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# Towards Salutogenetic Birth Space

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## Abstract

How can we improve the birth space to protect the normal physiological birth; how do we enable, preserve and promote it? The place where childbirth takes place, including the persons in this space, affects a woman's well-being (she feels safe, connected, relaxed or scared, strained or endangered) and the way she responds as an incarnate being and also influences the course of childbirth. According to the effects of the place of giving birth, we distinguish between pathogenetic—experienced by the woman giving birth as dangerous, even hostile—and salutogenetic effects with “birthing shelter” characteristics. Modern findings of different disciplines (physiology, architecture, neuroscience, social and evolutionary anthropology and culturology) contribute to our understanding of the complexity of childbirth, the needs of the woman and her baby and lead to maternity hospitals being designed as places of support for the holistic health of both; they also present basic recommendations for transforming maternity hospitals into salutogenetic birth places. We present changes that are taking place in the design of birth spaces and research results that are encouraging, supporting birth physiology at its best.

**Keywords:** salutogenetic childbirth environment, physiological birth, needs of birthing woman and newborn, maternity hospital design

## 1. Introduction: maternity hospital between pathogenesis and salutogenesis

This text regards the “birth environment” as every space where a woman gives birth, regardless of being a dedicated space such as a maternity hospital or a birth centre or a space temporarily adapted for birth (e.g., home birth), or an environment that was not deliberately chosen for birth (if the birth process surprises a woman and has such a rapid course that she has to give birth in an environment such as in a car). A birth environment consists of a birth space and the people in it. Before the intensive institutionalisation of birth, which peaked in the second half of the twentieth century, women normally gave birth in their home towns, most frequently at home or where contractions caught them. In the (post)modern globalised world, hospitals are perceived as a “normal” birth environment. As they are a predominant and socially desirable choice, they are often also compulsorily chosen as the only possible place for childbirth.

However, several different birth environments are appearing: midwifery units in hospitals and birth centres led by midwives. Home birth has never completely disappeared. This text relates to birth environments in healthcare institutions: both maternity departments in a hospital or autonomous maternity hospitals. We are focusing on a single aspect of the birth environment, the issue of “birth space”. Another aspect is otherwise crucial for the birth process—people—the woman

giving birth, her relatives, the newborn, midwife, obstetrician and other medical experts and doulas—since we know that birth space significantly defines their well-being, actions and behaviour. Verbal and non-verbal messages are ideally mutually supporting (congruent) and relate to the messages of the birth space.

Buildings or different environments built and designed by humans—from micro- to macro-level, that is, from an individual residential space to a metropolis—influence health significantly. In the last quarter of the twentieth century, the number of studies of relations between built environments and health increased. The American architect Roslyn Lindheim is among key authors today regarded as one of the founders of interdisciplinary studies of health-related spaces and healthy places, including the hospital environment. In her article “Environments, People, and Health”, published in 1983 and co-authored with S.L. Symen in the Annual Review of Public Health, she emphasised that our health is integrally dependent on two crucial types of bonds: bonds with other people and bonds with our biological and cultural heritage; if these are broken, our health is endangered [1]. With such insights, a new approach to hospital planning began: planning of spaces where ill and injured persons are treated. Contrary to self-evidently perceiving the hospital environment as non-harmful per se, research has shown that this environment either promotes health or influences it adversely and supports treatment, healing, recovery or not. Cooperation between architects, urbanists, psychologists, sociologists, theoreticians, who look at a space in terms of philosophy and cultural studies, and various medical experts has evolved gradually to co-create hospitals that would support health and transform existing buildings from potentially or actually “pathogenic” to more neutral or ideally to “salutogenetic environments”. This transdisciplinary collaboration is essential, because it makes it possible to surpass the (overly) narrow traditional views of key phenomena, birth and space.

If we speak of a directly man-made environment and health, we think of the physical building and the environment it creates, of its psycho-social influence and of meanings of the space, man-made environment and equipment, as perceived/understood by an individual. The space enables certain activities but limits and prevents others and also (to a certain extent) defines how particular activities and a certain physical activity will be performed. The environment influences our well-being and our attitude towards a particular action. To sum up, individual messages of the space span from pathogenetic on the one hand to salutogenetic on the other, but their final effect is more than just a sum of these factors.

## **2. When a man is ill or injured, he/she needs a healing place, a “shelter”; we need a supportive environment in transformative processes: the old and the modern world**

Since the beginnings of humanity, an ill or injured man sought shelter for healing; as healing tools and effective medication were scarce, a safe and supportive environment with natural forces that supported healing and recovery processes was especially significant [2]. Every approach to treatment is related to a specific culture and understanding of health, disease, life and transitions such as birth and death. According to historical sources, healing places were planned and designed, for example, in ancient Egypt—we should not forget that the architect Imhotep was also the first known doctor in the world—some temples were renowned healing places. The Egyptologist François Daumas discovered a sanatorium [3] in a temple, dedicated to the goddess Hator in Dendera in Egypt, while the temple complex in Deir el-Bahari was a place where pilgrims sought health during the Ptolemaic era. In ancient Greece, healing temples or asclepeions were dedicated to Asclepius, the god

of medicine, for example, the temple in Epidaurus in the Peloponnese, which is one of the best-known healing places in the ancient world. Their location and architecture supported the healing of the patient.

