

**PATIENT CENTERED APPROACHES IN LABOR AND DELIVERY  
ROOM DESIGN IN HOSPITALS: CASE STUDY IN  
DOKUZ EYLÜL UNIVERSITY HOSPITAL**

**HANDE ATMACA**

**AUGUST 2013**



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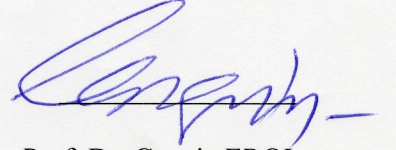
**A THESIS SUBMITTED TO  
THE GRADUATE SCHOOL OF SOCIAL SCIENCES  
OF  
İZMİR UNIVERSITY OF ECONOMICS**

**BY  
HANDE ATMACA**

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DEGREE OF MASTER OF DESIGN  
IN  
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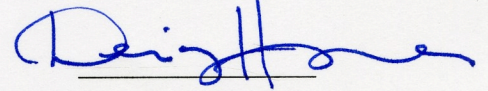
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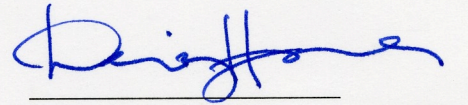
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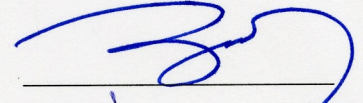
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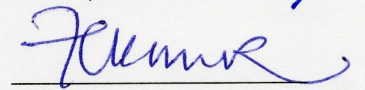
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## **ABSTRACT**

# **PATIENT CENTERED APPROACHES IN LABOR AND DELIVERY ROOM DESIGN IN HOSPITALS: CASE STUDY IN DOKUZ EYLÜL UNIVERSITY HOSPITAL**

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MDes, Design Studies Master's Program

Supervisor: Asst. Prof. Dr. Deniz Hasırcı

**August 2013, 115 pages**

Today the increasing number of operational deliveries and the effect of the hospital environment on women's birth experience have become critical issues. The transition of childbirth from home to hospital and thus the trend of defining birth as a pathological event have created hospital settings that regard medical safety first. This has come to a point that disregards women's psychological needs during this event. National Childbirth Trust state that women's psychological well-being has a great impact on birth experience such as ease of labor, feelings of accomplishment and establishing a strong bond with the child. It is also stated that women seek for a sense of control through their birth experience, physically and psychologically (2003). Lack of control is highly related to stress and negative health outcomes in healthcare settings, moreover in birth environments stress should be avoided at all times for the natural course of childbirth. The aim of the study is to investigate whether the sense of control over the physical aspects of the environment help women to have a better birth experience. In order to analyze the criterion of control, in this study, women were asked what elements of interior architecture contribute to the sense of control. The results show that control over the birth environment affect women in a positive way and interior architecture supports women during childbirth.

**Keywords:** Childbirth, Control, Interior Architecture, Labor and Delivery Room Birth Experience

**ÖZET**

**HASTANELERDEKİ SANCİ VE DOĞUM ODALARINA**

**HASTA ODAKLI YAKLAŞIMLAR:**

**DOKUZ EYLÜL ÜNİVERSİTESİ HASTANESİ ÖRNEK ÇALIŞMASI**

**Atmaca, Hande**

MDes, Tasarım Çalışmaları Yüksek Lisans Programı

Tez Yöneticisi: Yrd. Doç. Dr. Deniz Hasırcı

**Ağustos 2013, 115 sayfa**

Günümüzde doğumun doğal seyriden farklılaşması, medikal yöntemlerle gerçekleştirilen doğumun yaygınlaşması sağlık otoriteleri tarafından eleştirilen bir konu haline gelmiştir. Doğumun evden hastaneye taşınmasıyla anne adayları hasta, doğum ise patolojik bir olay olarak görülmeye başlanmıştır. Hastaneler ise bu durumun sonucu olarak hasta ve bebeğin sağlığını gözederken anne, bebek ve ailenin sosyal ve psikolojik gereksinimlerini gözardı etmişlerdir. Annenin doğum öncesi psikolojik durumunun doğum üzerinde ve sonrasında, doğumun kolaylığında ve anne-bebek ilişkisi üzerinde birçok etkisinin olduğu günümüzde yapılan çalışmalarca kanıtlanmıştır. Aynı çalışmalar kadınların doğum deneyimlerinde en çok kontrol hissine ihtiyaç duyduklarını ve çevresel kontrolün de bunlardan en önemlilerinden olduğunu göstermektedir (National Childbirth Trust, 2003). Hastaneler ise kadınların doğum süresince en pasif aktör oldukları yerlerdir. Kontrol hissini eksikliği hastane mekanlarında stres ve negatif sağlık sonuçları doğurmaktadır. Çalışmanın amacı yapısal çevre üzerindeki kontrol hissini daha iyi bir doğum deneyimine katkısı olup olmadığını araştırmaktır. Kontrol etmenlerinden hangilerinin kadınlar üzerinde en çok etkisi olduğunu görmek için, iç mekan elemanlarından hangilerinin kontrol hissine yardımcı olduğunu bulmak amaçlanmaktadır. Sonuçlara göre iç mekan tasarımının ve kontrol hissini doğum deneyimine pozitif etkileri bulunmaktadır.

**Keywords:** Doğum Odaları, Sancı Odaları, Doğum Deneyimi, İçmimarlık, Kontrol Hissi

*This work is dedicated to*

*My Family*

*and*

*B. Can Acarbay*

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## **VITA**

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## TERMINOLOGY

**Obstetrics:** The medical profession that focuses on pregnancy and childbirth

**Gynecology:** The medical profession that focuses on women's reproductive health

**Midwifery:** The profession that aids the childbirth

**Neonatal:** Newborn child

**Prelabor:** Before labor

**Labor:** The time before actual delivery

**Delivery:** Active birth

**Recovery:** 1-2 hours after birth

**Postpartum:** Resting period after childbirth



## **CHAPTER 1**

### **INTRODUCTION**

In this thesis, the effects of the sense of control over the childbirth environment on birth experience are discussed. Over the last century, there has been a major change in childbirth, both in terms of the environments and the childbirth practice. With the introduction of obstetrics and other advancements in medicine, birth settings have transferred from home to hospitals for better health outcomes. However, this change led to a new definition of birth that is considered more of an illness rather than a natural event. According to Childbirth Connection, one out of three babies is delivered by an operation in the United States, mostly with Caesarean section. This number is going up regardless of the risk of pregnancies, nationality or age of the mothers and the excessive amount of intervention in low risk pregnancies jeopardize the health of the mother and the baby (2012b). According to The Turkish Statistical Institute, Caesarean section rate was twenty one percent in 2003, in 2008 it increased to forty two percent in urban regions and twenty four percent in rural areas (2012). Today, Turkey is the third country in the world that has the highest Caesarean rate (The Turkish Statistical Institute, 2012).

Healthcare professionals only advice Caesarean section for complicated pregnancies thus promote natural birth for its various advantages. In addition to the physical advantages of natural birth such as; control of the body, less reception of medicine during labor, less time for recovery and quick adaptation to motherhood, natural birth also contributes to women's psychological state (Childbirth Connection, 2012b). As Overgaard, Fenger-Grøn, & Sandall (2012) state, studies support the relationship between negative experiences with the amount of medical action involved while acknowledging natural birth's positive outcomes. The birth experience of the mother can have deep effects which can last a lifetime. While feelings of achievement, self-confidence, adjusting to the new situation as being a mother and improvement of psychological well-being are results of positive birth experiences, negative experiences can lead to fear of another labor, Caesarean section demand, posttraumatic stress syndrome and depression.

Although there are design experts on the field, hospital design is very much shaped the medical professionals. As Lepori states, defining birth as a pathological event dictates specific requirements on the spatiality of the birth environments and the design of these environments mostly assert control to the healthcare professionals (1994).

Especially patient rooms are designed mostly to cover the optimum needs for the patients. As Del Nord states, patient rooms are one of the environments that are designed for a large group of users, and optimum conditions may not work for each particular user (2007). In fact, maternity rooms need more detailed assessment considering the ergonomics and equipment needed for pregnant women, the amount

of time spent waiting in pain in labor, mothers' mood for relaxing to ease birth, visual and auditory quality, family's crowding and the space for the baby. As stated by the London House of Commons (2002), the medical approach in childbirth is favored by hospitals deep down, by cutting women's choices, offering standard maternity rooms and limiting their movement by medical controlling devices. This corrupts the natural order of the birth process.

The National Childbirth Trust (NCT) conducted an extensive survey in the United Kingdom on two thousand women in 2003. Participants were women who had natural birth or an emergency Caesarean section in the last five years. The scope of the research was to find out whether elements and design of the physical environment contributed to their birth experience, the features of the room they considered beneficial and the limits of personal control woman had over their surroundings. Ninety four percent of the women stated that the birth environment has an impact on ease of labor, while forty three percent heavily emphasized that the environment is of importance in birth experience. Most of the women emphasized that unfamiliar and clinical look of the hospital reminds them of past time experiences they had at hospitals, which were stressful. On the contrary homely, clean and welcoming environments make them feel safe and secure which makes them relax during labor. They emphasized that it was hard to move or kneel between contractions because of the hospital floor material, and this made their labor time increase compared to their previous experiences of home birth (2003).

In healthcare psychology, control is an issue that is often stated to be at top priority. Control is related to coping with chronic and terminal conditions, disabilities and

managing stress. Also in medical environments it plays an important role in interpersonal relations between caregivers and patients (Walker, 2001).

“Control is defined herein as mastery or the ability to either alter the physical environment or regulate exposure to one’s surroundings.” (Evans & McCoy, 1998:8).

As Wallston states, absence of control can result in stress which affects health status negatively, feelings of control can eliminate the destructive forces of a stress generator and construct positive behaviors which has immediate effects on health outcomes (1989).

A sense of control is one of the most important elements women stated they wished to have during their labor and delivery stages (Green et al, 2003; Jones, 2011; Shin et al., 2000; National Childbirth Trust, 2003; Overgaard et al; 2012). However, previous studies focused on the theory of control of professional-patient relationship or procedural parts of childbirth more than the physical design elements of interior spaces. Green & Baston (2003) evaluated control in terms of patient-staff relationship and patients’ control over their own behavior, while Namey & Lyerly evaluated the term control in the context of past birth stories and put forward that women use “self-determination”, “respect”, “personal security”, “attachment”, and “knowledge” to refer to what constitutes a sense of control (2010:9). Hall & Holloway (1998) investigated women’s control over the process of water birth. Meyer investigated the meaning of control in context of childbirth by acknowledging its difference from other disciplines, and determined four key concepts of control as “decision-making”, “access to information”, “personal security” and “physical

functioning” and the outcomes of control as positive birth experiences, fulfillment and healthy progress of becoming a mother (2013:221).

In this study, the aim is to focus on the concept of control regarding the control over the built environment and to analyze if the sense of control over the built environment contributes to positive birth experiences. The interior architectural features of the birth environment are aimed to be investigated whether they can contribute to patient control, thus support the birthing experience.

### **1.1. Scope and Aim of the Research**

The aim of this thesis is to investigate the LD (Labor & Delivery) rooms as childbirth environments in hospitals, within the transition from home to hospital and to analyze mothers' needs in the built environment to be a bridge between designers, healthcare professionals and patients. The traditional birth settings, new approaches and the hospitals settings, the requirements of birth will be analyzed from a patient centered point of view.

The NCT claims that in the UK, within a period of twelve years the Caesarean rate has doubled and the according to the research, the possible causes may be hospital culture and the effect of the hospital environment. The survey was conducted with two thousand new mothers in England, Wales, Scotland, and Northern Ireland to assess whether the birth environment makes a difference. According to the survey, in

all the aspects that affect the birth environment, the physical environment has been one of the most important (The National Childbirth Trust, 2003).

The physical qualities of the space and how women used them are analyzed to figure out what women need and request. The control of the mothers over the environment are looked at to find out whether interior architecture can contribute to patient control and be a supportive factor in childbirth.

## **1.2. Methodology**

This research investigates the effect of the physical environment on childbirth experience through analyzing the role of patient control in the LD rooms in hospitals.

Control is defined as one of the most important needs of women during labor and delivery (Meyer, 2013). Although control of the physical environment has been touched upon in healthcare and childbirth related research, few design research studies have been conducted regarding patient control and the childbirth environments. In order to investigate the control mechanisms in the LD rooms, the framework of Evans & McCoy (1998) has been selected, since it contains the main concepts of environment and behavior studies and focuses on control's positive effects on health outcomes.

As a method, a questionnaire is prepared by linking interior architectural elements to each item of the framework of Evans & McCoy (1998). As an addition to the

existing framework, issues related to maternity and LD rooms have been added in order to create a broader framework that is specifically addressing the needs of the birth experience in terms of controlling the environment. The questionnaire has been conducted with 30 women between ages 18-42 to establish a patient centered approach; which brings forward the needs of the patient. In addition to this, 6 nurses that are responsible for the LD unit answered the same questions, to create awareness on patient - healthcare relations together while discussing design issues on childbirth environments.

**Research Question (RQ):**

Can interior architecture help to create a Labor & Delivery room environment that supports the overall birthing experience by enabling the feeling of control over the built environment?

**Hypothesis (H):**

The feeling of control over the built environment can be established by interior architecture and this has positive effects related to the birth experience.

**Sub Hypotheses (SH):**

**(SH1):** Control of the built environment in Labor & Delivery rooms can be enhanced by interior architecture.

**(SH2):** The sense of control over the physical environment can be increased with elements of interior architecture such as; Privacy, Crowding, Boundaries, Climatic and Light Controls, Territoriality, Flexibility, Responsiveness, Furniture Layouts, Symbolism, Stimulation, Cultural and Maternity Related Factors.



### **1.3. Structure**

This thesis contains five chapters. The introduction discusses the criticism over the medicalization of childbirth over the world and how it influenced and transformed birth environments. This chapter is constituted of the aim and scope, the methodology and the hypotheses of the research.

The second chapter talks about how birth environments have transformed in the world and Turkey throughout the history. Childbirth is a very cultural event and it is a natural part of everyday life. This part also discusses cultural transformations and how the change in medicine influenced the environment of birth.

The third chapter discusses the patient centered approach in healthcare and design. This chapter explains existing models of patient-centered care and the evolution of the user/ patient centered design approach. The framework that is used in the research is introduced and the components of it are discussed.

The fourth chapter explains the case study of Dokuz Eylül University Hospital and the LD rooms in the Department of Obstetrics and Gynecology. In this chapter the research hospital is introduced, the qualities of the LD rooms are explained. The methodology of the thesis is explained in detail and the findings and observations are discussed.

Finally, in the Conclusion chapter, the findings are interpreted to set up guidelines that could be used by further research and healthcare designers.

## CHAPTER 2

### CHILDBIRTH ENVIRONMENTS

The first childbirth environment in history has been the home. Today, other than the home, freestanding birth centers and hospitals are places which are mostly chosen to give birth (American Pregnancy Association, 2011).

#### **2.1. The Historical Development of Childbirth Practice and Childbirth Environments**

Two major professional practices involved in childbirth are Obstetrics and Midwifery. Obstetrics is a medical practice that combines traditional medical approaches from ancient Greece and Rome with modern European medicine in order to deal with medical requirements of childbirth. Midwifery is a practice that has grown with natural birth and has been rooted in the physical support women gave each other while taking care of the possible complications of birth (Klaimont, 2008).

The origin of Obstetrics derives from Midwifery. *Obstetrix* is a Latin word which comes from *obstare: to stand for*. Midwifery, which is the combination of mid (with) and wyf (woman), perhaps has been replaced by the word *Obstetrics* in 20<sup>th</sup> century,

since the Latin word gave a more academic impression in medical schools (Drife, 2002: 312).

