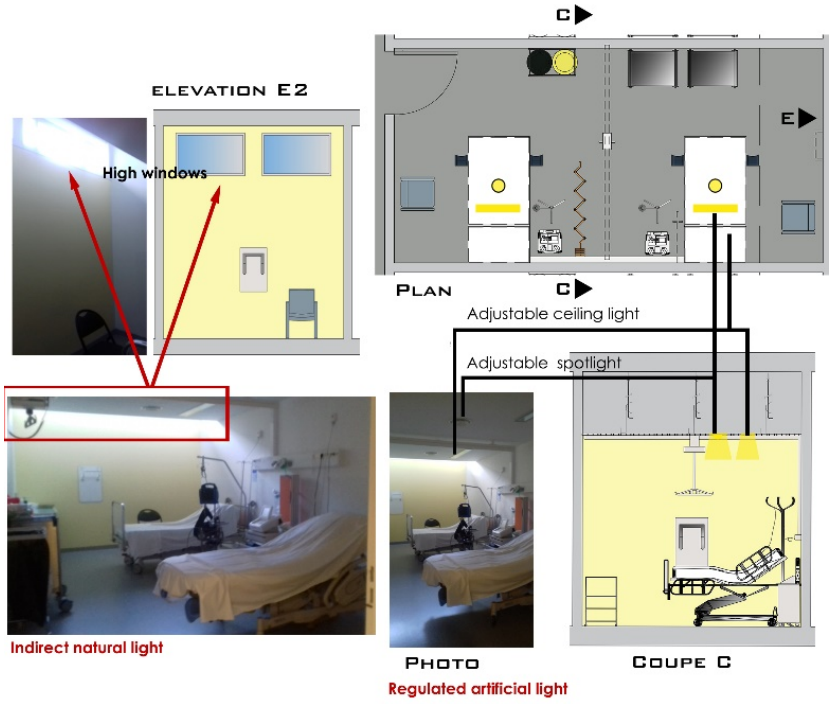

Figure 5. Ambiantal situation in CHU delivery room: light modulation devices.

In the maternity of the Mutualist Hospital Group, the lighting ambiance is also dimmed, allowing the woman in labour to focus more during the labour and delivery phases, thereby promoting calmness. The room delivery is equipped with large windows that allow natural light to enter, but this can be softened and filtered through the curtains. Consequently, the light is soft and warm, creating a soothing ambiance. All women expressed a preference for natural light over artificial hospital lighting. They stressed the importance of dimmed lights during the labour phase.

W5: *"The room is warm, with windows letting in daylight and not strong light like hospital neon lights."*

W7:*"At the onset of contractions, labour gradually begins in a dimmed ambiance... soft, gentle, warm lighting."*

4.1.4. Ambiantal situation 4: "Glare"

At the Maternity and Neonatology Centre in Tunis, when a woman arrives in the delivery room, the midwife switches on the artificial light. For the examination, she turns on the

focused surgical light but leaves it on unnecessarily afterward. The excessive light bothers many women, and some request the midwife dim it.

W15: *"So much artificial light... What bothered me in the delivery room was the surgical light. Offf. The midwife kept it on throughout my presence, even though I was alone."*

During in-situ exploration, Wided and Najet were in two different delivery rooms during their labour (Figure 6): room 19 had a skylight, while room 4 had no windows. We observed their childbirth experiences and measured their EDA. We noted the same ambiantal situation in both rooms. After one of medical procedures, the surgical light remained on. This intense light bothered the women in labour. The surgical light is powerful and focused, causing discomfort. In this situation, Wided expressed her discomfort, saying, *"I hoped she didn't turn on that light."* Similarly, Najet complained of eye discomfort: *"The light bothers me; my eyes hurt."*