Whatever is considered a desired property of the healing environment to maintain or restore health and heal injuries also applies to the birth process to a certain extent. The needs of a woman giving birth and the newborn for a safe shelter during birth and immediately after it conform to the needs of a person who requires a safe, calm and beneficial place to overcome a disease. As far as can be ascertained, the women of ancient Egypt, Greece and Rome mostly gave birth in the spaces where they lived their ordinary life and birth only rarely took place in a dedicated space far from home. Some assume that in ancient Egypt, women gave birth on rooftops or perhaps in garden sheds, but it is also possible that they used a special space in their local settlement, which was formed like a pavilion and made from papyrus, decorated with vine leaves [4]. Individual, usually smaller temples were located within temple complexes, dedicated to goddesses of motherhood, fertility, birth and rebirth, where births of deities were worshipped and fertility rituals were performed. The French Egyptologist and linguist Jean-François Champollion coined a name for them using the Coptic words “mammisi”, which is supposed to mean a birth place; a birth house as referred to in modern literature does not match the meaning of a modern “birth house” or birth centre. The people of ancient Rome also knew them. These are smaller chapels, free-standing or a part of a bigger temple, for example, the one in Dendera or in Edfu in Egypt, built according to Imhotep’s plans; “mammisi” is also a part of the temple in the Egyptian city of Kom Ombo. There are no authentic sources with regards to women actually giving birth there. What is more, women in the late stages of pregnancy and after birth were generally forbidden from entering temples, intended for healing. We barely know any more about the birth environments of common women than that they gave birth in a standing position with other women present, using dedicated accessories such as “birth bricks” [4].

Nowadays, we can relate the findings of studies of the healing environments of the old world, understanding their integration in the culture and spiritual tradition, with scientific insights into ways of designing, building and measuring and transforming “healing environments”. We are establishing the key elements of “healing environments” that very likely contribute to optimising physical, mental, emotional and spiritual healing according to individual patient needs—considering the patient’s different circumstances, cultures and wide spectre of beliefs and approaches to illness and health [2].

We presume that individual environmental elements can be ranged from harmful to those that are physically and mentally safe. The atmosphere of the space influences those who are using it. Environmental elements of spaces for the ill should be inherently salubrious or promote health [2]. Environments should be actively “salutogenetic” or ensure a “positive context” to actions. Due to the complexity of factors that co-create a common message of the space and due to the lack of research in this field, the preparation of common guidelines to design salutogenetic spaces remains unfinished. By reviewing modern findings, we already contribute to considering, analysing and actually (re)designing health-related spaces. Based on the increasing number of findings, we can conclude that the appearance of buildings, our experience of them and their functioning influence our well-being, for example, experiencing stress, because people respond to the environment and are sensitive to it [5]. Studies confirmed the connection between stress and our physical environment, and minimising stress is also one of the key elements that support health. Architects are increasingly including aesthetic aspects to improve hospital spaces and minimise stress and anxiety, increase patient satisfaction and promote health and treatment [2].

### **3. Birth is the culmination of a key life transition of an adult woman**

Our starting point is the fact that the birth experiences of women are always shaped and characterised by the space where they give birth. Birthing includes complex physiological processes that (only) in certain situations become pathological and require medical interventions; at the same time, birth includes biological, cultural and psychological factors that influence its course and are closely intertwined. The more we understand them and are capable of considering them in forming birth environments, the more they will meet the needs of a woman giving birth. In a transformative process, an individual requires an environment that is as supportive as possible. According to anthropological studies, birth is the culmination of a key life transition of an (usually) adult woman. Due to the liminal status in this process, they are especially sensitive and susceptible for messages from the environment; one level of the process contains information on the birth process and the second contains key messages of the dominant culture about the woman and her role (for more about authoritative knowledge, and the position of mothers and midwives, see [6]). By reviewing the messages of the particular birth space, we can clearly recognise if the woman giving birth has enough freedom and room in the birth room or is she just a passive patient who lies obediently on the bed most of the time?

In the second part of the twentieth century, births are finally moved to a hospital environment, the medicalisation of birth is in full swing and care for the woman giving birth starts to follow the “production line” idea. Examples of routine care were established for uncomplicated births, equal for all—consisting of vaginal examinations at admission and throughout labour, shaving and enema, showering, often inducing or accelerating labour using medications, lying on the delivery bed on the back in the first and second stage of labour, often or even continuous monitoring of the status of the newborn and contractions using a CTG, frequent use of episiotomy and fundal pressure, cutting the umbilical cord right after childbirth and taking care of the newborn away from the mother. Much has been written on such technocratic obstetric care already. The majority of critics of medicalised births criticised the routinely and too frequently used processes and procedures and overconfidence in technology, alerted to the underestimations of women’s labouring abilities, the inferiority of the woman giving birth and the objectivisation of the female body [7, 8]. An analysis of the spatial aspect of perinatal care in such a paradigm indicates a distribution of the birth process between various spaces in the hospital, from the admission room with a dressing room, enema room with toilets and shower, room for the first stage of labour, delivery room for the birth of the child to the post-natal department for mothers and nurseries for newborns. As a result, the woman was treated similarly to an object on a production line, which travels through functionally specialised hospital areas where she was often treated by different experts. The above has resulted in separation of the mother and the newborn immediately after birth in the delivery room and later while staying in the hospital, when the newborn spent time with the mother only at predefined time periods for breastfeeding. The newborn could not make bonds with the father until partners were allowed (sic!) to be present at birth and to make visits at the post-natal department. The described manner of obstetric maternity care and inability to choose a different birth environment from a hospital one in countries with no established birth assistance at home or in birth centres resulted in a forced temporary separation of the female from her partner, her relatives and home. This was maybe of benefit for females who had been experiencing intimate partner violence or other abusive domestic relationships. All others were deprived of the presence, assistance, support and encouragement from their relatives, which is much needed for women

giving birth and a great majority of mothers with babies. In short, according to experience, a medicalised birth space negatively affects the behaviour of the woman giving birth and the course of labour; it has iatrogenic effects on the woman giving birth and on the baby.