In Ancient Greece and Rome, birth was a ceremony where only women were involved. Normal birth and complications related to it were taken care of by the midwife who was a respected person due to her training. Again in the Medieval and Renaissance periods childbirth was again a female event which took place at home, which was sometimes accompanied by natural herbs and wine for pain relief (Klaimont, 2008).

In the 15<sup>th</sup> century, the first texts on Obstetrics were printed in German and in Latin. In 1513, “Der Schwangern Frauen und Hebamen Rosengarten” known as “The Rosengarten” by Eucharius Rosslin and in 1554, “De conceptu et generatione hominis” by Jacob Rueff were two textbooks that were groundbreaking in terms of childbirth. These first textbooks led to the introduction of men to the arena, since the prints became a medium for men to learn the practice for the first time. The textbooks were criticized by some of the doctors and midwives for that reason.

Nonetheless, the 17<sup>th</sup> century was the period that “male-midwives” also known as “accoucheurs” started to appear in childbirth practice. Male-midwifery was first seen in France, and then spread to Britain and in 18<sup>th</sup> century became popular in England (Drife, 2002: 311).

The lying-in hospitals were a major development which was initiated in the 18<sup>th</sup> century. These hospitals were run by both midwives and accoucheurs to take care of

the poor women, in Dublin and London. However; after a while, in these hospitals the number of death was ten times more than home births due to an epidemic condition called 'puerperal fever' (Drife, 2002). Puerperal fever is today believed to have spread through a bacterial infection called Beta haemolytic streptococcus (Hallett, 2005). Today, puerperal fever is rarely seen and can be treated with antibiotics if it is caught early, but it still holds risks for the mother and the baby (Burch, 2009).

The founding of pain medication drugs such as ether, morphine and chloroform in the late 18<sup>th</sup> mid-19<sup>th</sup> century and women's request on having a pain free birth changed the face of childbirth. Most women preferred labor under anesthesia which led to a movement called "twilight sleep". It was initiated in Germany and spread to England and United States where women were under heavy medication and in some cases were not aware of the birth process. The medicated birth needed a professional to attend so it had to be performed in the hospital. However, this movement brought unintentional action due to medication such as babies suffering from neonatal (newborn) depression or women being tied up to beds to control the excessive behavior. When it came to the 20<sup>th</sup> century, fifty percent of the hospital births were performed with chloroform and ether in the United States and Britain (Klaimont, 2008).

The first act against medical approaches to birth began with the article of Ashley Montagu, "Babies Should be Born at Home" in the Ladies Home Journal in 1950. However it was the 1960's when women got organized and raised voices (Devitt, 1977). In 1970's natural birth movement continued and it was supported socially and

politically. Women collectives started to educate each other to promote natural birth, reduce unnecessary interventions, increase women's control over the birth experience and engage them in the decision process (Chestnut, 2009).

In the second half of the 20<sup>th</sup> century, hospital birth was highly seen and the number of interventions was going up. Childbirth education, the importance of breastfeeding and family centered approaches started being acknowledged in this period. Hospitals started to create home-like environments in LDR (Labor/Delivery/Recovery) and LDRP (Labor/Delivery/Recovery/Postpartum) rooms which focused on uniting different stages of birth in the same environment. Hospitals started to pay attention to the importance of keeping the mother and the baby together at all times in the 20<sup>th</sup> century (Zwelling, 2007).

Today in the 21<sup>st</sup> century, the important point in maternity and child care is finding the balance between keeping childbirth as a natural part of life while acknowledging the necessity of technology to provide the best type of care for women and babies (Zwelling, 2007).

## **2.2. The Historical Development of Childbirth Practice and Environments in the Ottoman Empire and Turkey**

The first obstetrical clinic “viladethane” was founded by Besim Ömer Akalın, M.D. in 1894, and until that time women in İstanbul gave birth at home. Besim Ömer Akalın, M.D. was trained in Paris and after his return to İstanbul he opened up an Obstetrical clinic. Akalın was also the first Obstetrician in Turkey (Civaner & Ülman, 2009).

The viladethane was constructed by transforming the quarantine area inside the garden of Gülhane Military Hospital. It had only room for fourteen beds. The construction of the clinic was opposed by the society, since it was unusual for them for women to deliver babies outside their homes (Civaner & Ülman, 2009). The initial users of the maternity hospital were poor pregnant women who worked in a brothel house and because of it the viladethane was criticized by the public and called a “piçhane” (Balsoy, 2009). Akalin trained lots of nurses and gave them both the opportunity to receive theoretical education and to practice at the same time. The viladethane was a groundbreaking initiation that paved the way for women to deliver babies in hospitals in the Ottoman Empire (Civaner & Ülman, 2009).

Midwifery was practiced only by women in the Ottoman Empire. With the opening of the obstetrical clinics in the 19<sup>th</sup> century, male practitioners received training and started to aid childbirth (Balsoy, 2009). The first medicine faculty in the Ottoman Empire was constituted in 1827 and education on women’s health also started there. In 1898, The Gülhane Military Hospital was founded and the first gynecologic surgery was performed by Cemil Topuzlu, M.D. and the first gynaecology clinic was constituted in 1902 by Asaf Derviş, M.D. After The Turkish Republic was established, the second gynecology clinic was constructed in 1942 (İstanbul Tıp Fakültesi, 2013).

After that, in 1966 a Women’s Birth Clinic and Midwifery School was established within Cerrahpaşa Hospital and in 1998, midwifery became an undergraduate program for four years. In 2000, İstanbul University founded Şişli Vocational School and it still gives education of midwifery. Today, midwives receive a university

degree and work with obstetricians together at hospitals (The Turkish Association of Midwives, 2013).

To summarize, the role of hospitals in childbirth and the increase in operational methods are still controversial subjects worldwide. Compared to hospital birth, home birth is rare; but midwifery still continues to play an important role in hospitals and birth centers working together with obstetricians. Today, it is the women's right to choose where and how to give birth, with the help of the healthcare givers.

### **2.3. Types of Childbirth**

There are two types of childbirth in the 21<sup>st</sup> century, first is vaginal or natural birth which is through the birth canal, second is abdominally by an operation called Caesarean section (Lowdon, 2002). Since the requirements of both are quite different, the decision should be made with the healthcare giver.

#### **2.3.1. Natural Birth**

Natural or vaginal birth is the type of delivery without a medical operation. It could be performed at home, in a birth center or in a hospital (Lowdon, 2002). The number of people demanding natural birth is decreasing for several reasons. One of them is the issue of pain (Lowdon, 2002). The pain of natural birth is frightening for most of the women but pain caused by contractions in natural delivery is essential to guide the labor. The mother moves and shifts positions instinctively which helps the baby to settle in a right position to start delivery. If the pain is eliminated totally, the



feedback system of the body does not work and labor slows down. This is the reason why active participation of the mother is very important during the natural course of birth (Lothian, 2000).

As Lowdon states, other reasons to choose medical birth, apart from medical necessities are; the widespread demonstration of vaginal birth as a risky method for the baby, vaginal birth's implication as an intrusion over privacy since it requires close contacts with multiple care givers, fear and hesitation of mothers to see blood, urine or any other biological fluids that accompany natural birth, long waiting hours in labor, and the other hardships of delivery (2002).

Although natural birth has hardships as Lowdon (2002) states, natural, intervention free birth is still the safest, healthiest and most advantageous type of birth for both the mother and the baby. It is a widely accepted fact that babies who are born naturally are less likely to develop respiratory illnesses since contractions prepare the baby's lungs for respiration. Babies born with Caesarean section, tend to suffer from asthma in later years. Baby's passing through the canal serves as a system to alert various systems of the body. Also, there are numerous advantages for the mother. The mother can get up, continue her daily life even drive the very same day. Women usually feel stronger, fulfilled and accomplished with natural birth.

### **2.3.2. Caesarean Section**

A Caesarean section is the name of a medical procedure that generally takes place in hospitals by obstetrician gynecologists. It is performed under anesthetics. A Caesarean section is the operational procedure of delivery where the baby is taken out by an incision through the abdomen rather than emerging from the vagina (DeFrancesco, 2004). It usually takes forty five minutes to one hour, usually quicker than natural delivery, and it could be scheduled (American Pregnancy Association, 2011).

Ideally, the physician decides whether the patient needs a Caesarean section or not. Normally, hospitals have operation rooms for Caesarean sections. The mother could be taken back to her room after recovery which takes usually one hour (DeFrancesco, 2004). Some hospitals have post-operation rooms where recovery takes place after Caesarean section. In Turkey, the regulation requires mothers to stay at the hospital for two days after Caesarean section and one day after natural birth.

There can be number of medical conditions that require a Caesarean section but it should still be considered as a surgical procedure that holds risks in any case. Infections, harm to the organs, reaction to medication, blood loss, prolonged time of healing and hospital stay and emotional reactions can be seen. Emotional reactions are hardships to bond with the baby and negative feelings about the birth experience. There are also possible health risks for the baby, such as respiratory problems, premature birth, problems caused by anesthesia, or fetal injuries due to the incision (American Pregnancy Association, 2011).

## **2.4. Types of Childbirth Environments**

The type of childbirth also effects the type of environments the birth will take place. The necessary equipment, the type of healthcare giver, access to medications differ from each type of birth and the environment related to it. The place and type of birth are two important decisions that affect the mother and the baby. The two of them are highly related to each other.

There are three main places to give birth. These are home, birth centers and hospitals. These choices regard the medical history, financial status, personal choices of the mother (American Pregnancy Association, 2011). Each of these places offers different design qualities due to the type of care given which makes each of them important to analyze.

### **2.4.1. Home**

Home birth is usually performed with midwives assistance. Healthcare professionals recommend home birth for low risk pregnancies. Home birth is preferred by people who want a natural birth without intervention in a familiar environment. Home gives women the ability to relax and feel comfortable which helps during labor (American Pregnancy Association, 2011).

As Boucher, Bennett, McFarlin & Freeze state, the rate of home birth has been diminishing since the mid 20<sup>th</sup> century due to technological development and advancements in medicine in hospitals but still there is a small amount of women

that prefer home birth. In 2005, over twenty four thousand infants were born at home in the United States (2009).

On the other hand, home birth could be seen as a government promoted event, as in the case of Holland, thirty to forty percent of births take place at home. Holland is the country with the lowest perinatal deaths rate in the world. In Holland, the health system promotes home birth, and claims that the warm, calming and secure environment of home is of great importance to ease labor. In Turkey, home birth rate was determined as ten percent. In rural regions it is twenty seven and in Middle Anatolia it is one percent (Bayram, 2009).

General reasons to prefer home birth are increased personal control, comfort, freedom of movement, and request on medical intervention free birth (Boucher et al., 2009). Home is perceived as a place where mothers felt more confident, secure and in control compared to the hospital. The familiar atmosphere, lack of noise and disturbance, the sense of belonging and the ability to access the baby anytime are advantages of home over the hospital. Having preference over visitors, freedom over daily routines or eating habits give women freedom instead of the strict rules of the institutions (Lock & Gibb, 2003).

#### **2.4.2 Birth Centers**

Birth centers or free standing birth centers are places founded to provide women a more relaxing and free environment to give birth. Midwives are the common care

givers, in some cases Obstetricians also use birth centers located inside hospitals to give birth. Birth centers are recommended for low risk pregnancies which may require mild intervention. These centers are preferred since they do not have as strict regulations as the hospitals so they provide more freedom and control to the mother (American Pregnancy Association, 2011).

Birth centers provide continuous physical, informational, emotional support and can give individual care throughout labor. Birth centers avoid using standard interventions and focus on each mothers' own physiology to respect differences of each pregnancy. Nonetheless, there could be drawbacks. Although most of these centers are located near hospitals, immediate medical help may not come in time and all kinds of pain medication may not be available (American Pregnancy Association, 2011). In Turkey, birth centers do not exist. The places to give birth are limited to homes and hospitals.

### **2.4.3. Hospitals**

Today, hospitals are the most common places to give birth. In hospitals, the care givers are physicians, that relates hospitals with the medical model of care. Hospitals are generally targeted at high risk pregnancies that could require medical interventions (Childbirth Connection, 2012a). Nonetheless, today hospitals are preferred by regardless of the risk of pregnancy since people feel secure where they can access medical help if necessary (American Pregnancy Association, 2011). In the case of high risk pregnancies, hospitals are well equipped to take care of difficult

complications of the mother and the baby. If birth is given outside the hospital, in such complications the mother has to be transferred to a hospital. In this case, the hospital provides continuous care with medical professionals in the same environment. If medical pain relief is required, hospitals can provide it immediately, while in some cases, it could not be possible at home or in birth centers.

On the other hand, hospitals may have disadvantages over other types of childbirth. In a hospital the mother could receive a standard care that takes into consideration the medical and technological necessities more than individual physiology of the mother. Hospitals may also use unnecessary medical interventions. Hospitals may not give continuous physical, informational, and emotional care that the mother needs since the busy run of the hospitals and the changing shifts of the healthcare staff (Childbirth Connection, 2012a).

## **2.5. The Effects of the Physical Environment on Childbirth**

The significance of the environment on birth has been evaluated by its different effects in literature. Lock and Gibb state that the transfer from home to hospital is alienating for mothers and home is the place where women feel more secure, strong and safe. Hospitals create feelings of lack of control and disempowerment since they are not a woman's territory (2003).

Shin and Maxwell conducted a study on how interior architecture affects the birth experience. They evaluated how homely environments contribute to positive feelings

by providing personal control over the physical environment, visual access, visitors and privacy. The results showed that personal control contributes to the sense of whether the environment is perceived as “homely” and gives patient freedom of choice to ensure personal privacy and create a personal territory (2004).

The National Childbirth Trust (2003) conducted a wide ranged survey on almost two thousand women to find out what aspects of the physical environment made a difference and the level of control women felt they had over the environment during labor. According to the survey, ninety-four percent of the women stated that the environment affected their ease of labor. Above all the features women rated access to facilities such as a clean environment, large space for movement, en suite toilet, control over who enters the room, hears or sees them, control over temperature and lighting. Apart from these factors, the importance of staying in the same room through the labor, access to bean bags and pillows, having a place for visitors, easy access to food and drinks, desire for a homely environment and moveable furniture were mentioned.

Hodnett, Stremmler, Weston & McKeever (2009) and Walsh argued that the hospital bed also should be removed since it makes women immobile (as cited in Fahy and Parratt, 2006: 46).

Fahy and Parratt introduced the “Birth Theory” and evaluated the physical environment with relation to Michel Foucault’s “power” and “place” relationship. The sub categories were divided into two; “Sanctum” and “The Surveillance Room”. The Sanctum represents the homely environment while the Surveillance Room is



related to the clinical atmosphere. The results showed that homely environments have positive effects on both during and after the labor. Their comparison revealed that homely environments made the labor easy as well as contributing to a stronger mother-baby bond (2006:46).

Lepori (1994) states that today birth is perceived as an illness rather than a natural event and that approach creates standard hospital rooms. She further puts emphasis on the importance of movement during labor where women lack in most of the hospital rooms and she suggests that new models of design should be introduced.

In conclusion, it could be observed from the previous research that the built environment plays an important role in childbirth experience. These environments could vary from homes, hospitals to birth centers or other places that birth takes place. Each of these places offers different qualities so the experience in each of them is different from one and other. To summarize, it could be pointed out that the built environment should be considered as an active factor while considering the medical requirements and necessities of childbirth.

## **2.6. The Layouts of Delivery Models in the Departments of Obstetrics and Gynecology in Hospitals**

It is important to understand the schematics of medical care to understand different environments that the mother and the baby experience from the beginning to the end of birth. In addition, in order to plan and design these facilities, the patient flow, the

medical system, the floor plan and the support areas should be well elaborated to provide time efficient care (DeFrancesco, 2004).