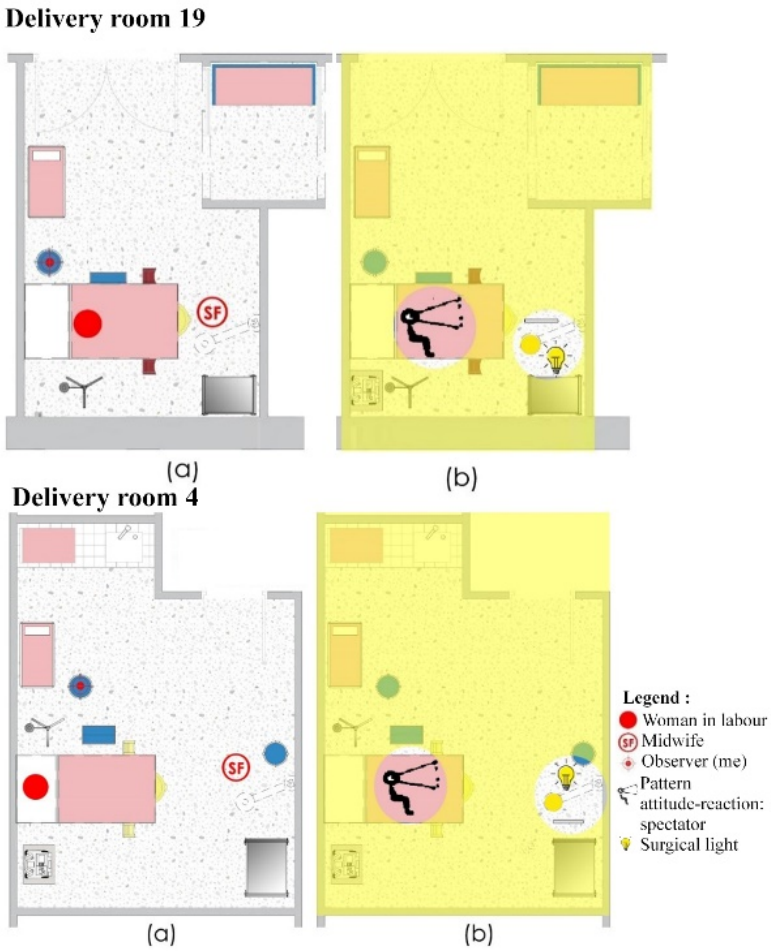

Figure 6. Ambiantal situation Diagram of Two women in labour: (a) User positions / (b) Surgical light.

This moment was stressful for them, as shown by peaks in their electrodermal activity (Figure 7), Najet (23.78 µS at 12:47) and Wided (9.80 µS at 10:29). At this

moment, the two women asked to turn off the light, which increased EDA. Several studies conducted by scientists have demonstrated that artificial light activates the cortex, leading to the production of adrenaline and inhibiting the birth physiology [16].

Figure 7. EDA Graph of two women in labour (a- Najet and b-Wided).

4.2. kinesthetic ambiance

4.2.1. Ambiantal situation 1: "Postures"

To establish a humanistic and holistic model of birth, we must first consider the kinesthetic ambiance. In this model, the woman in labour is autonomous, with greater freedom in her movement and choice of delivery position. Liberated from the confines of the medical bed and traditional gynecological positions, she can explore and subjectively experience childbirth. Reflecting on the kinesthetic ambiance involves contemplating freedom of movement and the fluidity of gestures and postures [17, 18, 19].

In the maternity of the Mutualist Hospital Group's nature room (Figure 8), this ambiance dimension is exemplified. Women's accounts and in-situ observations reveal that it's a spacious area equipped with various amenities such as pillows, cushions, a birth ball, a carpet, a birth rope, and a bathtub. These "posture devices" are designed to assist the woman during labour, allowing her to sit, walk, move, lean, relax, massage, change positions, and give birth. Throughout this process, the woman shares these movements with her husband and midwife, who provide both psychological and physical support. These various positions help reduce the woman's pain [20] and tension while also enhancing the nature room's fluid and calming ambiance.

W5: *"I dreamed of giving birth naturally... I searched and discovered the natural room at the mutualist. And honestly, based on my experience, it was fantastic—the amenities. There are balls, pillows, and a seat with a suspension that helps stretch the back. I had my husband sit behind me, moved around, walked, and did many things here; I even gave birth. It was really relieving. I have a fantasy, which is to try the bathtub."*