In the last decades of the twentieth and the beginning of the twenty-first century, this concept is slowly changing and with it birth assistance practices. By merging modern findings of medicine, midwifery, physiology, neuroscience, cultural science and other sciences, the theory and practice of birth assistance are being shaped to focus on the needs of the woman giving birth and the baby. The already established co-habitation of the mother and the newborn is among the more prominent changes in Slovenia—Slovene architect Kristl [9] already researched it in 1981 to transform post-natal hospital spaces—their separation became an anachronism; the importance of skin-to-skin contact right after birth is increasingly recognised and applied in practice together with a sensitive attitude towards the newborn. To achieve this, rooms for newborns required a different status and rooms for women after birth required enough space for a baby bed and appropriate surfaces for baby care. The possibility of the partner's presence at birth (and with it some open questions on its influence on the labour process, discussed by, e.g., M. Odent) and spatial aspects related to his (presumed) activities also had to be reconsidered. Space for the future father needed to be created literally. Every change in the birth assistance concept also changes the role of medical experts. In this way, the co-habitation of the mother and the baby has changed the activity of the nurse: She took care of the baby in front of the mother, taught her and helped her change nappies. She was also there to help mothers with lactation and breastfeeding issues and questions related to their own health and well-being and that of their baby. These activities were only possible in changed spatial circumstances. This also changed the nature of relationships between the mother and the medical experts.

Considerations on paradigmatic shifts from a technocratic paradigm to a humanistic one and then to a holistic paradigm of birth assistance, conceived by the well-established American cultural anthropologist Davis-Floyd [7], were mainly focused on otherwise important questions related to the choice of an institutional or home environment as the place of birth. Nevertheless, a theoretic approach to the issue of birth environment did not get much attention for a long time despite numerous experiences and insights. To develop a theory of birth space, a profound understanding of the birth process is required, which is summarised below.

#### **4. Physiological birth: a combination of well-functioning biological patterns and positive cultural messages**

An individual experiences the messages of a space in a subjective way; they are always “filtered” by human perception, processing of information and judgement of their meaning [10, 11]. Our subconscious responds to numerous stimuli from the environment most of the time; even if we do not observe it actively, we sense it and respond to it. Our conscious and unconscious abilities to perceive, experience and synthesise numerous messages from the environment and from our interior (ourselves) are crucial for the survival of humanity and man as an individual. We are constantly responding to these messages to survive as organisms, to remain alive as individuals and to continue our species. Both aspects are being condensed during labour for the survival of the woman giving birth and the newborn and to continue the functioning of the biological pattern, which is directed to continue the species.

The experience of the space by the woman giving birth and the personnel in the building and designing modern birth spaces in hospitals has mostly been overlooked until recently or at least not regarded as a priority. This applies to health-related spaces in general and is partly due to the fact that these processes are mostly subconscious.

Examinations of childbirth in humans, the physiology of birth and the biology of a newborn show that these have not changed very much, unlike the circumstances surrounding them that have changed very much in a relatively short period of time (considering the timescale of evolution) [12, 13]. The current prevailing medicalised birth environments in maternity hospitals present a deviation from recognising and considering these rather long-lasting patterns that could be classified into pathogenic birth environments according to their effects on the woman giving birth.

Scientific studies help us find answers to questions concerning the ideal birth environment if we look through the prism of evolution. Studies of births in primates and indigenous people [14] and research into motherhood [15, 16] help us greatly. According to numerous findings, we conclude that female primates (including women) need a natural and well-known “domestic”, non-intimidating and pleasant environment without disturbing elements, for example, related to cultural forms that co-design the everyday life of a certain group and those that are typical for behaviour at birth. For a smooth birth, the female or woman giving birth needs to define the limits of the specified “birth area” to control the “birth territory”, allowing no intrusions. Consequently, she can give birth with all her powers and abilities without any situations that could evoke fear and with it a defensive response, withdrawal or a passive response or “freezing” (fight, flight or freeze response). A spontaneous physiological birth enables a female free movement and actions stimulated by her body; her group is nearby but respects the limits of the birth territory by maintaining an appropriate distance. In contrast to other primates, the thinking brain “silences” the instinctive behaviour of a woman at birth. Some researchers propose that for a smooth course of childbirth, women should give birth in an environment that enables them to activate the neocortex to a lesser degree and act more spontaneously, that is, according to the “primitive mammal brain” [15, 17–19]. The findings of research on specific behaviours described as “nesting” indirectly confirm its advantages. Nesting was monitored in women in less institutionalised environments such as birth centres [20] but can also be seen in modern planned home births. Research into traditional birth cultures and the practices of indigenous people unveiled some common features: birth usually occurs when accompanied by a known person. Women rarely choose to give birth accompanied by strangers and they usually give birth at home or in their current place of residence; a non-domestic environment is uncommon. If chosen, this is usually an environment that belongs to a close relative or is a special space for female activities in a certain community. A woman usually gives birth in a separate space that is usually protected, for example, divided by a blanket. A woman rarely gives birth outdoors, and companions usually motivate her and support the birth process. A woman is free to move and crouches, kneels or sits while giving birth, often supported by a person who stands or sits behind her. A (normally female) birth expert is mostly present. Females usually form the complete birth support circle [21, 22]. Studies of various birth cultures—of indigenous people as well as a modern medicalised birth—indicated different specific features of individual birth assistance in generic birthing patterns. These features reflect the prevailing beliefs of the woman’s body and its abilities and are based on a specific view of a woman and her social position.