In the department of obstetrics and gynecology, there are two types of services. Obstetrics is specially dealing with pregnancy and childbirth while gynecology is specialized in the healthy reproduction of the female body (Mayoclinic, 2013).

The department of obstetrics is an important part of the hospital to care for the mother and the baby before, during and after birth. Today these facilities accommodate; labor, delivery, recovery rooms and postpartum (after delivery) rooms, fertility, breast health and genetic counseling centers and perinatal care for the newborn (Binggeli & Greichen, 2011: 663).

Type of delivery and the number of deliveries anticipated are the key determinants of an obstetrical unit's layout. There have been used three models of delivery until today. First is the traditional model; second is thr LDR model and third is the LDRP model (Skaggs, 2008) LDR and LDRP rooms can be referred to as a “birthing rooms” (Binggeli & Greichen, 2011:663). The hospital should decide on the model of delivery (traditional, LDR or LDRP). This will affect overall design of other areas such as nurseries, areas for staff and patients, as well as required staff skills (Skaggs, 2008).

### **2.6.1. The Layout of the Traditional Model**

The traditional model of delivery was commonly used in 1970's in the USA, which was also referred to as ‘three-room delivery’. It is an institutional model of care

which is still provided by the institutional maternity services in Europe (Lepori, 1994).

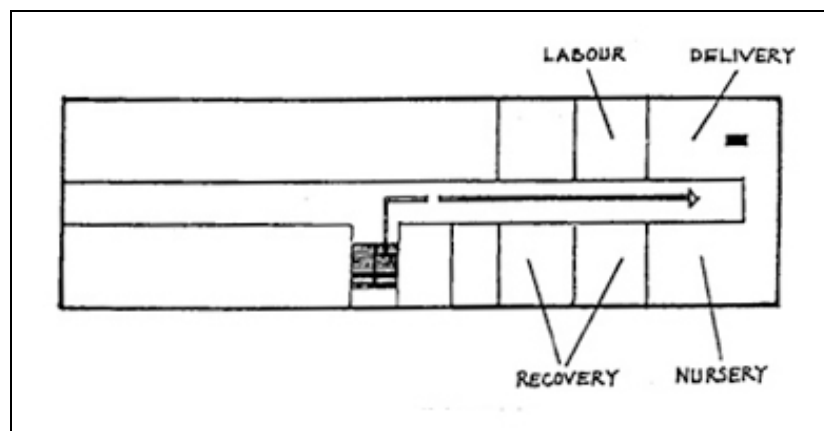
When the mother arrives at the hospital's obstetrics department, often she is admitted to a prelabor room to monitor if she is ready for labor, or if she is in false labor. At this point, it is the healthcare professional's decision to monitor the mother or send her home to wait. This room is usually adjacent to the emergency department and the labor and delivery rooms if the mother is ready to give birth. If the pregnant woman is ready to give birth, she skips the prelabor area and is admitted to the labor or delivery rooms immediately where labor initiates and the baby is delivered. The labor and delivery rooms are the center of the obstetrics area (DeFrancesco, 2004).

The traditional model of delivery occurs in a set of different rooms or places that the mother is transferred between different stages of labor. However this transportation can hold risks for women and labor and this is an extra effort for the nurses (Herrold, 2009).

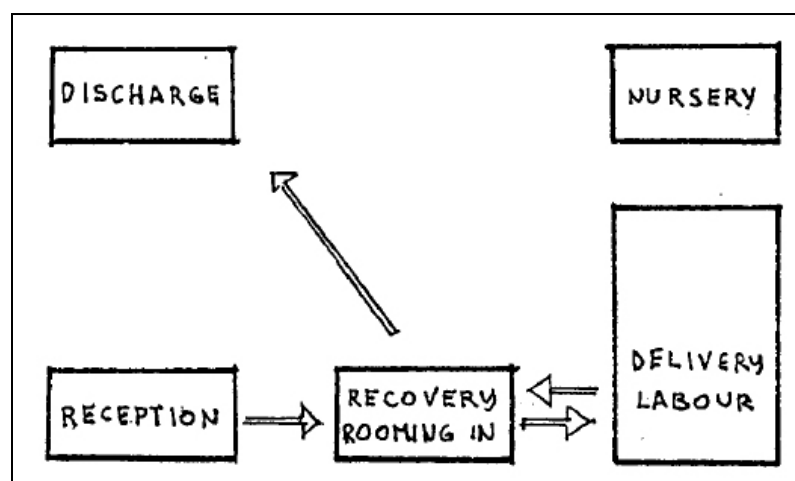


**Figure 1.** Process of childbirth, (Herrold, 2009:8)

The traditional system is constituted of different environments for each stage. Labor and delivery rooms are placed side by side, but separated; also the recovery room is apart from those. The nursery is separated from the recovery room, and the mother and the baby stays apart. In all of the rooms, the look is very institutional, the main piece is the bed and the room is covered with operational machinery (Lepori, 1994).



**Figure 2.** The layout of the traditional delivery model (Lepori, 1994:3)



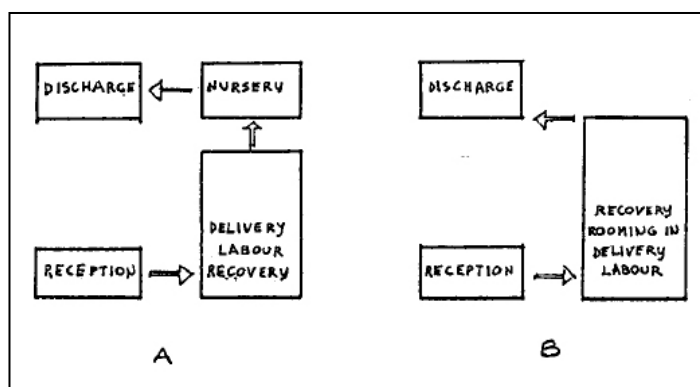
**Figure 3.** The traditional model of delivery that separates each phase of childbirth (Lepori, 1994:3)

### **2.6.2. The Layout of the LDR Model**

In the late 1960's and 1970's, maternity units were one of pioneers to create hospitable healthcare environments. As a response to the clinical look of the hospitals, alternative units started to be designed to create home-like settings. These settings aimed to give patients more control over the environment and to integrate the whole family in the birth experience. Demanding customers were the case and their birth plans required private labor and delivery rooms. As a result of this demand, the new birthing units arose, and not only did they satisfy needs of the patient but increased the market share (Stichler, 2007).

LDRP/LDR rooms became the latest development in maternity care. In the USA, hospitals started integrate the labor rooms and delivery rooms into LDR and LDRP rooms (Stichler, 2007). These rooms included different stages of natural birth in the same room, without the need to transfer women between stages of labor. The difference of LDR rooms from LDRP rooms is; LDR rooms are a version of LDRP rooms that do not contain the postpartum stage, that the mother is transferred to another place after recovery (Philips, 2003).

The LDR and LDRP rooms are targeted at vaginal deliveries for both low and high risk pregnancies, since they also accommodate the needed equipment for emergency situations. Beyond their functions, these rooms have aesthetic qualities which show positive psychological effects on women, and also increased the income of the hospital (Stichler, 2007).



**Figure 4.** Comparison of LDR and LDRP models (Lepori, 1994:5)

The LDR room is a fully equipped room for low risk vaginal deliveries where three stages of birth; labor, delivery and recovery occur (Philips, 2003). After admittance in the triage, the mother is placed in the LDR room to deliver the baby and stays there until she recovers, and after recovery, she is transferred to the postpartum room. The newborn will be either transferred to the nursery or stay with the mother in the postpartum room. The LDR room is also used for unplanned Caesarean sections during the first part of delivery. For actual delivery by operation, the mother is transferred to the operation room. After the delivery, the mother is moved to the recovery areas (Skaggs, 2008).

In the LDR room there is a LDR bed that can be adjusted to multiple birthing positions. If there is a complication or a need for a minor procedure (apart from Caesarean section or multiple births) the mother can be taken care of in this unit without a need to move to an operation room. Although local anesthesia is used in some cases, general anesthesia is not usually performed. After birth in an LDR room the mother and the baby is moved to separate rooms for postpartum unless the

hospital has a joint place for the mother and the baby. The early attachment of the mother and the baby is cut at a critical time. The separation appears in a period where the mother has not yet recovered and the baby's early receptive phase is still ongoing. Also staff of the department uses extra energy to transfer mothers and babies between different rooms and use effort to maintain and clean all these rooms for multiple times for the next patients (Philips, 2003).

### **2.6.3. The Layout of the LDRP Model**

LDRP is also referred to as "single room maternity" care since women stay in the same room from admittance to the hospital until discharge. The LDRP method also addresses one nurse for one mother and baby, which means continuous care. The baby also stays with the mother the whole time which is called "rooming in" (Anderson & Stone, 2013).

In traditional labor and delivery rooms, the mother is transferred through rooms at least three times; maybe five if a Caesarean section is performed. Data based on medical errors, interruptions in treatment, and risks about safety occur during transfers. The rooms that are adaptable for single care show ninety percent decrease in transfers and seventy percent decrease in patient falls and errors related to medication (Stichler, 2007). Important contribution of these rooms is that they help to establish an early and continuous mother baby bond since the mother does not have to change rooms from entering labor until discharge (Anderson & Stone, 2013).

A LDRP room is an improved version of a LDR room with the addition of a postpartum unit. All stages of labor occur in a single room, where the mother and the baby stay together the whole time. For this reason it is referred to as SRMC (single room maternity care). A LDRP room provides family centered maternity care not just for the mother but for the newborn baby and the family with dedicated zones. LDRP room is not just an operational system but a program that requires educated staff, patients and parents (Philips, 2003).

LDRP rooms are suitable for vaginal deliveries and cut out the need to transfer the patient between rooms. Also, like the LDR model, the first phase of the Caesarean sections can be initiated here before transferring to the operation rooms. Also Caesarean section patients could use LDRP rooms as a postpartum room, this way these rooms can serve for multiple purposes since they are normal patient rooms with full equipment (Skaggs, 2008).

## **2.7. Key Considerations for Designing a Birthing Room**

The Department of Health of United Kingdom released a guide book for the design of the maternity care facilities. According to the guide, there are seven key principles to consider while designing a birthing room (2013).

1. Protecting the mother and baby from any harm
2. Providing inhabitants privacy, respecting their virtue, allowing unrestricted movement and comfort



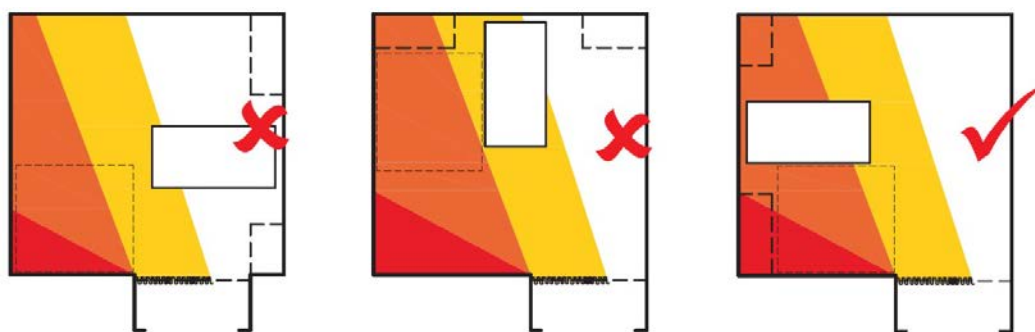
3. Providing healthcare support, equipment and service in one room without transferring women
4. Creating an environment that could accommodate any necessary activity
5. Creating flexible places that could be transformed due to changes in need or policy
6. Minimizing the possibility of infection spread
7. Providing places to reach water to ease pain (U.K Department of Health, 2013:24).

Other recommended qualities of the birthing room are:

1. Sanitary facilities should be placed inside the room.
2. Providing closet and storing places for the mother's personal belongings.
3. Places to have beverages
4. A separate place in the room or next to it to keep hygienic equipment apart from the room until needed
5. A place for the accompanying person. Either a fold up bed of that could be put in the storage area or that could be fold back in the wall, either way the flexibility of the room should be considered.
6. Resuscitation area for one baby that is fixed to the wall, in case of multiple births a mobile center that could be provided. The place on the wall should not inhibit access to the birth pool and should be apart from places for drinking.

7. Medical gas outlets should be placed in the bedhead area that is covered up to create a non-clinical atmosphere. They should be easily accessible wherever the mother is inside the room.
8. Twin socket-outlets should be provided.
9. Basin for hand wash for the staff
10. An area for writing if requested by policy, a trolley if Electronic Patient Records are in use (U.K Department of Health, 2013).

In order to improve the birthing experience, the patient rooms should be spacious and large enough to take in family members and the mother to move freely (Herrold, 2009). Moreover, rooms should have places appointed for the nurse close to the door, healthcare staff; doctor or midwife near to the foot of the bed, the newborn care at the footwall near the doorway and the family near the window (Stichler, 2007). To ensure privacy, it is advised that the bed should be located around the corner from the access space of the room to provide personal privacy as seen in Figure 5 (U.K Department of Health, 2013). The privacy of the patients should be kept in positions to protect their privacy from the hallway (Binggeli & Greichen, 2011).



**Figure 5.** Bed locations and privacy (U.K. Department of Health, 2013:30)

The active area for delivery should not be visible from the access area of the room to ensure privacy. This area should have the capability to be placed against a wall where there is necessary equipment, and there should be handrails for women to move by herself during labor (U.K. Department of Health, 2013).

There should be enough space in all birthing rooms to facilitate necessary medical equipment. In LDR and LDRP rooms the required footage is approximately 27.9 square meters (300 sq. ft.), providing a minimum of 4m in length (13 ft.) (Binggeli & Greichen, 2011).

The wall of the bed should be aesthetically designed and have enough space to provide emergency equipment for the mother and the baby. The medical gases needed such as oxygen, suction must be placed on the headwall beside the fetal monitor, in the nursing zone to be most accessible when needed. The newborn zone should accommodate the needed medical equipment (medical gases, resuscitation machine etc.) on the headwall for emergencies or small interventions. Equipment like monitors should not be put on the shelves below the patient's head where they can fall and injure the patient. Also televisions should be inside closets rather than be mounted on the wall to prevent possible injury (Stichler, 2007).

Bathroom doors should be wide enough to fit the patient, the staff and the IV stand. Doors openings are recommended to be near 180 centimeters, either a sliding door or two door panels that can accommodate the nurse and patient moving through the opening simultaneously. Patient falls mostly happen while walking to the bathroom, so the room should have lighting options for day and night. Especially for the

birthing room, the bathroom has to be specialized; there should be shelves at optimum height to provide cleansing material for the mother. These shelves protect the patient from falling while trying to access these materials or possible infections from contaminated material from the dirty floor. Open showers with an optimum sloped floor for drainage could be designed to keep patients from falling and it could be accessible for the handicapped people. Also the bathroom should be supported with handrails or places to rest (Stichler, 2007).



**Figure 6.** LDR room with birth pool in Klinikum Fürth, Germany (<http://www.klinikum-fuerth.de/>)

Birthing pools are optional parts of the birthing room but if it is to be designed they should be designed as a whole with the birthing room. The floor surface should be appropriate for wet areas and should be an integrated part of the whole floor surface. Support equipment such as handrails should be provided (U.K Department of Health, 2013).



**Figure 7.** LDR room in Heidekreis Klinikum Hospital in Walsrode, Germany (<http://annwyse.blogspot.com/2013/03/labor-delivery-rooms.html>)



**Figure 8.** LDR room in Asklepios Children Hospital in Sankt Augustin, Germany (<http://annwyse.blogspot.com/2013/03/labor-delivery-rooms.html>)



**Figure 9.** LDR room in Asklepios Children Hospital in Sankt Augustin, Germany (<http://www.asklepios-kinderklinik.de/impressions.html?L=1>)

There should be a separate place for examining the newborn that is away from the patient bed to eliminate crowding. There should be places for the mothers personal belongings, and the medical equipment should be kept out of sight when not needed (Herrold, 2009).