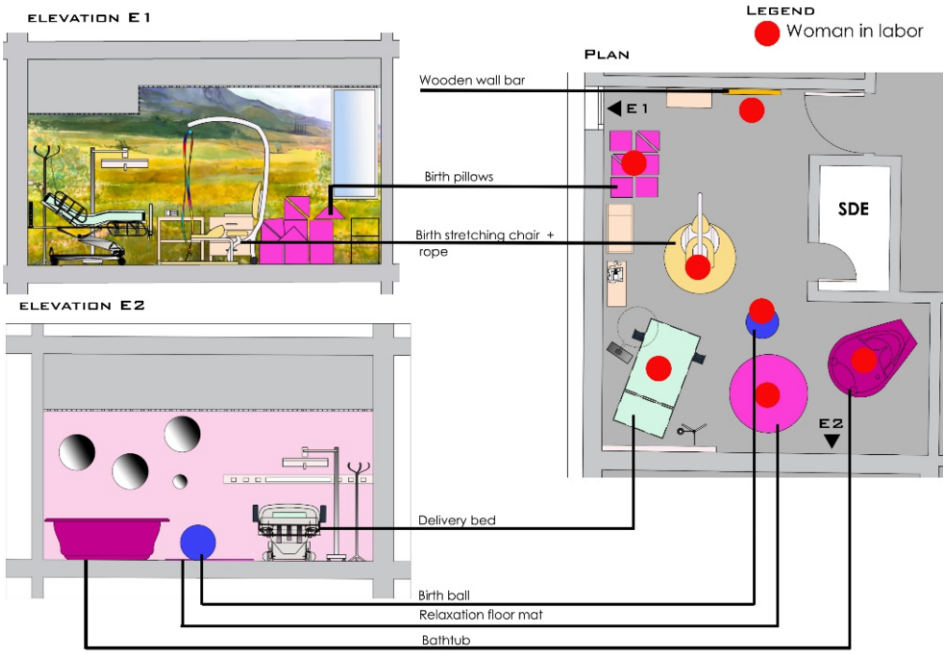

Figure 8. Spatial affordances for childbirth postures in GHM nature room.

The birth centre is designed to resemble a family home, respecting its layout and composition. It comprises two main areas: a spacious birthing room equipped with a variety of amenities such as a bed, birth balls, mats, bathtub, birth rope, soft lighting, and music; and a "living area" featuring a kitchenette and living room. The feeling of being at home, immersed in a familiar and welcoming ambiance, enables freedom of movement and action for the woman in labour. During the initial consultations, the pregnant woman can identify available “posture devices”, as she becomes familiar with the surroundings. Additionally, she has the opportunity to experience these amenities both before and during labour and delivery by participating in childbirth education classes. Thanks to the use of wireless monitoring, she can move around more freely during this birthing experience. Furthermore, she is empowered to actively participate and choose the delivery position that best suits her needs. These positions encompass reclining in bed, stretching out, hanging, squatting, kneeling, being on all fours, utilising the mat, in the spacious bathtub, and on the birth balls. The flexible environment allows the woman in labour to feel at ease and deliver in a manner that is both natural and autonomous.

W8: *"It was nice to give birth at the birth centre; there were also the balls for labour, which I didn't have at home. I came into the room; I already had strong contractions. I stood on the edge of the wall, against the window. I was standing, and then I stood on all fours, on the ball and knees on the floor mattress."*

4.2.2. Ambiantal situation 2: “Immobility”

In the Tunisian study, the interviewed women did not place significant attention on the kinesthetic ambiance, as the only childbirth model adopted in Tunisia is technocratic. This model promotes the gynecological posture for childbirth and does not encourage

alternative postures. Additionally, we encounter a static, monotonous, and limited birth space.

We inferred from both studies that women in the Grenoblois birth space were more sensitive to light and kinesthetic ambiance. The Grenoble birth space offers a variety of birth models, namely the technocrate and the holistic, to varying degrees between the hospital, the maternity clinic and the birth center, while the Tunisian adopts only the technocratic model. We must point out that the holistic model uses ambiances and emphasizes the senses in spatial design. Thus, there are sensitive dimensions not mentioned during the Tunisian experiment, given their lack of consideration in space and in no way a lack of sensitivity on the part of women, especially the kinesthetic ambiance.

5. Discussion

Based on those observations, interviews, and existing research, we suggest it's important to let women control the lights. This can be achieved by adjusting the artificial light or using architectural devices to filter natural light. Such light modulation options offer a variety of lighting ambiances, which can serve as affordances for mood and sensory engagement with the surrounding space for the woman in labour [21]. Dorreen Balabanoff, an artist and designer, underscores the significance of the trio of light, colour, and darkness in the design of birth spaces, offering mothers new ways to explore those spaces [21].