Expert literature on midwifery in popular culture also includes statements on ancient birth practices that idealise pre-medicinal forms of birth assistance and the figure of a lay midwife. These statements should be replaced by critical reflection based on facts. Due to the rapid development of information technology, data acquisition on past and current forms of birth assistance and its circumstances including spatial factors is significantly easier. We can include them in our set of knowledge and skills as part of humanity's immaterial heritage (or midwifery heritage). These forms of birth assistance need to be studied in terms of wholesomeness and the risks for the mother and child and include them in practical use if they are deemed suitable and effective.

We can summarise that only both factors—well-functioning biological patterns and chosen positive cultural practices and messages—ensure the right circumstances for an optimal physiological birth.

The findings of neuroscience and neurobiology on the complex “game of hormones” including oxytocin, endorphins and catecholamines in a woman giving birth and to a certain extent also in the present midwife explain the significant influence of the environment on the course of childbirth. Simply said: a space has an important role in enabling or inhibiting a physiological birth because of its inhibiting or stimulating effects on the excretion of antagonistic hormones: oxytocin and adrenaline. Homelike and friendly spaces adapted to the woman giving birth trigger “positive” feelings or moods via the parasympathetic nervous system and enable a pulsatory release of oxytocin in the mother's body. Birth contractions are effective and the body opens. We can mitigate or prevent negative influence on the woman giving birth by understanding which aspects of space trigger or increase stress and cause anxiety, fear and unease, related to adrenaline, and by taking suitable spatial measures according to these findings. The welfare of the woman giving birth is always of prime importance, but other people who use these spaces should also be considered because of their influence on the well-being of the woman giving birth and themselves. A midwife and the partner who feel unwell in a birth space, for example, due to the lack of a comfortable seat or being exposed to strong lights without the possibility to relax, will negatively affect the woman giving birth and the course of childbirth by building up tension and uneasiness.

## **5. Birth environment enables, supports or inhibits, prevents or disables a normal childbirth**

The quality of the birth environment should be studied in terms of salutogenesis, which means researching it according to the following basic question: does an individual birth environment enable and support a physiological course of childbirth and post-natal period for a woman and a newborn or not or to what extent? Research findings and theoretical considerations on the influence of the birth environment on the woman giving birth and the baby are presented below. Based on them and the presentations of some already proven solutions, we give some proposals on how to create a salutogenetic birth environment that supports the health of the mother and the baby.

The messages of a pathogenetic birth space are as follows: As the woman giving birth you are in a demanding process. It is doubtful whether you can manage it which is why you should lie on the bed and hence the visible appliances to check your condition and that of your baby and to solve complications. There is not enough space beside the bed, centred in a small room that you see for the first time and feel a bit confused, to move at ease and change positions. The floor is uncomfortable for bare feet, the room's surfaces are metallic and shiny and the walls are

white or in intense colours. The space is cold, sterile and clinical. There is no toilet, shower or birthing pool in the delivery room. We need to hurry; the clock is clearly visible. Doors do not protect your private space; the personnel do not knock or wait to enter and slam the door or even keep it open. You can hear loud conversations and debates because there is no special room where the staff could discuss in private. The room has no sound insulation and noise breaks into the room from the hallway; you can hear the voices of other women giving birth, which scares you. You do not dare be loud for fear of affecting other women. When you are on the bed with your legs spread apart, you can be seen directly from the door; there is no privacy. You are not connected to your partner because he is also scared while standing/sitting by your head. You cannot relax because the room is too bright, too cold or too hot and you cannot influence these factors. You are not connected to the midwife because she also takes care of other women giving birth and comes and leaves the room constantly to check on you and your baby and the course of birth. You feel exposed to controlling looks and criticised for your behaviour. The room has no windows or a nice view of nature; it is generally not pleasant. All of this causes frustration, feeds fear, increases stress, prevents the excretion of oxytocin and endorphins and stimulates the excretion of catecholamines. Such factors inhibit physiological birth. The female body can only respond to such an environment as presenting a danger for her, the birth process and her newborn and prepares for defence or withdrawal or becomes unresponsive. The organism chooses the best possible survival response in a given situation. Since a woman cannot escape the delivery room and fight the danger, her defensive mechanisms lower the intensity and frequency of contractions or stop them completely and that disturbs the normal birth process. If the mother's nervous system interprets the detected messages of the birth environment as dangerous, spontaneous childbirth is significantly more difficult due to these hormonal activities [23].

To summarise, a smooth childbirth is not possible in certain spaces. A medicalised birth space negatively affects the behaviour of the woman giving birth and the course of labour; it has iatrogenic effects on the woman giving birth and on the baby.