The needed equipment for emergency situations should be within the room to eliminate transfers. There should be alarm and security systems in the entries. Some new developments monitor movement of the baby to eliminate identification mistakes and child abduction. Keeping the baby beside the mother as long as possible is also important in terms of security (Stichler, 2007). In LDR and LDRP rooms delivery lights should be movable; recently these are mostly adjustable lights. If portable lights are used, storage must be provided inside or outside the room. The delivery process requires lots of movable equipment for the delivery and also for the whole birth process such as bassinet, stool, mirror, incubator etc. (Skaggs, 2008).

If a hospital has more than twenty five postpartum beds, it should have a nursery for the newborns that is 50 square meters minimum. Today, hospitals have been using LDRP rooms to accommodate the babies with the mother, and this eliminates the need for a separate nursery. Also this change is cost efficient since it requires the same amount of electricity, ventilation or medical equipment the number of the normal newborns in the nursery reduces and unnecessary crowding is eliminated (DeFrancesco, 2004).

LDRP rooms increase the sense of control by adjustable lighting, temperature and soundproofing. The reduction in infection control by keeping the infant apart from other babies is one of the most important features of single-room maternity care. The new development in maternity care will continue to affect the built environment of childbirth (Skaggs, 2008).

**Table 1. Comparison of LDR and LDRP rooms**

<b>Comparison of LDR and LDRP rooms</b>		
<b>Comparison Criteria</b>	<b>LDR Labor-Delivery-Recovery Rooms</b>	<b>LDRP Labor- Delivery- Recovery-Postpartum Rooms</b>
<b>Efficiency</b> <i>In terms of healthcare provider</i>	Difficulty of finding where the mother and the baby are transferred after birth.	Ease of patient rounds since the mother and the baby is always in the same room. Enhancing the relationship between healthcare staff and patient.
<b>Efficiency</b> <i>In terms of patient and the family</i>	The mother is usually transferred to a postpartum unit one hour after the birth which the most critical period of recovery.  Mother baby bond is disrupted at a critical time	Mother and the baby are only separated according to the mother's demand.  Newborn care is provided near the bedside of the mother which ensures continuous mother-baby bond.
<b>Functionality</b>	Rooms are for a single function.	Rooms are for more than one function.
<b>Financial efficiency</b>	Multiple care areas require repetitive maintenance and monitored by different budgets.	Single care areas require a united cost system that is easily tracked and patient expenses can be monitored quickly.



<b>Maintenance</b>	The bathroom, floor and the whole room has to be cleaned after the mother is transferred to postpartum for the next patient.	The room serves for only one person that reduces the costs for maintenance
<b>Standards of care provided</b>	The World Health Organization, UNICEF and American Academy of Pediatrics promote programs that keep the mother and the baby together. The mother and the baby are separated at the last phase.	The World Health Organization, UNICEF and American Academy of Pediatrics promote programs that keep the mother and the baby together. The mother and the baby are together the whole time.

**Table 1. Cont. Comparison of LDR and LDRP rooms (Philips, 2003:70).**

When planning an obstetrical unit, the key consideration is to analyze the birth or delivery. The American Academy of Pediatricians' and the American College of Obstetricians and Gynecologists' Guidelines of Perinatal Care has a survey to determine the need for LDR or LDRP services (as cited in Skaggs, 2008:86).

- Will the LDR and LDRP rooms be used by planned operational deliveries for other purposes before surgery, during recovery or after birth?
- What is the highest number of anticipated births that will happen in a year?
- What is the total duration of stay of patients in the hospital through all stages of labor (before, during, after).

- Will the LDR or LDRP rooms be used for different functions such as monitoring patients prior to labor or after labor? The duration of these patients has to be determined in order to achieve an optimum number in calculation.
- What is the anticipated number of Caesarean section operations, planned or unplanned?
- What is the number of foreseen occupation number of all kinds of patient rooms?
- What is the maximum number of patients anticipated and the repetition of that highest period in a year?

After the data is collected, the number of LDR and LDRP rooms can be determined with the following calculation: *Number of patient episodes x mean overall length of stay: LDR/LDRP room needed/365 days x room occupancy rate*

Other than this calculation some set standards can be used for calculating the room needed for LDR, LDRP and Caesarean sections:

- 1 LDR for 350 vaginal or unscheduled Caesarean sections
- 1 LDRP per 100-200 vaginal or unscheduled Caesarean sections
- 1 Caesarean sections or delivery room per 400-600 annual births (If hospital receives less than 1000 deliveries these benchmarks could be used, if they received more over the years it has been seen that the number leads to fewer rooms then needed) (Skaggs, 2008).

## **2.8. Design Criteria of The Ministry of Health for LDR rooms in Turkey**

In 2012, The Ministry of Health of Turkey has published a directory about birthing rooms for new hospitals to be constructed. In terms of this directive, birth will not happen in different rooms, but women will stay in the same room throughout labor and delivery. The room is referred to as SDL room (Sancı-Doğum-Lohusa), the Turkish names of Labor, Delivery, Recovery (LDR). Bathrooms will be provided for LDR rooms. The room has to be minimum 16 square meters (4.00 m x 4.00 m), the bathroom excluded. There has to be central nursing zones and drug preparation areas that could observe these rooms easily. The floor should include; the operation room for Caesarean section, NICU (Neonatal Intensive Care Unit), doctor's room and midwife's room close to LDR rooms. These rooms that are listed above should be inside a separate zone, kept apart from the general circulation area by controlled transition.

The LDR room should accommodate:

- Patient bed that could be transformed into a birthing bed
- Open bed with radiant heater for the newborn
- Multipurpose washing basin with closet
- Sofa for visitors
- Closet for the patient
- Maximum natural lighting and air-conditioning will be provided, an additional climate control will be considered

- Like all Intensive Care Units, on the sliding doors, there has to be 19'' monitors to project patient information to the desk and data cables has to be connected above the patient bed side unit.
- While planning LDR rooms, the entrance of family and visitors should be considered in order to achieve patient privacy (The Ministry of Health of Turkey, 2012).

The new LDR rooms that will be planned in the hospitals has to be calculated according to the number of beds if otherwise is necessary.

Number of patient beds for birth:

- 20 – 50 beds: 2 LDR
- 51 – 99 beds: 3 LDR
- 100 beds: 6 LDR
- 200 beds: 12 LDR
- 300 beds: 18 LDR
- 400 beds: 24 LDR rooms will be provided (The Ministry of Health of Turkey, 2012).

Regarding the International Standards, this guide could be broadened with considerations of aesthetics, privacy and personal control. A detailed assessment could be made to enhance personal storage places, personalization and creating places for the family to participate in the birthing experience.

This chapter summarized definitions of different types of childbirth methods and the different environments related to them. In addition, the effect of the environment, key considerations for design of birth environments are discussed while new approaches and governmental regulations regarding the birthing rooms are introduced. The following chapter focuses on the patient centered approach in healthcare design and research. It will detail the models of patient centered approaches and the concept of control.

## **CHAPTER 3**

### **PATIENT-CENTERED APPROACHES IN HOSPITAL DESIGN**

Today, healthcare and design research show a parallel understanding with patient centered healthcare and user centered design approaches. Both of these terms aim to generate the same idea, the human and its needs should be put in the center. This chapter talks about the historical development of these approaches and how they are applied to healthcare environments.

#### **3.1. User Centered Approaches in Design**

The term “user-centered” was first used in the field of computer sciences, in University of California San Diego in 1980’s. The first area of use was to provide a legible and effective interaction between the user and the computer system. According to this approach, the designer’s role is to create a model of use that the product requires the least amount of training on how to operate it (Kahraman Haliloğlu, 2010).

User centered approach in design takes the user as a focal point. It aims to increase the efficiency of the product by integrating the user in the design process. To achieve the maximum satisfaction of the user, the needs, limitations, choices and expectations of the user is taken into account and their acts on the final product is evaluated afterwards for further design implications (Kahraman Haliloğlu, 2010).

In the built environment, the most important emphasis of the user centered design approach is that the place exists to promote the activities of its users. The user centered design approach aims to understand and analyze the experience of the user. It points out that the user is not a passive actor but the environment and the user have a two-way relationship that affect each other. So the acts, behaviors of the users are shaped by the environment which the user transforms actively (Vischer, 2008).

The acts and behaviors of the users are feedbacks used to analyze the quality of the built environment. The quality is comprised of both the functional comfort that the space offers and the degree of environmental stress the users have to cope within this space. As an example, users may express discomfort about the furniture of their offices but this problem could be generated not because of the furniture arrangement but moving out of individual offices to cubicles. In addition to the feedbacks of the physical actions, more comprehensive and cultural issues such as privacy and how it affects the users are noted for improvement (Vischer, 2008).

In the case of healthcare design, a majority of the hospital design projects take into account the cost and functionality of the hospitals, usually based on the decisions of administrative and healthcare staff, policy-makers, designers and constructors.

However, the purpose of the user centered design approach is to create spaces that meet the needs of existing and future users of these spaces while taking their preferences into consideration (Andrade, Lima, Fornara et al., 2012).

### **3.2. Definition/ Models of Patient Centered Approaches in Interior Architecture**

In the 19<sup>th</sup> and beginning of the 20<sup>th</sup> century, hospital design was regulated by new technological developments, operational necessities and new medical approaches on health problems. For only the last twenty years the requirements of users; such as patients, visitors and families have started being acknowledged. However, the reality that the physical environment has deep effects on health conditions is not a new topic. In 1895, the acknowledged nurse Florence Nightingale stated multiple aspects of the physical environment to be effective on health, in her book *Notes on Nursing*. She mentioned features like climatic conditions, lighting, aesthetics, furniture to materials and colors (Harris, McBride, Ross et al., 2002)

In the late 1980's and beginning of the 1990's researchers showed interest in hospitable environments that are warm and welcoming with the increasing acknowledgement of the positive outcomes of design on patients. From the 1990's with the emerging concept of "healing environments", researchers turned their face to a concept that is called "patient-centered care" (Devlin & Arneill, 2003:672). As Dijkstra, Pieterse and Pruyn state, the traditional approach was to design facilities that only deliver health, later on this approach developed into creating places that also regards the psychological well-being of the patients (2006).



“Healing environments” is a concept that emphasizes the restorative power of design which also helps the physical condition of the patient and help coping with chronic and acute diseases. As Ulrich states, traditional approaches created places that were ‘hard’, these hard spaces only satisfy functional qualities but disregard psychological needs of the patient. Moreover, he suggests that research shows that poor design conditions can have negative effects on the health condition of the patients such as increased blood pressure, depression and anxiety (1991). Healing environments accommodate spaces of privacy, positive attractions, places that are connected to the nature, coherent wayfinding systems and improved design features to minimize crowding (Sweeney, 2008).

According to the Institute for Healthcare Improvement in England, the healthcare providers are today under financial pressures since the healthcare industry developed to be a competitive market and this approach made them to focus on requirements of the competition (Institute for Healthcare Improvement as cited in Sweeney, 2008:5). Patient centered care arose as a response to pressures in healthcare (Devlin & Arneill, 2003). In 2001, patient centered care was one of the recommendations of the Institute of Medicine to be a major goal of 21<sup>st</sup> century healthcare system (Sweeney, 2008:5).

The main purpose of the patient centered care is to acknowledge the patient’s needs, differences in cultures, patient’s preferences and values. Patients, their families and healthcare providers should be integrated in collaborative decision making process. It also emphasizes that patients should be able to access information related to their health status (Sweeney, 2008).

### **3.3. Patient Centered Design**

The patient centered approach in healthcare and the constructional developments in healthcare facilities led to a new concept called “patient centered design”. The focal point of patient centered design is to create physical environments that improve the patient’s overall experience.

The traditional approach in healthcare design usually targeted on the needs of the physicians rather than patients and staff. Interviews with hospital patients show that patients want environments that are accessible, home-like, connected to nature, nurture staff-patient relationship. Patients expressed the needs for privacy, spaces for visitors and family and places for recreational activities (Sweeney, 2008).

One of the very important models of patient centered care is called “The Planetree Model”, which was initiated in 1978 as a major change in healthcare. The aim of the model is to, bring healthcare professionals and patients together, integrate patients in the decision making process, promote patients’ rights to access information and to include families and patients in this process. The Planetree Model considers the healthcare environment as a component of the healing process and targets to create homelike, aesthetically pleasing and comforting environments that aid the well-being of patients (Andrade et al., 2012:98). Another approach towards “humanizing healthcare” is Private Finance Initiative in U.K. points out the need to construct environments according to the existing users of the healthcare environment and involve them in the design process (Andrade et al., 2012: 98).

To summarize, as Devlin & Arneill state, the main argument of patient centered design is to give the patient the freedom of choice, in other words ultimate “control” over their healthcare process. It aims to give the patient control, a concept highly acknowledged in environment and behavior studies. Control has been noted as an important issue since hospitals are few of the places that people feel that lack of control. Moreover, in healthcare related research, control has been related to positive health outcomes such as; decreased levels of stress and increased well-being of the patient. In hospitals intrusions on privacy, incomprehensive way finding systems, lack of control over stimuli such as television, noise or windows are factors that patients feel lack of the control over the environment (2003).

#### **3.4. Control as a Part of the Patient- Centered Approach in Labor & Delivery Rooms**

“Control is defined herein as mastery or the ability to either alter the physical environment or regulate exposure to one’s surroundings.”  
(Evans & McCoy, 1998).

Human beings have a strong urge to control the environment they live in. Uncontrollable events and surroundings create distress in people that also create negative health outcomes. People who experience a lack of control may suffer from elevated blood pressure, increased stress and anxious behaviors. The sense of control over the stressor can help to eliminate these negatives outcomes. As an example, the music coming out of the window can create stress while playing the same music at home with louder noises does not. The controllable agents are less likely to become stressors for human beings (Ulrich, 1991).

In addition, blocking personal activities and behaviors have a negative impact on people. Studies conducted on crowding, indicate that people experience stress when their movement is blocked. Furthermore, if restrictions become continuous, it creates an effect on people that is called “learned helplessness”. Learned helplessness is usually experienced in places where extreme noise and crowd occurs. These feelings leave people with the understanding that they can not change or alter their surroundings (Evans & Cohen, 1987).

As stated by Devlin & Arneill, hospitals are one of the few places that people have the least control over their environment. In order to deal with this uncontrollable environment, patients develop certain behaviors. While some patients show attitudes of extreme obedience and play the good patient, the other group show signs of anxiety and aggressive behaviors and play the bad patient. To change this behavioral pattern patient’s sense of control should be promoted by giving them the freedom of choice and access to information (2003).

The tie between stress, health and design has been acknowledged by several studies, but only a few of the research was conducted to relate which design qualities promote the sense of control and help patients deal with stress (Ulrich, 1991).

Today, there is a growing amount of evidence supporting the importance of control in the birth experience. Control has been an underlined issue not only by women but also the healthcare professionals and critics (Namey and Lyerly, 2011). As Green et al., state that control or loss of it is highly critical for the birth experience and the well-being of the women psychologically (2003). Although the significance of

control has been commonly acknowledged, the issue of control lacks an established definition in childbirth related research and existing definitions are apt to different interpretations since control has multiple aspects (Namey et al., 2011; Jones, 2011). Moreover, prior research mostly studied levels of perceived control using numeric measurements rather than using qualitative methods to observe lived experience of control (Jones, 2011).