By exploring significant situations related to light, we have frequently observed that woman in labour prefer to be in dimmed ambiance. As a result, we are establishing a set of guidelines for the spatial design of birth spaces focusing on light, namely:

- Design various "light devices" to allow light to enter the birth space in different ways, producing a variety of lighting ambiances (Figure 9). We note that openings can lead directly to the outside or through buffer spaces such as patios, atriums, galleries, etc. These spaces enable the attenuation and modulation of natural lighting. Other devices can be integrated into the design to minimise light input and filter it, such as awnings, sunshades, translucent glass, blinds, and curtains for windows.

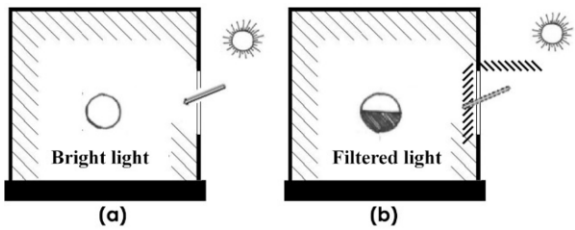

Figure 9. Proposal for light filtering device for (existing (a) and projected (b)).

- Establish systems for women to regulate artificial light intensity (Figure 10). Given her preference for subdued lighting, devise systems allowing her to adjust the brightness.

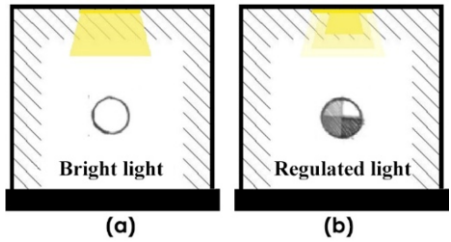

Figure 10. Proposal for light modulation device for (existing (a) and projected (b)).

During the exploratory study in Grenoble, women highlighted the importance of "posture devices." They stimulate the haptic dimension (movement and touch) for them. This brings us to the concept of spatial affordance [9], as space is not merely a passive support for actions but rather a stimulator. It suggests to the woman in labour how to use it and its practices through the various potentialities or affordances it offers.

To enhance natural births in delivery room of the Maternity and Neonatology Centre in Tunis, we require a larger space for women to move around freely (Figure 11). We'll redesign the rooms to add "posture devices" and make them better for childbirth.

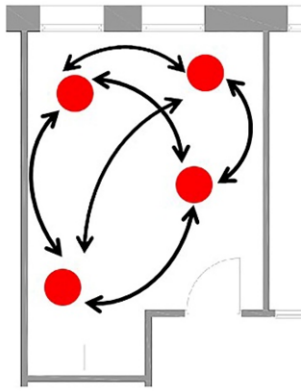

Figure 11. Posture devices.

Through the kinestisic ambiantal situations identified in the Grenoble study on physiological or natural birth rooms, we can outline the following recommendations:

- Design a spacious space for the birth room, promoting freedom of movement for the woman's body to enhance the birthing experience.
- Install "posture devices," which are essential accessories for birth, such as a large bathtub, birth balls, tables, cube and triangular cushions, a stretching chair, a birth rope, a wooden wall bar, a relaxation floor mat, mirrors, and more.
- Using wireless monitoring would offer the woman in labour increased mobility.

6. Conclusion

In conclusion, the quality of space is pivotal in architectural projects, including birth spaces. It encompasses factors influenced by both the physical structure and user

preferences, such as light, temperature, sound, and textures, all contributing to well-being. Architecture goes beyond aesthetics to a sensitive experience.

Ambiance is a crucial concept that combines physical phenomena, built environments, and sensory perception. It varies based on individual perception and is closely linked to quality of space. In the context of birth spaces, ambiance significantly impacts childbirth experiences. The shift towards natural childbirth practices emphasises the importance of ambiance in shaping these experiences. Key aspects include natural light, adjustable artificial lighting, and "posture devices" to enhance women's comfort and autonomy during labour. kinesthetic and lighting ambiances can be incorporated into the design process to allow birth spaces to be tailored to the various needs of women in labour, creating a supportive and empowering environment for childbirth.

Furthermore, it's essential to explore additional types of ambiance, such as sound, thermal, and olfactory. They can significantly affect the sensitive experience and the well-being of the woman during the birth event. By investigating these ambiances further, we can develop more comprehensive and effective design recommendations, ensuring that birth spaces truly meet the diverse needs of their users.

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