## **6. Has anyone asked us anything? Promising approaches to designing maternity hospital and birth centre spaces: from qualitative to quantitative methods to the birth space theory**

Two health-relevant complementary approaches to research health-related environments: (a) quantitative and (b) qualitative. When “health-related places” were conceptualised, quantitative studies prevailed at the beginning, based on studying spatial factors that influence health, such as size, illumination, temperature, noise and the well thought-out distribution of spaces for the efficient movement of medical staff. This means research into physical, quantitatively measurable determinants of spaces and their rational, efficient use, for example, to improve control over infections, to separate clean and unclean paths without crossing etc. Architects use these determinants to design the so-called healthcare evidence-based architecture of hospitals and other healthcare institutions.

To understand the experiencing of hospital spaces, we require qualitative research that highlights how patients experience the building, spaces and interior design according to their need for peace, privacy, positive stimuli and connection with people and nature. Quantitative data turned out to be useful and beneficial for designing birth environments, but if we limit ourselves to such criteria, this is especially inadequate if we wish to establish good birth environments. In contrast

to treating a disease or injury, birth is about a woman's physiological activity that includes extraordinary physical processes, concentrated in a fairly short time period. A woman requires an environment with specific features that will enable birth. A leap to a new quality is only possible by researching how women giving birth experience a space and to what extent it meets their needs and by studying the embodied experiences of women. Using qualitative methods, different ways of how the women giving birth, midwives and companions use an individual birth space and create certain patterns with their movements should be considered in designing new spaces or re-designing the existing ones. Experiences of a space are being explored based on the birth stories of individuals. The experiences of women giving birth with the building and interior design of spaces intended for perinatal care and individual birth rooms are being analysed.

When focusing on the development of qualitative methodological approaches, we need to highlight contributions from female architects who were sensitive to the specific needs of women during birth. Lindheim already recognised the iatrogenic issue, related to the medicalisation of the birth environment. According to the comparable needs of a carefully designed space that protects one's privacy and also enables close contact with relatives, she paralleled two key life transitions, birth and death. She studied the spatial contexts of birth and explored the attributes of births in hospitals and birth centres and at home [24], significantly influencing "birth design" and also co-operating in changing the circumstances of birth, similar to the Italian architect Bianca Lepori at a later time [25, 26].

More systematic considerations about the influences of the space on birth and initiatives to implement changes to hospitals and similar institutions have only recently received more attention in academic circles. At the turn of the twenty-first century, the birth environment is already becoming the central topic of certain scientific articles and publications with fresh perspectives on the issue of "birth territory" and interesting insights into relationships between the woman giving birth and the designed space [27–30].

To enhance our understanding of existing birth spaces and clarify the image of those we wish to design in the future, we present a couple of steps from initial studies of birth space to thorough and specifically targeted qualitative research.

Phenomenological studies present an important approach to studying birth space. They highlight the individual experiences of women, midwives and partners from different angles to clarify meanings, attributed by them.

Studying birth experiences is of great help and (also) understood by researchers as characterised by space. Women share their experience and story in questionnaires, detailed, most often semi-structured interviews or testimonies. The English organisation The National Childbirth Trust was among the first that published the significant findings of women's experiences of hospital birth spaces in 2003 [31]. The analysis of respondents to closed and open questions indicated that women giving birth found it very important: (a) to have control over the illumination and temperature of the space; (b) to have a pleasant and clean, domestic, "non-clinical" space; (c) to have room for movement, walking and enough pillows, bean bags and floor mats; (d) to have the assurance that others cannot hear them; (e) to have an accessible corner with snacks and drinks; (f) to have a birthing pool ready; (g) to have a comfortable chair for their companion and (h) bathroom with shower and bath, which would be a part of the birth space or have simple access to them [31]. The women giving birth also found it important not to be observed, to be able to control who enters the delivery room, not to change spaces during birth—they desired the freedom to do what they feel while giving birth. This report, based on the experiences of women, proved that the physical environment influences the birth experience. It demonstrated how women experienced birth environments and

exposed their needs but especially emphasised that one half of respondent women giving birth did not have access to what they desired [31].

The experience of birth and birth space is an embodied experience, which is why researchers based their studies on philosophers, architects and artists who surpassed the Cartesian separation of the body and the mind such as Maurice Merleau-Ponty with the phenomenology of perception [32] and James J. Gibson by studying visual perception. Important “perspective openers” include “poetics of space” by the French philosopher Bachelard [33], “poetics of light” by the artist James Turrell, the concept of the multi-sensory architectural experience by the Finnish architect Pallasmaa [34] and “attunement” by the architect Alberto Pérez-Gómez [35] and the theory of “transcending architecture” by Bermudez [36], among others.

For a broader embrace of these considerations and experiences, the inclusion of interpretative methodology was logical. It includes visual qualitative methods by analysing photographs of delivery rooms, using videos and reflective interviews [37] or using a semiotic analysis of architectural plans and documentation to build and operate maternity departments or maternity hospitals. If such methodology is used in researching birth spaces, for example, exploring light has a substantially different meaning. It is not merely about the suitable illumination of the midwife’s work space and the baby-changing place etc. but about the role of light in the birth process, the understanding that it has an important role in the birth experience. It is about the creative use of “light-colours-darkness, the inseparable trio”, the key factor in forming a birth experience according to the researcher of birth environments Doreen Balabanoff [38].