The need for clearing the definition of control in childbirth has multiple reasons. The ambiguous definition of control may lead to computing the results differently in research since mothers-to-be, medical professionals and researchers could be referring to different contents. Also, the historical and ideological understanding of birth differs according to every country (Namey & Lyerly 2011).

The effect of personal control in the physical environment on health outcomes has been acknowledged by numerous studies (Beck & Meyer, 1982; Carpman & Grant, 1993; Shumaker & Reizenstein, 1982; Zimring, Reizenstein, & Michelson, 1987; Zimring et al., 1987, as cited in Shin et al., 2004) However, control and its relation the physical environment of birth has been touched upon by few (Shin et al., 2004).

### **3.5. Model of the Study Based on the Framework of Evans & McCoy**

The framework of Evans & McCoy (1998) investigates the role of the built environment on stress levels and human health. Evans & McCoy claim that stress becomes an outcome when human needs are not fulfilled within scarce

environmental resources. Their study aims to introduce a categorization of interior architectural elements that are linked to stress. They claim that the previous research has focused on sociological issues or ambient features such as lighting, traffic or noise that can cause stress. Few studies considered the effect of the built environment as a stressor (1998).

The framework of Evans & McCoy (1998) is made up of five architectural elements and specifically focuses on the interior architectural elements and sub features that are related to them. These interior architectural elements are; Stimulation, Affordances, Coherence, Control, Restorative.

“Stimulation” refers to the information that people are exposed to in a built environment. Stimulation can be visual, acoustical or olfactory such as colors, sounds or smells. These types of information can be constructive and be a positive distraction for people. On the other hand, undesired levels of stimulation can aggravate people and cause fatigue. “Affordances” is the clarity of the function of each space. Disorientation and ambiguities on the use of space leads to confusion and can be eliminated by appropriate markings and signage. Misaffordances in a space can create stress and affect the health outcomes. “Coherence” is also related to the clarity of a space regarding the “legibility of an interior”. Spatial configuration, patterns and wayfinding are important components of a coherent space. Ambiguity can lead to confusion thus create stress. “Restorative” elements refer to scenes of nature, artwork or design features that are positive distractions and have a therapeutic effect on people. These elements can help people cope with stress thus support well-being.

The last element under the framework, which is building the core of this study is “Control”. Control has been evaluated by having the ability to regulate the environment one is in and having a word on the surrounding events. According to Evans & McCoy (1998), cutting down choices and limiting human needs can lead to stress and also cause negative health outcomes. There are fourteen features determined by Evans & McCoy under the element of control. These are are “Crowding”, “Boundaries”, “Climatic & Light Controls”, “Spatial Hierarchy”, “Territoriality”, “Symbolism”, “Flexibility”, “Responsiveness”, “Privacy”, “Depth”, “Interconnectedness”, “Functional Distances”, “Focal Points”, “Sociofugal Furniture Arrangements”.

The framework of Evans & McCoy (1998) has been chosen for this study since it offers one of the most comprehensive frameworks that addresses multiple aspects of the interior space that can be linked to control. In addition, since there are interior architectural elements that are listed under every element, it is appropriate to investigate another built environment with these subheadings. The framework has not been changed or altered ever since. This study takes the framework of Evans & McCoy (1998) and aims to extend and apply it to LD rooms.

In Evans & McCoy’s framework, under the element of “Control” there are; “Crowding”, “Boundaries”, “Climatic & Light Controls”, “Spatial Hierarchy”, “Territoriality”, “Symbolism”, “Flexibility”, “Responsiveness”, “Privacy”, “Depth”, “Interconnectedness”, “Functional Distances”, “Focal Points”, “Sociofugal Furniture Arrangements”. By taking the existing framework as a base, the elements of the LD room has been related to each feature. As an addition to the existing framework,

some of the elements were grouped because they were linked to each other and three important features, the aspect of maternity, cultural factors and stimulation are added by this study. In the end, a framework of twelve elements were constructed.

TABLE 1  
*Interior design elements that may influence stress*

<i>Stimulation</i>	<i>Affordances</i>
intensity	ambiguity
complexity	sudden perceptual changes
mystery	perceptual cue conflict
novelty	feedback
noise	
light	<i>Control</i>
odor	crowding
color	boundaries
crowding	climatic & light controls
visual exposure	spatial hierarchy
proximity to circulation	territoriality
adjacencies	symbolism
	flexibility
<i>Coherence</i>	responsiveness
legibility	privacy
organization	depth
thematic structure	interconnectedness
predictability	functional distances
landmark	focal point
signage	sociofugal furniture
pathway configuration	arrangement
distinctiveness	
floorplan complexity	<i>Restorative</i>
circulation alignment	minimal distraction
exterior vistas	stimulus shelter
	fascination
	solitude

**Figure 10.** Interior design elements that may influence stress.

Evans, G., & McCoy, J. (1998). When buildings don't work: The role of architecture in human health. *The Journal of Environmental Psychology*, 18, 85-94.



**Table 2. Proposed framework of control over the childbirth environment based on the framework of Evans & McCoy.**

**Interior architectural elements that may influence control over the childbirth environment**

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**Privacy**

Spatial hierarchy  
Depth  
Interconnectedness  
Functional Distances  
Focal Points

**Crowding**

**Boundaries**

Visual Boundaries  
Auditory Boundaries

**Climatic & Light Controls**

**Territoriality**

**Symbolism**

**Flexibility**

**Responsiveness**

**Layout of furniture**

**Maternity related factors**

**Cultural factors**

**Stimulation**

### **3.5.1. Privacy**

All animals want to be by themselves during time of birth, and almost every woman looks for someone or help. This difference in needs must be a consequence of a million year period of change. A common behavior is seen in monkeys; labor stops while a human is watching them. The same also applies for women when they are exposed to unfamiliar environments. Fear or anxiety releases the adrenaline hormone which blocks oxytocin, the major hormone that starts labor in women. That is the reason why so often contractions of women start at home but suddenly stop at the arrival to the hospital since the adrenalin rushes, which is known as the “white coat syndrome” (Cassidy, 2007).

Privacy has been emphasized by numerous research related to the hospital environment (Carpman & Grant, 1993; Shumaker & Pequegnat, 1989; Shumaker & Reizenstein, 1982; Zimring et al.1987 as cited in Harris et al., 2002). Privacy organizes the extent of social contact and exposure of self to others (Altman, 1975). Privacy is one's own arrangement of the level of socialization and identifying who will be contacted (Pedersen as cited in Chestnut, 2009: 24). It is more important for patients since they can feel lack of control since the hospital is not an accustomed territory. In some cases the staff needs to intervene and check on the condition of the patient that could obstruct the needed privacy. Other than the staff, the patients' relationship with each other is crucial in terms of achieving desired privacy. Shared rooms for multiple patients may violate personal privacy (Harris et al., 2002). Privacy is related to the number of people sharing the room, the presence of equipment used for visual protection, the place of the sanitary places and the position of the patient bed (Chaudhury, Mahmood & Valente, 2005).

Privacy is not only about obstructing or allowance of other people but having dedicated spaces to spend time with family and friends. The increase in contact with visitors in dedicated zone such as waiting areas or shared spaces, help patients recover easily and improve psychologically (Harris et al., 2002).

Space is an element that can solely affect privacy and constitute a personal territory. Particularly in patient rooms spatial layout is related to aspects of control, privacy and territoriality (Evans & McCoy, 1998). Regarding maternity rooms, personalization of the surrounding can help women feel secure and decrease the negative effects of home-hospital transition (Shin et al., 2004). Kilpi, Valimaki, Dassen, Gasull, Lemonidou, Scott and Arndt state that, in healthcare settings patients' lack of control over the surroundings reduces the sense of privacy and creates stress. Considering the physical aspects, hospitals are differentiated from homes with their room plans, acoustic and lighting qualities, materials, colors and climatic conditions. These unfamiliar conditions of the hospital environment can increase the level of stress in patients (2000).

“Spatial hierarchy” “Depth”, “Interconnection of spaces”, “Functional distances”, “Focal points” and are elements that can help to balance interpersonal relationship thus privacy. “Spatial Hierarchy” reflects the layout system that constitutes a harmony between spaces is crucial for privacy requirements. In interior environments, privacy or balancing the level of interpersonal relationships is a key element to establish a sense of control. Spaces arranged in a hierarchy, enables the creation of places both for solitude and gatherings. Social interaction and isolation are both requirements to fulfill personal privacy. Regulation of social interaction is

provided via spatial qualities that a space offers. Qualities of interiors such as size, location and degree of stimulus affect the level of privacy that a building offers (Evans & McCoy, 1998)

“Depth” signifies the quantity of spaces one has to pass to reach to another. The increase in depth assures more privacy, ability to control social and visual contact. Direction of doorways, intersections of crossing of passages also regulates social relationship. The central points of intersections can be a medium to attract people and create places for interaction “Interconnection of spaces” reflects the network between places via passages, halls and doorways that regulate social relationship refers to interconnection of spaces. “Functional distances” signifies the accessibility of places for the patient thus affects interpersonal contact. “Focal points” work as activity generators thus enhance social interaction which is beneficial for patients (Evans & McCoy, 1998).

In short, privacy is an important factor that affects the overall well being of the patient. Also balancing the level of interaction enhances the sense of control in the healthcare setting which creates positive health outcomes.

### **3.5.2. Crowding**

Crowding is an emotion driven outcome of a subjective experience that is linked to perceived density and environmental situations (Churchman, 2002). In some cases, researchers linked crowding to the amount of people per unit, some of them to subjective feelings and some of them to individual’s psychological reactions. Density

is an important part of crowding, but solely these concepts are not the same, crowding is more intricate than density alone (Zlutnick and Altman, 1972).

In terms of pointing out the determinants of crowding, it could be pointed out that, the density of people, the duration of time spent, the psychological and physiological circumstances, the scarcity of resources and the lack of control over the social interaction are key important factors (Zlutnick and Altman, 1972).

Crowding has key determinants such as:

“Situational/environmental characteristics” the density of people per unit that will spend a considerable amount of time within an environment with scarce resources. This type of condition can be for a short term like an elevator, or a long term period like in a neighborhood (Zlutnick and Altman, 1972).

“Certain interpersonal events” where inhabitants lack control over the relationship with each other. The communication between people is established through a personal control mechanism and whether to contact a person or not is decided. This type of control functions through controlling the physical environment, verbal and nonverbal expressions and other personal factors affecting relationships. In terms of controlling the physical environment, arranging furniture or seating, opening and closing doors function as control systems that affect personal relationships. Other non-verbal personal expressions are body movements, looking to a person or turning the head away; or nuances in speech such as interruptions or the tone of speech. Crowding happens when one of these types of control mechanisms is no longer

applicable. If one is in a high density environment but has the ability to change it, s/he may not be affected by crowding, but if the consequences of leaving this space is higher and one is not able to escape that situation where there is no interpersonal control, then the person may experience the feeling of crowding (Zlutnick and Altman, 1972).

“Personal/subjective events” in situations where personal circumstances make it difficult to control interpersonal relationships. These are psychological determinants of crowding that are related to the lived experiences or personal capabilities. There could be a situation where it is too crowded such as a prison that a person can not avoid contact, or a situation with less people but the individual has less capability to handle that kind of social relation (Zlutnick and Altman, 1972).

Although there is not much research related to the size and shape of the hospital rooms, it is widely seen that patients prefer rooms that are ample and uncrowded. Small rooms are hard to provide space for visitors and raise the sense of crowding. Also restricted public areas are difficult for the daily traffic of the hospital, form of the hallways can be disorienting in terms of integration (Harris et al., 2002).

In short, crowding is an important factor in the hospital setting since it involves many actors; patients, visitors, healthcare staff and many more that work in the same environment and this could create stress on the patient. The feeling of crowding should be eliminated with a design that allows patient to control the level of interaction with others.

### **3.5.3. Visual and Auditory Boundaries**

“Boundaries” signifies obstructions or allowances of visuals and sounds. Restorative design elements can be considered as beneficial visuals that can reduce the amount of stress in a physical environment. These types of elements provide positive distraction, a breathing space and rehabilitation for users. Restoration by design can be achieved by creating views of nature, attractive elements and spaces that will allow withdrawal from the hospital space. Views of nature can be both a positive distraction from mental exhaustion and work as a restorative element. Withdrawal for a certain time can be a restorative intermission for resting. Elements like water features and fire places can create a positive attraction for patients (Evans & McCoy, 1998).

Windows which provide views of beautiful scenery or nature are more preferable by patients. Ulrich states that views of nature help reduce pain, the need for pain medication and help patients recover quickly (1991). Research conducted by Baird & Baird (1995) shows that windows could increase feelings of attachment to the environment (cited in Harris et al., 2002).

Kaplan states that even though nature is not the only restorative environment, it is certainly one of the strongest. Considering the restorative power of nature, the accessibility of nature is essential. Even if it is a small area rather than a forest or a lake side, the accessibility of the small natural environment gives the same restorative effect (1992).

Kaplan talks about two types of attentions. One is involuntary attention that is of an effortless kind, an attention towards something that is of great interest or attraction. The other type of attention is directed attention, a greater mental effort that can cause tiredness and loss of energy. Nature creates a place for “soft fascination” with sceneries of trees, clouds and plants. Nature is a source to keep the directed attention away for a while and ease the mind, have a breathing space for people (1992).

During times of sickness patients have a hard time to compensate noise and control of noise has beneficial effects on healing. Increased levels of noise can cause anxiety, sleeping disorders, increase in perceived pain and lengthen the time of healing. The excessive noise levels can also affect the caregivers (Chaudhury, Mahmood & Valente, 2005).

Noise in hospitals could be generated from several features of the hospital and its inhabitants. Due to their health condition and pain, generally patients are deeply perceptive to noise since they spend most of their time in bed where they do not have control over the sounds. In addition, noises are usually reminders that they are not at home by their nature; such as noises of the medical equipment or other patients. Crying people, alarms and the chaotic environment that the noises create, increase patients’ feelings of fear and anxiety. In particular noise in hospitals becomes even a bigger issue due to the hard materials used on the floor. Soft covers such as carpets assist to control the amount of noise. Noise could also be a problem in shared rooms due to television or the other patient and the visitors (Shumaker & Reizenstein, 1982).



To summarize, the hospital environment is constituted of continuous stimuli that affect the patient. However, control over the stimuli such as noise and visuals can reduce the amount of stress. Restorative element can be added in these environments to contribute to positive stimuli and support the well being of the patient.

#### **3.5.4. Climatic & Light Controls**

Light and temperature are important ambient features that affect the overall satisfaction of the patient. Uncontrollable and unanticipated factors of the environment such as extreme levels of heat or light can cause stress in patients. Design could minimize the level of stress by asserting power to the patient that s/he can control these features (Harris et al., 2002).

Hospitals can have climatic controls due to their energy consumption plans, or they may install systems that go on and off according to the calendar rather than the temperature. Some hospitals may not even have air conditioning systems in patient rooms. The lack of control over the temperature is a highly bothering issue for patients. Although the temperature is set for an optimum level, patients' conditions are different than each other. As an example, patients who are less mobile need warmer environments while patients with fever require otherwise. Also, in some buildings windows can not be opened which makes it more difficult when air conditioning (HVAC), heating or ventilation systems can not operate (Shumaker & Reizenstein, 1982).

Poor lighting conditions also create dissatisfaction in patients. Hospitals are generally inefficient places in term of choosing right fixtures or bulbs for lighting and that

creates places that glare too much or some places that are left too dark. In the hallways, to provide clarity and represent an image of sterility, hospitals use linear fluorescent lights which create a high amount of glare on the shiny surfaces. Lighting design should also be integrated with windows. Windows are usually over lit compared to the halls which disturb patients. Effective coverings enable an optimum light from the outside. The lighting design of the hospital should respect different types of user, for example a healthcare professional needs a different amount of light than a patient resting in the room (Shumaker & Reizenstein, 1982).

In short, light and temperature in the hospital area are two important features since the required amount of it may vary from person to person. For this matter the control over these aspects are very important in healthcare setting to eliminate stress.

### **3.5.5. Territoriality**

In the beginning of 1920's, research indicated that, the concept of territory was constructed through social observations of how individuals and groups behave in urban life. Researchers and observers tended to analyze behavior in certain public spaces such as restaurants, bars or neighborhoods, where specific groups tended to keep their own space and hold others out of it. Such an example is, gang members' behaviors as they own a street of their own or a neighborhood that is divided by its occupants of Irish whites and blacks separately. In daily life, territorial behavior and its signs are visible such as 'no trespassing' and 'keep out' signs, trying to mark a certain space with boundaries. It is commonly known that animals mark their territory and can show aggressive behaviors against intruders. Also people may show

similar reactions in terms of marking their boundaries, and these marks can vary according to the individual, society and the culture (Altman, 1975).

The concept of territory is multidimensional and intricate with different components. These can be listed as; 1) Cause and purpose of behavior (such as eating or mating), 2) Geographical factors (dimension and position of the region), 3) Type of the social group (individual to large groups), 4) Duration or length of time (permanent or contemporary residence), 5) Reactions or behaviors to protect the territory. Related to these factors, there are three types of territories; “primary”, “secondary” and “public territories”, that are classified according how fundamental that territory is to a person or a group (Altman, 1975).

“Primary territories” are the fundamental dwellings of a person or a group, their ownership is well known by others and intrusion without permission is a serious issue. This could either be a home of a family, or a doctor’s office in a hospital where patients are excluded. There is a strong control mechanism surrounding the primary territory since these territories are refuge places that protect the privacy of the inhabitant (Altman, 1975).

“Secondary territories” are semi-public places that could be shared by different individuals or groups. These could be neighborhood bars, restaurants where some people regularly spend time and others use rarely. Although secondary territories are shared places, they can be used by regular people, or social clubs, maybe in certain daily periods. Regulars often have preferred seats, or they can be doing daily jobs in that same place and non-regular users could seem as outsiders. The belongings of the

space could be owned by the regulars and kept from other people or defensive behavior could be seen as reactions to keep the territory (Altman, 1975).

“Public territories” are used temporarily and usually open to everybody’s access. Recreational areas, streets are accessible to public if certain rules are followed. In public territories, the property claim is limited to a time. A bar stool is one’s property but if it is left for a certain period it could be claimed by others. The public space and the use of it are strongly related to the culture or institutional policy. Control mechanisms are also dependent on the designer, if a telephone booth is not designed optimally sound proof, or a public square is poorly planned, then users have to defend their territories with other behaviors verbally or physically (Altman, 1975).

As Altman states, a place becomes more of a territory with personal belongings marking it, such as a young teenager’s room in a house, which is decorated with posters and trophies saying this is ‘my place’ (1975). Hospital settings are usually unfamiliar environments for the patient that creates stress and anxiety. These places are shared with multiple people that are not familiar to each other as well. For this reason, creating environments that give patient control over the environment to create a personal territory with implications of design holds great importance.

### **3.5.6. Symbolism**

The hospital environment creates an “image of the hospital” and “images of the person as a patient”. Hospitals stand on the opposite side of the equilibrium as the “institutional” opposed to the “residential”. The institutional look of the hospital articulates certain images such as cold or clinical, but on the other hand the same

images represent a professional, trustworthy image. The professional image of the hospital is favored in some cases while the cold environment is intimidating for the patients (Shumaker & Reizenstein, 1982: 212).

Other than the physical image of the hospital itself, the design implicates certain messages of hospitals whether the patient is seen as an active participant, or a passive actor. The symbolic message gives away who is in charge and who has to behave accordingly. The meaning taken from the image of the hospital changes according to every patient and patient's past experiences. A barrier could reflect a negative idea to a handicapped person while it does not mean much to someone else. The symbolic meaning of the hospital reveals itself in three main environments; public areas, patient room and bathroom (Shumaker & Reizenstein, 1982).

The inaccessibility of the poorly designed patient bathroom has been always a problem also causing patient falls. Inaccessible patient bathrooms could be symbolically giving the message that the hospital does not acknowledge physical capabilities of a handicapped person.

The institutional look of the hospital settings can create the sense of lack of power in patients. The largeness of the structure, sterile environments, the lack of difference and monotony in material and furnishings, the conditions that restrict personalization creates environments that can cause feelings of stress and powerlessness (Evans & McCoy, 1998).

The symbolic meaning of an institution is the expression of a group of messages that the environment delivers to the users. Architectural characteristics, social qualities, all send messages to the user how they are perceived by the hospital, either as individuals or objects to be acted upon. The symbolic message is formed by many features, so it is one of the most difficult areas to study. Although there is a lack in research in this field hospitals today growing away from the sterile, cold look towards more intimate, warm environments (Harris et al., 2002).

The emphasis on the homely atmosphere of the healthcare environment has been touched upon several times by design guidelines to enhance wellbeing of the inhabitants of institutional environments. For long term care patients it is a positive effect to find a homely environment since they leave their own behind. Architectural interpretations such as using artwork and natural elements, personalization options for patients and using homelike furniture are used quite often. However the meaning of home is quite different for everyone. Homeliness is also related to a familiar environment that accommodates past habits. The space should be similar in scale and form to a home where people used to live in (Joseph, 2006).

Patients in non-institutional looking environments are observed to have better motor functions, they needed fewer amounts of sedative medications and showed less aggressive behavior. Eating habits on dementia patients improve and their food intake increase in dining rooms with a homelier atmosphere (Joseph, 2006).

### **3.5.7. Flexibility**

Flexibility and personalization are important parts to create a territory since accustomed objects, people and environments make people feel confident and secure. The disruption occurring from home to hospital transition can be eliminated by enhancing personalization options. The unfamiliar atmosphere of the hospital, the look of the technical and medical equipment neglects each person's uniqueness and creates a homogenous group made up of patients. This negative situation can be overcome with the help of healthcare professionals and designers. There could be areas dedicated to patients, such as bulletin boards, cabinets for clothing or easy reach tables. The staff could be educated to respect personalized areas such as leaving the clothes of patient in cabinets according to patient's arrangements (Shumaker & Reizenstein, 1982).

The issue of flexibility in healthcare environments has been touched upon very few times. Two important studies in the history have been conducted by Duffy and Hutton (1998) and Brand (1995). Duffy and Hutton (1998) has offered a four theme structure that is constituted of a) shell (structure), (b) service (cabling, lifts), (c) scenery (partitions),and (d) set (furniture) Brand (1995) has put a broader version of this study and offered (a) site, (b) structure, (c) skin, (d) services, (e) space plan (interior layout), and (f) stuff (furniture). He claimed that elasticity between these components of building would increase the convertibility of a building in the future (as cited in Pati, Harvey and Cason, 2008).

Personalization in the hospital setting can be hard to accomplish since the demand of the management is to keep daily routines in the same to minimize the workload of the staff. Keeping every room different from each other can be disorienting for nurses and staff. In order to compromise, the personalization could be kept as compact as possible, limitations could be set to specialize a part of the room (Shumaker & Reizenstein, 1982).

### **3.5.8. Responsiveness**

Another actor that affects control in the environment is receptivity, in other words the reactions that occurs after an act is provided. The reactions and the recipients' quick reflection, create a sense of control (Evans & McCoy, 1998).

The Pebble Project by the Center for Health Design conducted a series of research over newly constructed or renovated buildings. One of the hospitals was the Methodist Hospital in Indianapolis. The aim was to create flexible and adaptable rooms that were called 'acuity-adaptable rooms' that were designed as flexible units that could be transformed in order to the acuity level of the patient. In this hospital researchers reconsidered an interior window to increase patient visibility. The window was operable and could be turned into an opaque window. This way patient privacy was protected and results showed a decrease in patient transfers and patient falls (Chaudhury, Mahmood & Valente, 2005).

To summarize, a fast interaction with staff helps eliminate stress and prevents patient falls and other possible risks for the patient. The quick response of the staff helps patients to feel secure and provide immediate care.



### **3.5.9. Layout of Furniture**

The layout of the furniture can either influence or block social contact. Arrangements that allow alteration and create appropriate distance for dialogue and eye contact contribute to socialization. Immobile furniture, distances too close or far between people can have negative effects on socialization (Evans & McCoy, 1998).

The layout of furniture is highly related to research on spatial proximity. Spatial proximity deals with person-person limits of closeness in social interaction which is often shaped by the environment. Proximity studies deal with two important components one of them is the position of leadership the other one is behavior of small groups. It is widely seen that leaders tend to keep the central positions or at the end of the table while sitting. People have a tendency to put high ranked people at the end of the table, such as fathers' situation at the dinner table (Altman, 1975).

In terms of the small group arrangement, circular organizations increase face to face contact and increase social interaction. In a study conducted by Sommer (1959), it was seen that in mental hospitals patients were more socialized when sitting corner to corner. On the other hand, schizophrenics often avoid contact by preferring to sit side by side (cited in Altman, 1975).

Other than leadership and group relations, preference is also a key element related to seating habits. In classrooms students tend to prefer to share seats with friends or people who tend to show similar behavioral attitudes like them. Face to face contacts tend to increase social interaction and sharing, but the level of closeness can also be interpreted as an intrusion to privacy. In terms of regulating the dual relationships if two strangers are the case, it could be less preferable (Altman, 1975).

Small adjustable furniture settings in public places enhance interpersonal relationships. Studies in wards and nursing homes show that suitable furniture arrangements around dining tables increase social interaction and show positive outcomes on eating habits on the elderly. On the contrary, research on waiting halls with linear furniture arrangements that are aligned side by side show reduction in social interaction (Joseph, 2006). In addition to this, immobility of furniture, not being able to move them according to personal preference affects the mental status of people (Suresh, Smith and Franz, 2006).

In conclusion, furniture arrangements are important elements of a healthcare setting, since affect the level of socialization. The ability to organize, alter the layout of furniture, gives patients a greater sense of control over their social relationships, which they need in healthcare settings.

### **3.5.10. Stimulation**

The ambient features of the hospital environment such as; calming colors, natural sceneries, pleasant sounds and the freedom of control over the stimulation such as noise, light and temperature are helping to achieve positive health outcomes on patients (Chaudhury et al., 2005).

Music also has calming effects on patients. In terms of pregnancy, music helps to slow down breathing and reduce stress which is helpful during labor. Although it does not decrease the actual time of delivery, it helps to shorten the time perceived. Also music is proven to help reduce the amount of pain (Schwartz, 1997).

Color is also a very effective and easily adaptable component of the interior architecture. Mostly in healthcare environments it has beneficial effects on patients since some colors are linked to increase in calmness. Research on colors and emotions show that mostly color green has a calming effect on people whereas it can be achieved with scenes of nature. The warm colors such as red and yellow hues are stimulating colors that are making people more alert. Making inexpensive transformations through colors can make attractive variations in the healthcare environment (Dijksra, Pieterse and Pruyn, 2008).

### **3.5.11. Maternity Related Factors**

In terms of dealing with labor, pain is one of the most important conditions that should be regarded. In order to deal with pain besides medical intervention, the control of the body and the movements is crucial for pregnant women.

In order to relieve pain labor women may find some positions more relieving than others. In conditions women give birth by themselves, they select the most comfortable position instinctively. Today labor in institutions does not allow women to move freely because of fetal monitoring devices, anesthetics or restricted space (Enkin, M., Keirse, M., Neilson, J., Crowther, C., Duley, L., Hodnett, E., Hofmeyr, J., 2000).

The positions in labor can vary according to the childbirth environment, culture, healthcare professional, technology, mothers 'comfort. During the time of labor these positions have important effects on the position of the baby, the ease of labor, and the impact of the contractions on delivery. There have been several types of positions that are used in labor U.S. institutions such as lithotomy, semisitting,

dorsal, squatting or kneeling. Lithotomy is the one that has been used most often although it shows no superior advantages over others, in fact can sometimes require extra efforts of pushing. For this reason other positions are also currently being used in labor and delivery (Blackburn, 2007).

Each type of position can show different kinds of advantages and disadvantages over different stages of labor. In the first stage of labor upright positions help the baby position through the cervix and help the cervix to stretch by the help of gravity. The second stage in upright positions also helps to reduce the rate of Caesarean sections and instrumental delivery and decreases the length of labor. Squatting and kneeling has also advantages over birth since it help women to dilate easily helping the baby's head move downwards. On the other hand, supine positions where the mother lies down on her back shows increase in instrumental delivery. Upright positions when compared to lithotomy or supine positions have advantages on the effect of contractions, decrease in labor time, and decrease in blood loss. The positions show their effect right after women change positions and they stay effective as long as the position is maintained. If the mother is comfortable in a supine position, a side lying or upright position should be used with it (Blackburn, 2007).

A revolutionary person in childbirth research and practice Dr. Michel Odent suggests the importance of privacy and quite in order to achieve the best birth experience. Odent claims that the most important difference of human species is that control of the rational activates by the neocortex. During birth there is a decrease in neocortical activity that makes women to shut down, become disinterested about what is happening around her, sometimes can be impolite to people around because of this

physiological change that takes people back into the primitive mammal behavior. This reduction in neocortical control should be interpreted as she should be kept out of any stimulation that will alert the neocortical activity. The woman instinctively cuts herself off the environment and changes positions to avoid the stimuli around her. Language is a stimulation of the neocortex so the person around laboring women should be calm and silent, like a trained midwife. Also light is one of the stimuli that should be controlled. Bright lights should be replaced with dimmed lights. The issue of privacy is also a must in labor. Feeling observed creates emotions that one should control her own behavior. Also the birth assistant should not be staring at the mother but monitoring her from a distance. The birthing place should be familiarized, personalized, small changes that even a hospital room can do quickly changes the experience of birth. If we look at the mammals they always try to hide when labor is approaching, or women in the ancient tribes showed the same behavior (Odent, 2003).

During birth the right temperature is very important for the mother and the baby. She should be in control of windows and the climate in the area since sudden changes such as shivering can occur. After birth the optimum temperature plays a role for the release of the placenta. Also the body temperature of the baby needs to be kept warmer (Odent, 2003).

In short, childbirth has a lot of factors that are highly related to the environment. The environment does not only affect the mother psychologically but also affect the ease of birth, thus the health of the mother and the baby.

### **3.5.12. Cultural Factors**

Including family members in the birth process is a very cultural factor that could vary over one country to another. Odent was one of the people who had a revolutionary idea that men should not be integrated in the birth process. He stated that a person, preferably someone of a mother figure, like a nurse or midwife should assist the mother. This person should be very silent and quite with her movements, which comforts the mother and helps the natural course of birth. He further stated that repetitive actions; such as a quite midwife knitting besides the mother, helps women to maintain a low level of adrenalin which is crucial for labor. He states that repetitive actions lead to maintain very low levels of adrenalin which eases labor (2011). On the contrary, also there are supportive actors that believe having family members shows great importance and support for the women during the birth experience.

To summarize the control over the birth environment is strongly related to interior architectural elements according to the literature survey. In the following part, the findings of this study which are made up of the results driven from the elements listed below will be discussed.

This chapter summarized the patient centered approach in healthcare design and the concept of patient control as an important part of it. In addition, the relationship between control and childbirth is investigated from different perspectives and the framework that is used in this study is introduced. The following chapter introduces the case study.