As it was important to “give voice” to women and their stories in historiography, it is essential to enable women to “occupy” the room and use it. Here, concepts of the “birth territory” have a central role [39]. By observing the activities of the woman giving birth and the midwife in various modern medicalised, institution-alised birth environments and by analysing influences on birth, it was emphasised that the birth space directs certain activities of the woman giving birth and medical staff while hindering, disabling or preventing others [40, 41]. Even if something is not explicitly forbidden, it is practically infeasible. For example, a woman can hardly move in a relaxed manner and take different positions in a very small delivery room where the bed occupies most of the space, its walls have no handles and the metal horizontal surfaces of the furniture are not meant to offer support. The mere message that welcomes a woman who enters the room is clear, even if the staff are silent: “just lay on the bed”, as there is no other space for her anyway.

Research has compared different birth environments and established that women need a relaxed and domestic atmosphere, their own room and freedom of movement [37, 42]. Such spaces are more often designed in birth centres than hospitals. When women described giving birth in birth centres, they said they experienced them “as home”, “an oasis of peace”, “motivating environment”, “a nurturing environment”, where you can “build a nest” [20].

Specific research established, for example, the sub-threshold, subliminal effects of messages of hospital birth environments, which medicalise the understanding of childbirth in women giving birth and render them more passive than otherwise [43]. Research focused primarily on the negative influences of the delivery bed, especially if this is a typical childbirth bed, if it is in the centre of the delivery room and visible directly from the door. The bed became a synonym for hospital births. In their conclusions, researchers proposed a different space organisation to ensure the woman had the best possibilities for movement and changing positions while giving birth [12, 40, 44]. Some researches formed concrete proposals for different ground plans including equipment, for example, moving the bed away from the centre of the room or having a folding bed that can be folded into a closet. Promising

proposals also included transferring the bed from the delivery room to another auxiliary space where it is quickly and easily available if the woman giving birth desired to lie down or if needed due to complications [44–46].

Research into the spontaneous use of the space by the women giving birth in an individual stage of labour, especially where influences of the technocratic paradigm are minimal (e.g., home birth), is very useful. Studies can answer the question if we can define certain typical sequences of movement and physical activities and patterns of positions that should be considered in the planning of birth spaces in institutions.

As we defined at the beginning, the birth environment consists of the physical environment (birth space) and the people who are present at birth. It is characterised by a unique specific understanding of the meaning of private and public space for a woman, her socially desired roles—should she take care of the home and the family and/or be employed, to what extent and how control should be exerted over her as a mother, her behaviour and body. Research into social interactions and the balance of power relations indicates that both home and the delivery room in a maternity hospital are places where a woman could be under control and her decisions would not be autonomous. However, the opposite can also be the case; in both these environments, the woman can have control over the environmental factors and birth assistance too and decide freely. The French philosopher Michel Foucault already alerted to the importance of recognising an institutionalised space as the space that defines specific human relationships and as being shaped by relationships at the same time. A typical example is the structure of a panopticon and its function in economy of controlling people. In the buildings and spaces of medical institutions such as hospitals, traces of power relations that define the place of a patient can be read. We should reconsider the prevailing patterns of social interactions in the spaces of maternity hospitals, birth centres or homes—by changing the environment, equipment and sequence of spaces and locations of various elements and their relations, unsuitable hierarchical relationships can be transformed into more collaborative ones, ensuring a central role for the woman.

Some research has focused on the issue of the production line model applied to modern birth, primarily due to the lack of privacy and feeling of safety, and wishes to bring changes [47]. This can be done by rearranging “typical” delivery rooms in such a way that (a) one room is intended only for one woman giving birth from admission to the end of childbirth or until the departure of the mother with the baby; (b) the personnel knocks and waits for permission to enter; (c) the woman giving birth is not visible from the door: the doors are covered by curtains; the space intended for active birth is not in the field of view, including the bed and the birthing pool and (d) each delivery room has its own bathroom with shower.

As we deviate from the data within a medical-mechanic definition of birth to studying personal birth experiences, besides narrower medical and health-related aspects, categories/terms such as connection with the whole and others as movement, flow, privacy, intimacy, sensuality, interconnection, interlacing of a female and the direct environment, altered states of consciousness, resonance, phenomenological perception and undisturbed excretion of oxytocin that enables the course of birth are also included [48]. These aspects are important for all included in the process of childbirth, and a high-quality birth space should consider them.

Connection with elements of nature is especially significant for a woman giving birth. The findings of studies of natural and built environments in terms of evolution have already brought an understanding of the complex influences of built environments and the designing of healthy spaces [14]. Our emotional and cognitive brain has been shaped by the natural environment as have the brain's responses to it, which is why we are able to identify natural dangers quickly and reliably, respond

appropriately and spontaneously look for environments that are as safe as possible. But we have not yet developed a “system” to identify dangers, “built in” man-made objects and our related defensive mechanisms. A soothing environment for a man still includes contact with nature and natural elements [49], for we are oriented towards life and give priority to impulses from the environment, connected to vivacity, which are therefore also aesthetically pleasing. This is a common human attribute. Intercultural research has shown that our well-being increases when we are in contact with the natural elements—we speak of human “biophilia”, love for nature [50, 51]. What is more, we may claim that a human does not only feel well when in contact with nature, but also nature actually enables and stimulates regeneration. This meaning of the embrace of nature for human existence was summed up by the Slovene architect and urbanist Janko Rožič in an insightful thought: For modern human, it is extremely beneficent to “... descend to nature’s level and blend in with the whole which heals. [52]”, which reminds us that etymologically speaking the word “whole” comes from an Old English “hāl” meaning “healthy, safe”.