## **CHAPTER 4**

### **CASE STUDY: İZMİR DOKUZ EYLÜL HOSPITAL, DEPARTMENT OF OBSTETRICS & GYNECOLOGY, THE LABOR & DELIVERY UNIT**

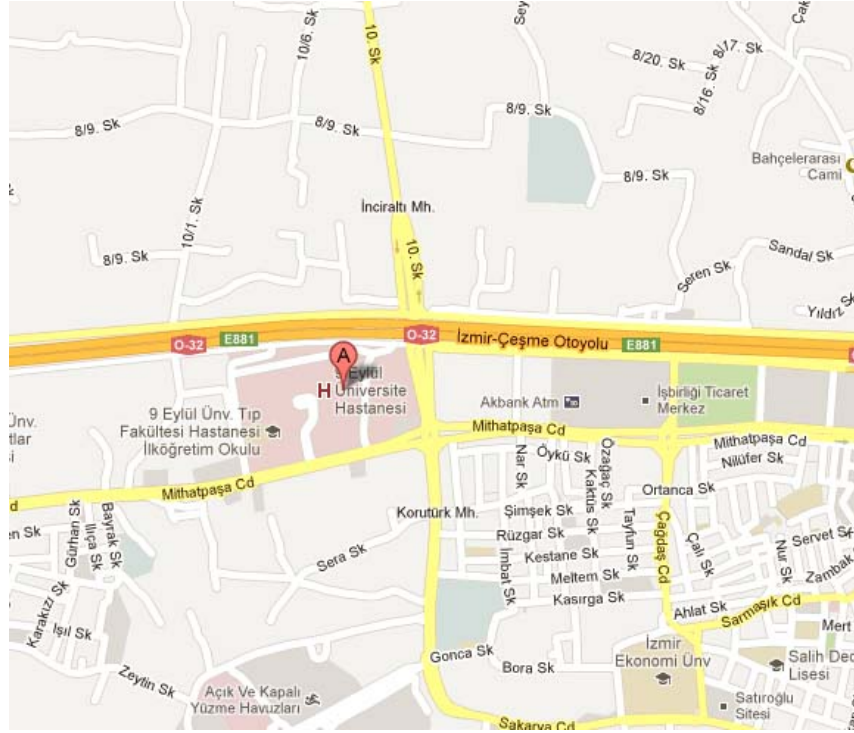
İzmir Dokuz Eylül University Hospital, Department of Obstetrics & Gynecology, The Labor & Delivery Unit, is chosen for a case study since it is a university hospital which accommodates labor and delivery rooms together in the same room close to an LDR method. Hospitals mostly use the traditional method where labor and delivery occurs in separated rooms. However this study aims to look at what women need during one of the hardest part of childbirth; labor, and to look at ways to aid this process. As an addition, since it is a university and research hospital it accommodates patients from different backgrounds and ages, that makes it fruitful to research. In the latter sections, the hospital and the LD rooms will be explained in detail. The qualities of the hospital and the LD rooms, users of the space will be further elaborated.

#### **4.1. Description of the Research Hospital and the Department of Obstetrics and Gynecology**

Dokuz Eylül University, Faculty of Medicine was established under the name Ege University, İzmir Faculty of Medicine in 1978. Until 1982, it served in Karşıyaka State Hospital, then in İzmir Municipality Eşrefpaşa Hospital. By the new law regulations in 1982, the old buildings of the Pharmacology Faculty of Ege University were transformed into the temporary building of Dokuz Eylül University Hospital in 1985, which had a bed capacity of 325.

Today, Dokuz Eylül University Hospital is a large structure of many facilities. It has a new Clinic Building with a bed capacity of 925, Children's Emergency Department, Fertility Center, Organ Transplant Center, Radiology Department, an Emergency Center which has the first teaching program in Turkey, a Day-time Hospital for small surgical procedures and thirty four polyclinics (Dokuz Eylül Üniversitesi Hastanesi: Tarihçe: 2013).





**Figure 11.** Map of the research hospital  
(www.googlemaps.com)

The Department of Obstetrics & Gynecology has five polyclinics; these are for diagnostics and outpatient treatments. These are; Gynecology Polyclinic, Obstetrics' Polyclinic, Menopause Polyclinic, Infertility and Endocrinology Polyclinic and Family Planning Polyclinic.

Other than the Polyclinics for outpatient treatment, there is The Obstetrics' and Gynecology Service for inpatients. That has a bed capacity of 44. The two of them are in single patient rooms; the rest is divided into rooms for three or six patients. The women with gynecological problems and the women who recently gave birth stay in The Obstetrics' and Gynecology Service.

The other and one of the most important part of the The Department of Obstetrics & Gynecology, are the LD rooms. Dokuz Eylül University Hospital has four LD rooms,

which the baby and the mother are kept under constant monitoring with a NST (Non-Stress Test) device after admittance until labor. For natural birth the mother has to stay in the hospital for twenty four hours, for Caesarean deliveries this number is three or four days (Dokuz Eylül University Hospital Website: Tarihçe: 2013).

#### **4.2. Description of the Labor & Delivery Rooms**

In the LD unit there are two types of rooms. One of them is the LD type of room and the other one is called the preparation room. There are four LD rooms and two preparation rooms. The LD room is used for natural birth, the mother is kept and monitored before birth and the actual delivery also happens in the same room. The preparation room is used for monitoring the Caesarean section deliveries before being transferred to the operation room. In some cases, the Caesarean patients are monitored in the LD rooms. The preparation room is also included in this study to have the opinions of mother who had a Caesarean section.

LD rooms in hospitals are places where women in labor are admitted and also actual delivery occurs in these rooms. In Dokuz Eylül University Hospital, the LD rooms are not formed in a traditional approach which separates labor and delivery in different rooms. The LD rooms in Dokuz Eylül University Hospital are formed similar to LDR method; which indicates that labor, delivery and recovery take place in an adjoined room, but the rooms in Dokuz Eylül University Hospital do not accommodate the aesthetic qualities of the LDR room.

The LD rooms each have a bed in the center which could be transformed into a birthing bed. There are two built in resuscitation machines in the room for the newborn babies.



**Figure 12.** LD room 3  
(by the author)



**Figure 13.** LD room 3 from the hallway  
(by the author)



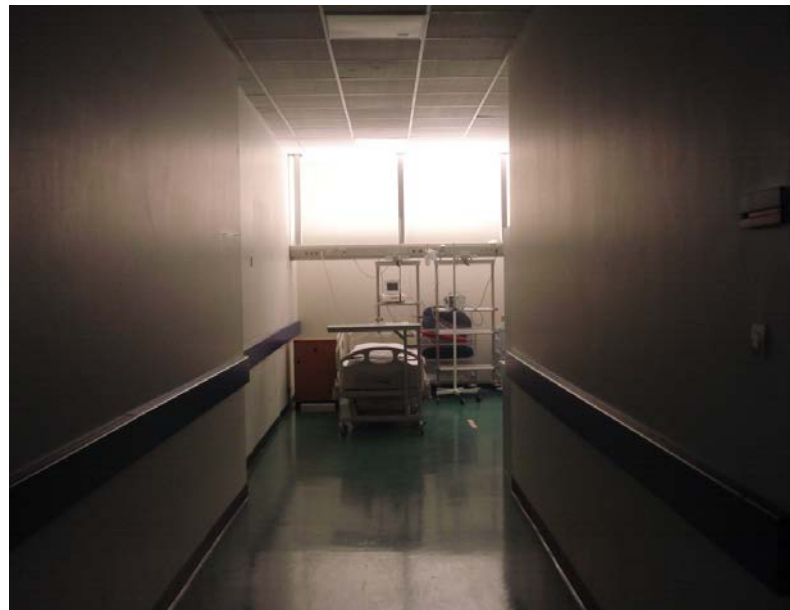
**Figure 14.** The LD room 3 entrance  
(by the author)



**Figure 15.** The preparation room for Caesarean deliveries  
(by the author)



**Figure 16.** The preparation room for Caesarean deliveries  
(by the author)



**Figure 17.** The preparation room for Caesarean deliveries entrance  
(by the author)

### **4.3. Methodology**

Dokuz Eylül University Hospital, Department of Obstetrics and Gynecology, Labor and Delivery Unit was chosen as a case study, to examine if a sense of control in the LD rooms aids women in their birth experience.

This study has been conducted with 30 women, and the 6 nurses who are responsible for the LD unit. The nurses' answers were used to confirm both patients' and healthcare staffs' views. The questionnaires with the patients were conducted the next day after delivery, while they were in the postpartum stage, in the Obstetrics Services. 19 of the women had a Caesarean section and 11 of them had given natural birth. The questions were asked referring to their past experience, regarding prior to delivery; the labor stage. All the questions were related to the LD room (LD room or the preparation room) which they spent time inside, waiting to give birth. The questionnaire is made up of questions in a Likert Scale and open ended questions to provide additional comments of women. The necessary permissions for this study have been taken from the Dokuz Eylül University Hospital Management.

#### 4.4. Findings and Discussion

The statistics were calculated with SPSS Statistics software, version 20, using frequencies, percentages and Chi-square tests, and interpreted with participants responses to the questions.

**Finding 1: Privacy:** The findings show that, 76,7% of the women believe that the privacy of the room was either fair or good and that affected them positively. 26,7% of the women stated that the privacy condition of the room was either fair or poor and that had a negative effect on them. Only 6,7% of the women stated that the privacy of the room was fair but that did not have an effect on their birth experience. As a supportive result of the hypothesis (H), there is a strong relationship between privacy; control over social interaction with positive birth experiences ( $\chi^2=23,804$   $df=4$ ,  $p<0.05$ ). As a supporting result, five out of six of the nurses emphasized that the room meets the standards for patient privacy and this affects patients positively and all of them agreed that privacy affects the birth experience.

Having a single room was mentioned by women as a supporting measure of privacy. Also, it is seen from the results that having a single room contribute to positive birthing experiences. 76,7 % of women stated that not sharing the room has strong positive effects on birth experience. In this study having a single room shows strong positive effects on patient privacy and there is a strong relationship between positive birth experiences and having a single room ( $\chi^2=17,340$ ,  $df=2$ ,  $p<0.05$ ).

The women were also asked if the room had any equipment for privacy such as curtains or separators; and the majority of the women 62,1% stated that, the room did not have curtains or separators but this did not affect their birth experience. They mostly emphasized that they did not share the room so they did not need any curtain or separator for privacy. Women mostly stated that being in the last room of the corridor, or having a bed not visible from the doorway increased their level of privacy. On the contrary, all of the nurses stated that the room has curtains and separators and this affects women in a positive way. The women's answers could be generated since they did not pay attention towards this issue since mostly they did not share the room.

Although gender issues were not discussed in this thesis, most of the women stated that their sense of privacy increased since the unit was only accessible to healthcare staff and they only contacted women personnel during labor. In the further studies, the effect of gender can also be discussed. As a conclusion, regulating privacy thus having control over social interaction in the LD room affects women positively during childbirth.

**Finding 2: Crowding:** There is a strong relationship between the density in the room and the birth experience ( $\chi^2=23,397$ ,  $df=8$ ,  $p<0,05$ ). 53,3% of the women were satisfied with the room because they stated it was ample and there were not too much people in it, so crowding did not occur which contributed to their birth experience. 16,7 % of the women stated that the room was very crowded and it affected them



negatively. Only 10% of the women in this study stated that the amount of people in the room does not affect the birth experience.

In addition, 20% of the women stated that there were many people but the feeling of crowding did not happen since the room was big enough. These women also mentioned that the feeling of crowding did not happen since they thought it was the healthcare staff's job to be there, and their presence made women feel secure. Also women who stated there were too much people, but they considered it as a help from the staff and they were affected positively.

“Nurses were cheering and everybody was congratulating me; I was happy they were all there for me”

“There were only nurses and doctors in the room and I considered it was their job so I was not affected by their presence”

In addition to the patients' emphasis on crowding, all of nurses in the unit mentioned that crowding in the room affects the birth experience and five out of six stated that crowding does not happen in the LD rooms and that affects women positively. According to this study, it could be stated that crowding is an important factor that affects the birth experience. Also as a result supporting the literature survey, crowding may not occur although the density increases. To summarize, in this study for the majority of the women the feeling of crowding did not occur and this affected them positively.

**Finding 3a: Visual Boundaries and Restorative elements:** In this study, the LD rooms do not have a window, and the preparation rooms for the Caesarean section deliveries have windows that are closed and not operable. The patients were asked whether not having windows and not seeing outside affected their birth experience.

Although the initial results were mostly in a negative direction, through the end of the study 53,3 % of the women stated that not having windows did not affect their birth experience and 40% of the women stated not having windows affected them negatively. The women who stated that they were not affected by not having windows mostly stated that they could not pay attention because they had too much pain. The findings show that there is not a strong relationship between having windows in the LD room and the birth experience ( $\chi^2=0,299$ ,  $df=2$ ,  $p>0,05$ ).

On the other hand, women who were affected negatively by not having windows mostly mentioned windows' importance by their quality of providing scenery and daylight. They often emphasized the difficulty of waiting for long hours without doing anything and not being able to see outside. They mostly mentioned that they felt isolated, and a window towards outside would be a positive contribution to the birth experience. Although the results of the patients' survey are close to each other, four out of six of the nurses replied that not having windows affects women in a negative way.

“There is no significance between day and night, and it affects the women in a negative way”

In the case of patients, only 3,3% of the women (1 woman) stated that the unpresence of windows affected her positively since she would feel uncomfortable. In that case, windows should be considered while designing LD rooms.

**Finding 3b: Auditory Boundaries and Noise Control:** There is a significant relationship between noise control and positive birth experiences; hearing other patients' noise significantly affects patients in the LD room ( $\chi^2=16,766$ ,  $df=4$ ,  $p<0,05$ ).

According to the patients' questionnaire, 43,3% of the women stated that they heard other patients and that affected them negatively, while 23,3% of the women stated that they did not hear other patients and that contributed to their birth experience. In general, 70% of the women stated that they hearing voices of other patients affects the birth experience while only %33,3 of the women stated that other patients' voices did not affect their birth experience. Women mostly stated that hearing other patients frightened them, some of them even stated some physical consequences of hearing other patients.

“My contractions stopped every time I heard someone screaming”

In addition, the women were also asked if they thought of being heard by others and get affected by that feeling. 56,7% of the women stated that people outside can hear the patient. When women were asked if they were affected by this situation, the majority of them, 63,3% stated that this aspect do not affect the birth experience

since it is a very usual situation in labor. In short, in terms of noise control, according to this study, women are more affected from the outside noises than controlling their own voice in order not to disturb people. To summarize, hearing other patients' voices shows great importance on women. Also the nurses' questionnaire support this view, all of the nurses stated that women get frightened and afraid by hearing other patients and that affects them negatively.

**Finding 4a: Climate control:** The LD room has a general climate control that nurses are in charge. 46,7% of the women stated not having control over temperature affected them negatively while %50 of the women stated that temperature control does not have an effect on birth experience. The women who stated that they were not affected by the lack of temperature control, stated that the room had an optimum temperature and they had control via nurses so they did not need to control the temperature. Four out of six of the nurses also stated not having control over the temperature is negative for the patients.

“The temperature could be low to prevent bacteria or etc, and patients could get cold, so we help them when they need”

To summarize, it could be stated that control via the help of the nurses on the climate is of importance, and can be a contribution to the birth experience.

**Finding 4b: Lights control:** The LD rooms have a general lighting system that could be operated by the nurses. 30% of the women stated that they had no control over the lights and that affected their birth experience negatively. 13,3% of the women stated that they had control and this affected them positively. %56,7 of the women stated that not having control over the lights did not have an effect on them since the temperature of the room was satisfying or they could make changes via the help of nurses.

To summarize, although the results are close to each other, according to this study, the mediated control shows as much importance as self control on climatic and lights control. Since the nurses helped women, the majority of the women was not affected negatively, or did not focus on the matter, since they did not feel discomfort. Also the nurses stated that they helped women when they needed. This shows that mediated control over climate and lighting can contribute to womens' birth experiences.

**Finding 5: Territoriality:** There was a significant relationship between fewer amount of transfers with positive feelings ( $\chi^2=37,406$ ,  $df=4$ ,  $p<0,05$ ). Majority of the women stated that transfers affect them negatively and being in the same room throughout labor is important for them. Only 23,3% of the women stated that they were not affected by being moved to other rooms. As a supportive result of the hypothesis (H), it could be stated that less amount of transfers and keeping the same territory has positive effects on birth experience. It could be further stated that this hospital showed positive effects since labor and delivery occurs in the same room, as

a supportive finding to the literature review about the positive effects of LDR and LDRP rooms. Although the patients' survey shows that transfers could affect women negatively, four out of six of the nurses stated that being transferred between rooms do not affect the birth experience.

Also, having places for personal items strongly affects the feeling of territoriality. Women were asked if they had places to keep their personal belongings and whether this affected their birth experience. 40% of the patients stated that they did not have places for their personal items, and it affected them negatively and 16,7% of them stated that they had storage places and that had a positive effect on them. 43,3% of the women stated that storage places do not affect the birth experience. They mentioned that they left their personal belongings to their families, and they could access their belongings when they needed. In general 56,7% of the women stated that the storage places are of importance and affect the birth experience. As a supporting view, four out of six of the nurses also stated the room has storage places and that affect women positively. To summarize, it could be stated that, being in the same room shows positive effects on women and contribute to the birth experience. Also having places to put their personal items contributed to their experience.

**Finding 6: Flexibility:** The participants were asked if the LD room had a homely environment and %96,6 of them disagreed and only one patient was undecided about the subject. %53,3 of the women stated that not having a homely atmosphere in the LD room had a negative effect on their birth experience and the rest of them stated that they were not affected by this aspect of the room. Also, the participants were also asked if having a homely environment would make a positive contribution to

their birth experience and 56,7% of them agreed with this question. Homely environments were asked to participants by their quality of aesthetics and the level of control they represent, such as birth baths, birth pools, soft floor or coverings, and control over the surrounding. As a supporting view, four out of six of the nurses stated that the patients are affected negatively by the clinical look of the LD rooms. In addition the patients were asked if they had any options to do reorganization in the room. 57,7% of the women stated that reorganization options do not affect the birth experience and 42,3% of them stated that they did not have the chance and this affected them negatively. The women who gave a neutral response, mostly stated that since this was a hospital environment they never imagined its possibility. On the other hand, it could be generated since the women are not culturally accustomed to having a word on the hospital setting.

As a supportive result of the hypothesis, flexibility; control over alteration and shaping the environment affects the birth experience. Women tended to prefer settings that are close to home environments, not only in terms of aesthetic qualities, but also in terms of the control they have over a particular environment. Although the women were not accustomed to being able to changing the hospital environment, they preferred homely environments that assure a certain level of control with birth baths, birth pools and soft floor coverings.

**Finding 7: Symbolic message:** As a supporting result of the hypothesis (H), there is a significant relationship between symbolic message of the hospital with the birth experience ( $\chi^2=30,833$ ,  $df=6$ ,  $p<0,05$ ). The patients were asked about the symbolic

meaning of the hospital and whether this affected their birth experience. 60% of the women stated that the hospital has a big and institutional environment and that is comforting and reassuring for them.

On the other hand, the patients were asked if the hospital had a cold and clinical look, 53,3% of the women agreed and stated that this affected them negatively; 13,3% of the women disagreed and they stated that this affected them in a positive way. In general the rest 33,3% of the women stated the hospital environment does not affect the birth experience negatively or positively. In general, 66,6% of the women were affected by the hospital environment. In general, it could be stated that the symbolic message of the hospital affect women and their birth experience. As a supportive view, five out of six of the nurses stated that the hospital has a cold and clinical look and this affects the women in a negative way. It could be stated from the findings of the study, that the symbolic message of hospital environment affects the birth experience.

**Finding 8: Responsiveness:** There is a strong relationship between the accessibility of the healthcare staff and positive birthing experiences ( $\chi^2=30,000$ ,  $df=2$ ,  $p<0,05$ ).

As a supporting result of hypothesis there is a strong relationship between responsiveness and birth experience. 83,3% of the women responded that the responsiveness of the staff affected their birth experience positively, while the rest of the women stated that they could not get immediate respons from the staff so this affected them negatively. In general, all of the women emphasized the importance of responsiveness of the healthcare staff. As a supporting view, all of the nurses stated



that the responsiveness affect the patients in a positive way. It could be stated from the results that responsiveness of the staff affects the birth experience.

**Finding 9: Furniture arrangements:** The women were asked if they thought having the ability to reorganize furniture is important. 60% of the women were undecided about this issue, 36,7% of the women agreed and 3,3% of them disagreed that furniture arrangements were important. However this result could be generated since all of the women were tied to NST machines that are used for monitoring the mother and the baby. This machine is in the form of a strap and the mother has to lie down all the time. Since this was the case, the women were not able to do any arrangement by themselves. However the majority of the nurses stated that having options to reorganize furniture is important in the birth experience.

**Finding 10: Stimulation:** The labor stage of birth could take a long time. In this study the shortest time in labor was 15 minutes and the longest was 2 days. The women were asked if they would like to have any stimulation, for positive distraction. 42,8% of them would not want any stimulation and 20% of them stated they would just want to be walking. Apart from them the most mentioned was tv (25,7%), music (14,2%) and books (5,8%). Plants and artwork were not mentioned.

According to the findings of the study, the women tended not to request any stimulation. However, the reason could be due to the fact that, culturally they are not accustomed to having stimulation that they could have control over. However, it could be beneficial to have items for positive distraction and leave it to their choice.

**Finding 11: Cultural Factors:** The childbirth unit in the research hospital is in a private area with access control only to nurses and physicians so family members can only enter the waiting area in the entrance but not enter the LD rooms before/during/after childbirth. Today, in the recently designed LD rooms such as LDR or LDRP rooms, it is a very common approach to integrate family members in the birth process. However this could vary according to culture, hospital policy or personal preference. The feelings about not having a place for the family members in the LD room were asked to participants.

As a supportive argument of hypothesis (H), there is a strong relationship between having family members in the room and the birth experience ( $\chi^2=6,724$ ,  $df=2$ ,  $p<0,05$ ). It could be stated from the findings that having control over visitors, thus social interaction has positive effects on women. 70% of the women stated that not having a place for the family members affected them negatively. Also all of the nurses stated that not having family members affect women negatively during childbirth.

In order to gather further information on the issue and investigate the cultural factors involved in the birth process, women were asked in which stages they would like to

have a family member with them. 53,3% of the women replied as they would like to have their family or one of them through the whole time, 23,3% of the women replied they would like accompany after birth, 10% stated they would like accompany before birth, and 13,3% of them stated they would like family before and after but not during birth. In general, the majority of the women stated that, they would like their family to be with them through the most of the process.

According to this study most of the women want their family members with them in the LD room. As a supportive result of the hypothesis (H) having control over social interaction can be supportive during childbirth and cultural factors are also important in the birth experience.

**Finding 12: Maternity related factors, equipment to aid control over self movement:** The participants were asked if they had a place to walk inside the room. Although the women were tied to NST machines and mostly were unable to walk, 51,7% of them stated that the room was big enough and this affects the birth experience positively and one woman 3,3% stated that that there was not enough space so it affects the birth experience negatively. In short, in this study having places to move around shows importance and affects the birth experience.

In addition, the participants were asked if the room had any equipment to support personal control over movement; such as walking or kneeling to aid the birthing process. 33,3% of the women stated that they did not have equipment to aid movement and all of these women stated that this affected them negatively. 10% of them stated that they used the side of the bed the get up and this affected them

positively. 56,7% of the women stated that the equipment to aid control over movement does not affect the birth experience. However these women stated that the nurses helped them to move or get up, so they did not need equipment. They had control over movement via nurses.

On the other hand, all of the nurses stated that the room does have enough equipment to aid movement and this affects the women in a positive way. It could be stated that control over movement is as important as self control and shows positive affects on women.

**Finding 12: The relationship between overall control and overall satisfaction:**

According to the findings, there is not a strong relationship between overall control and overall satisfaction ( $\chi^2=11,667$ ,  $df=12$ ,  $p>0,05$ ). Although the results do not address a strong relationship, this could be a result of a lack of understanding of the terms “control” and “satisfaction” by the women, as all components of control seem to suggest otherwise. Moreover, the women may not be able to visualize how the environment can be improved, and any need related to the physical environment is commonly overcome by the social. That is, the nurses compensate for most deficiencies in the environment. The women mostly stated that they had control over the environment via nurses, and but mostly emphasized the importance of control not only in the LD room but throughout all phases from admittance until recovery.

## **CHAPTER 5**

### **CONCLUSION**

This study investigated the effect of the built environment on birth experience by focusing on the patient control and its contribution to positive outcomes. The framework of Evans & McCoy (1998), which explores the interior architectural elements of personal control and their effect on health have been applied to childbirth environments to investigate if a sense of control can contribute to women's experience during childbirth. The case study was conducted with a questionnaire based on this framework and further developed with items specifically related to childbirth. The same questions were also asked to the nurses responsible for the Labor and Delivery unit, to bring together the patients' and healthcare staff's views. The elements of control have been taken as items and each of them were investigated to see if they really affect the birth experience. It has been seen, in this study, the majority of the items that construct a sense of control affected the birth experience.

According to the findings of this study, most of the interior architectural elements show great effect on the birth experience. Some of them were prioritized by women before others. As in order of women's emphasis of importance: "Responsiveness", "Privacy", "Crowding", "Territoriality", "Cultural Factors", "Auditory Boundaries", "Symbolic Message", "Flexibility", "Maternity Related Factors" showed great

importance on women. The mostly stated element was “Responsiveness” showing the value of social relationship between healthcare staff and the patients. The other elements were mentioned less than the elements above. In order of importance; “Climatic & Light Controls”, “Visual Boundaries”, “Furniture Arrangements” and “Stimulation” had less effect on women. However, “Climatic and Lights Control” showed great importance on women with mediated control via nurses. “Visual Boundaries” shows also importance although the results are close to each other. “Furniture Arrangements” and “Stimulation” are also elements can be given patients as a choice for women who prefer to use this opportunity. Although some elements were emphasized less than the others, the participants did not refer to these elements as if they would be affected negatively if they had it in the room. So, related to the findings, the women could benefit from having these options and left the choice to their preference. In short, over the 12 elements, most of them show an effect on birth experience and mothers and some of them shows the importance of mediated control via healthcare staff.

As a conclusion, it could be stated that control over the built environment affects the birthing experience. Interior architectural elements can increase the sense of control and support women during childbirth. The aim is to create a framework that could be used to create better childbirth environments and raise awareness on this important subject. The need to have a balanced relationship between the social and physical aspects in such a critical time in one’s life in the birth environment stood out. One of the hardships of the study was that firstly, there were a limited amount of people every day who had given birth, which made it difficult to speak to the same number of people everyday. As stated in previous literature, the study confirmed that most of

these women had Caesarean sections. The number of natural births was less than Caesarean section births. This may change from country to country, and it may be interesting to investigate the relationship between control needs in the hospital and types of birth in different countries. In further studies, the sample group can be increased, comparisons between hospitals with different birth environments can be made and the study could be broadened. Also, in a further version of the study, the number of participants could be increased and more variations could be made regarding the statistics to increase the reliability of the results. This significant environment which is the first meeting point of mother and baby and the first place that the baby sees in her/his life should be investigated in further detail, always following the developments in healthcare, but more critically answering the needs of the users.

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## **APPENDICES**

### **APPENDIX A: INSTRUMENTS**

## APPENDIX A: PATIENT QUESTIONNAIRE

(The same questionnaire has been applied to LD unit nurses)

### Patient Centered Approaches in Labor & Delivery Room Design in Hospitals

The questionnaire below is prepared as a part of the research for my master's thesis in İzmir University of Economics, Master of Design Studies. The aim of the thesis is to investigate the effect of the built environment on birthing experience. Thank you for your contribution.

*Res. Asst. Hande Atmaca  
hande.atmaca@ieu.edu.tr*

*Next to each question that asks whether you agree/not, there is an additional box that asks if this situation affected your birth experience. Please choose one of the following Positive (P), None (-), Negative (N) boxes.*

### Questionnaire

---

**Age:**

**Number of birth:**

1	2-4	5+

**Type of Birth:**

Natural	Caesarean section

**Reason to choose the hospital:**

Acquaintances	Previous experience	Doctor's advice	Staff	Location of the hospital	Other

**Time spent in labor room:**

Up to 1 hour	1-6 hours	6-12 hours	12-24 hours	1 day	2+ days



## PRIVACY

---

1. Rate the overall privacy of the room.

Unacceptable	Poor	Fair	Good	Excellent

N	None	P

2. The room has equipment to assure privacy such as curtains, separators etc.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	None	P

3. Did you share the LD room with someone else?

Yes	No

N	Non	P

## CLIMATIC & LIGHT CONTROLS

---

4. The patient has control over the temperature.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	None	P

5. Please describe the condition of the room regarding the temperature.

6. Bedside lamps and general lighting could be controlled by the patient.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

7. Please describe the condition of the room regarding the lighting during day and night time, activities such as reading or resting.

## VISUAL BOUNDARIES

---

8. The LD room has a window.

Yes	No	N	Non	P

9. If yes, can the windows be controlled to air the room or get natural light?

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

10. The patient has control over who comes into the room.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

11. The patient has control over who could see her.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

## AUDITORY BOUNDARIES

---

12. The patient hears other people/patients while in the room.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

13. The patient can be heard by others while in the room.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

## TERRITORIALITY

---

14. How many times have you been transferred throughout labor and delivery?

0	1-3	3+	N	Non	P

15. The room has places for patient's personal belongings.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

16. The patient is able to alter, shape, and reorganize the environment according to her wish?

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

## FLEXIBILITY

---

17. The room has a homely environment.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N	Non	P

A. If yes, which qualities of the room made it feel homely?

B. If no, which qualities of the home would you prefer the room to have?

18. I believe a LD room with a homely atmosphere has positive effects on birthing experience.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

## CROWDING

---

19. There can be too many people at the same time in the room (visitor, staff etc.).

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

## LAYOUT OF FURNITURE

---

20. The layout of furniture can be change for personal preference.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

## SYMBOLIC MEANING

---

21. The hospital has a big and institutional atmosphere.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

22. The hospital room has a cold and clinical atmosphere.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

23. What kind of feelings did the hospital awake, please briefly describe.

## RESPONSIVENESS

---

24. The patient gets immediate response when healthcare staff is needed.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

## CULTURAL FACTORS

---

25. In which stages would you prefer to have your family member/s with you?

None	Labor	Delivery	Recovery	All

26. Patient's visitors have place to spend time inside the room.

Yes	No

N	Non	P

27. Did your visitors have places for socialization outside the room?

A. If yes, could you describe briefly.

B. If no, could you describe how you would prefer the place to be?

## CONTROL OVER MOVEMENT AND MATERNITY

---

28. The room has equipment to move/kneel or to assist walking.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

29. There are places to move/ walk between contractions.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

N	Non	P

## STIMULATION

---

30. Which of the below the patient has in the room?

Television	Books	Plants	Music	Artwork	Walking	None

**31. What type of features do you think would be useful to spend time in the LD room?**

Television	Books	Plants	Music	Artwork	Walking	None

**OVERALL CONTROL AND SATISFACTION**

---

**32. Rate your overall control over the environment**

0-2	2-4	4-6	6-8	8-10

**33. Rate your overall satisfaction**

0-2	2-4	4-6	6-8	8-10

*I agree that the information and photographs collected for this academic research could be used without revealing personal information.*

<i>Signature</i>