For a woman who gives birth physiologically, the sensual experiences of a birth space, enriched with natural elements, for example, the pleasant scents of fresh flowers, natural sounds, the feeling of pleasure as the body immerses into a sufficiently sized bath or birthing pool, a floor mat, pleasant for bare feet, wooden furniture and photographs of nature, will trigger responses that lead to (increased) trust and help her relax.

## **7. How do we define the quality of a modern birth space? Guidelines towards a salutogenetic space**

The woman’s need to create a personal, comfortable, pleasing and safe environment to relax and abandon herself to the birth process is rooted in the biological birth-giving of primates. To give birth, a woman needs to be able to create her own “personal territory”, a limited environment that she can “control” and make decisions about, whether it is in a maternity hospital or birth centre or at home. We cannot take this for granted for all of the above environments. Nevertheless, we might reasonably claim that due to their relative unadaptability, more needs to be done in public hospital-like institutions to transform birth spaces than in birth centres or at home. According to modern findings, the planning of a new maternity hospital or its upgrade must consider and apply designs of the building and its interior with foreseeable and indirectly measurable conscious and subconscious effects, which will ensure positive physiological responses while strengthening their synergy. This also applies to the planning and building of new smaller birth environments, like an autonomous midwifery centre or a midwife maternity ward, which is still waiting for its realisation in the future in some European countries including Slovenia. To respond to the current issue of prevailing hospital births, we need to form smaller birth places. Every birth environment, regardless of whether it is an institution or a home, should become a place of health and emotional security [53].

The majority of women do not require a very structured clinical environment to give birth. If today’s delivery rooms in hospitals were conceived, built and designed within the technocratic paradigm that treated birth as a potentially pathologic event, we need to adapt hospitals to the needs of most women and babies without overlooking the needs of women who experience complications at birth. We need to create such spaces that will enable relaxed movement, not hinder the spontaneous behaviour of women and set minimal limitations for them to connect with their biological and cultural heritage. If we follow the thesis of R. Lindheim, the architect mentioned in the beginning of this chapter, consistently, we may claim

that a salutogenetic birth environment enables both connections: expressions of still well-functioning biological birth patterns, supported by thoughtfully chosen positive cultural messages.

According to the nowadays recognised role of hormones required for a smooth course of childbirth, a birth environment needs to be formed, which enables, “allows”, strengthens and stimulates the optimal secretion of natural oxytocin, endorphins as well as adrenaline (but only when a woman really needs it to birth the baby), because they reduce the need of procedures and interventions, carried out by medical staff on female bodies. In every birth environment, the circumstances that hinder a spontaneous course of birth must be identified. The environmental elements that evoke fear, anxiety and prevent relaxation must be changed and transformed for the well-being of the woman. This is why the renovation of birth spaces is definitely not about applying some makeup. An inner transformation is required, which will respond to the needs of women and result in a quality birth environment.

It seems that birth spaces should resemble “spas” or “wellnesses” in being comfortable, pleasant and beautiful, that is, spaces intended for well-being. According to the determined properties of a quality birth space, considerations on hotel-type delivery rooms with a bathroom, birthing pool or bath, atrium, small kitchen and bed where the woman’s partner can also spend the night are in the foreground. In such a space, childbirth takes place from admission of the mother to leaving the hospital with the baby. Continuous care of “one midwife for one woman” (one-to-one midwifery) is easier to implement, at least during her stay in the institution. According to the latest findings, this type of care has several advantages over the usual shared care.

Access to maternity wards within hospitals should be separate from the entrance of patients and visitors of other hospital units and services. In this way, women or couples that come to give birth do not meet the sick or their visitors. By placing a maternity ward next to the hospital building or constructing a completely separate unit (birth centre), we avoid these challenges in a simple but effective manner. All types of birth environments require a carefully and thoughtfully designed access to the building, that is, the transfer from a public area to a half/institutionalised environment.

## **8. A quality birth space is a salutogenetic one**

An ideal birth space should ensure that the course of birth maintains its potential energy intact as much as possible and enable its free flow, so the woman giving birth “adopts” it and actually becomes a driving force of her own birth through her activities and the use of the birth space.

While observing health safety criteria, the appropriate hygienic standards, a suitable logistical connection of multi-purpose spaces etc., a quality birth space also reflects the findings on the experience of the birth space. It makes it possible for the women to experience it as pleasant, domestic, comfortable and beautiful. Atmosphere is important and consists of carefully chosen colours, textures, materials, visual messages, interior design and furniture elements including doors and windows. An informally designed space with a thoughtful ground plan and pleasant corners for activities and rest and for relaxation and refreshment with food and beverages, with ergonomic furnishing, artistic objects, beautiful views, natural materials (stone, clay, wood, cotton, linen, wool etc.), harmonised colours in shades of the earth, sky, water, greenery, using few or no intense saturated colours, with textures that offer visual and haptic pleasures, with soft lights and a pleasant

temperature foster a sense of acceptance, familiarity and warmth and create options for a woman giving birth to relax and indulge in the course of birth, accept it in its nature of “ordered chaos”.

Women need a birth environment that expresses compassion, warmth, love and care; such an environment supports her in various emotional states during birth, and it tells her that her needs are accepted and assures her that she will be listened to.

Salutogenetic birth environments enable the dynamic integration of people according to the needs of the woman giving birth: they enable a woman to connect with herself, her feelings and experiences, the baby, her partner, other relatives and the medical staff. Therefore, the possibilities of establishing emotional and physical presence between the (future) parents, the newborn and the mother, father, between the woman giving birth and the midwife need to be ensured. If she needs support, a touch, massage or a hug from her partner or other companion or doula, a salutogenetic space makes this easily possible because it is conceived multi-dimensionally, enabling various possible “uses” and activities. The space sends all involved a message that her loved ones are welcome and that people and their presence and support and assistance have priority over technological solutions and medication whenever possible, which is why medical equipment is “hidden from sight”.

A salutogenetic space is simple and sufficiently spacious; contraptions for an active birth are readily available, deliberately chosen and unobtrusive when not in use and equipment is functional and defines the use of the room as little as possible; the bed is not in the centre of the room or is located in the neighbouring room. The space is not too strictly defined, the bed is hidden and emptiness lets the woman giving birth know that she can move as her body tells her and that she can be active and take a rest and breathe. It should enable various activities and ensure varied uses of spatial elements according to the changing needs of an individual. An individual place in a chosen birth environment allows different uses of equipment and space.

In-depth research findings otherwise indicate common patterns of needs of women giving birth and the newborn, which should serve as a foundation for designing a birth space that should also be simply adaptable to the dynamics of birth. Its openness to adaptations to the specialities of an individual woman (and the newborn) and relationships that are being formed between her and the environment from one moment to the next is essential, and influence birth physiology, experience and results.

Therefore, such birth spaces are required that are designed thoughtfully and in a somewhat restrained fashion. In this way, women can co-shape them according to their current need. Based on these findings, it is not recommended to paint the walls with intense, saturated colours or to install stationary equipment and predefine the location where a woman should give birth. Women can be fully involved in care, which is not routine but individually adaptable. Each woman decides what is most suitable for her [54].

A salutogenetic space by using various sensory channels ensure that the woman giving birth has contact with natural elements such as water, stone, wood, fresh air and natural light and can see plants, animals, for example, birds in the park, the landscape, the sky and weather phenomena such as rain and snow, and allows connection with nature.

A salutogenetic birth space ensures privacy with different options to establish a personal and intimate area; it allows women to temporarily “adopt” it, “control” who enters and what is going on with the space in general. In it, women giving birth regulate heat and light in simple ways; the space has sound insulation. In a salutogenetic birth space, women are not exposed to a controlling look and cannot

be observed from the hallway or through openings in doors or the wall. As opposed to a medicalised environment, nothing/no one “regulates” their behaviour or personal expression. A good-quality birth space guarantees that the woman giving birth can maintain her intimate and personal area as much as she needs it. If she or her companions need some extra personal space, they can be present in the space without crossing personal borders.

Due to the extended alienation from basic birth patterns and the related normalisation of medicalised birth assistance, some women require intensified messages to be able to safely let go; a birth environment for a physiological birth should also have a stimulating effect. Usually, it is however already enough that a birth environment enables birth to “happen” and supports processes in the baby, mother and father right after birth; in such cases, stimulation is redundant and disturbs spontaneous processes.

In the attempt to pass into a humanistic paradigm, this space, intended for a special, embodied experience, needs to be specifically designed for a woman to “settle in” and to temporarily adopt it and to think that this is actually doable. We are giving the woman back her voice, body and space. When creative and sensitive architects design a birth space, they bear in mind that a woman giving birth is going through dynamic processes including mental activities and rational decision-making, altered states of consciousness, states of contemplation and mindfulness and various physical activities that are beyond an everyday experience and at times extremely difficult. Using thoughtful spatial design solutions, they create opportunities for the space to resonate emotionally and spiritually with the life-giving process. They are striving to achieve harmony between the space and the woman giving birth. In this way, “woman-centred perinatal care”, one of the key features of the humanistic birth paradigm, embodies itself in the space. A quality birth environment surpasses the existing paradigm of designing hospital spaces, which still includes maternity wards. It is exceptionally important in increasing the chances that women will (more often, frequently) give a normal, physiological birth. In birth spaces meant for high-risk births, additional medical-technical requirements must be observed.

Although it may seem that space is something that is most unalterable, research confirms that the goal of providing a birth space, which enables and supports care that is tailored to an individual woman, is realisable.

The architect Juhani Pallasmaa emphasises that a building guides, measures and frames actions, mutual relationships, sensations and thoughts and that in this sense, basic architectural experiences play the role of verbs [55]. The experiences of modern birth spaces as such should create suitable contexts for childbirth and the processes of the woman connecting with her inner self, with herself and her baby, and outwards with her relatives, medical staff, nature, and beauty; everything should align itself for a smooth childbirth.

The theory of birth space with the emergent architectural language of designing salutogenetic birth spaces is important for raising awareness and informing future designers and planners of birth environments. It should serve as a tool to face architectural challenges. New findings change the perspective of decision makers, medical staff and users. The people who decide on the planning of new birth spaces or renovate existing ones must be acquainted with it.

## 9. Conclusions

There is a gap between the possibilities of modern-day birth environments and assured best conditions for a physiological birth and the earliest post-natal period.

A salutogenetically designed birth environment supports the holistic health of the woman giving birth, the mother, the baby and the family. When a physiological birth is possible according to the medical condition of the mother and the baby and when a woman desires it and it takes place in salutogenetic birth environments, that is, environments that co-create health, we can look forward to seeing positive short- and long-term medical results of births for women, newborns and families.

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