

## Assessment of factors affecting pregnant women's satisfaction during natural and cesarean childbirth in a teaching hospital

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### Abstract

**Background:** Reduction in cesarean birth rates in Iran requires observing certain conditions and necessities. A fundamental aspect is optimization and reinforcement of the physical structure and the country's maternity hospitals based on the updated universal theories and standards as well as their localization in accordance with the domestic culture and circumstances.

**Objectives:** Since incorporation of the pregnant mothers' demands and priorities plays a significant role in deriving satisfaction of patients and enhancement of hospital standards, this study aims to consider prioritizing women's preferences for promoting the quality of maternity wards.

**Methods:** In this research, 110 pregnant women or mothers who had given birth to child one year ago, were entered into the study. They were randomly selected from three hospitals, including Akbarabadi (59.1%) and Aliasghar (9.1%) hospitals in Tehran and Public Hospital (31.8%) in Amol City. A prioritization questionnaire was used to consider the quality of maternity wards. Data were analyzed through SPSS software and Friedman test was used to rank the dimensions of the questionnaire.

**Results:** Friedman test results showed that priority levels of major dimensions in the questionnaire were significantly different from each other. The presence of husband during childbirth (13.33), existence of window and view to exteriors (10.99), and use of nature (10.95) were the most important dimensions, while privacy against strangers (5.74) was the less important parameter. A significant difference was observed in mean of several dimensions' score (e.g. use of artworks 0.007 and control of environmental comfort 0.044) between natural and caesarean childbirth.

**Conclusions:** The top priority of the respondents was related to presence of their husbands during the childbirth process, use of natural landscape and appropriate view, possession of decoration and furniture with delighting, diverse colors and patterns.

**Keywords:** Maternity Ward, Quality Promotion, Women's preferences.

### Background and Objective

According to instruction of Ministry of Health, Medicine, and Medical Education for promotion of natural childbirth, the general purpose of this project is to promote the mother and baby factors by reducing the rate of caesarean delivery and rising satisfaction of pregnant women via protecting the privacy, optimizing the physical space of delivery room and enhancing the motivation of service providers in order to increase the natural childbirth rate in public medical centers. Therefore, in order to make the childbirth pleasant, protect the pregnant women's privacy and enable presence of the trained companion beside the mother, the hospitals are mandated to provide physical space of delivery room in individual form (according to the book entitled Standard of Planning and Designing of Safe Hospital - Maternity Ward) and the possibility of providing individual cares<sup>1</sup>.

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Caesarean delivery is a surgical operation done only by the intervention of medical group and by the means of advanced equipment. In many cases that mother's health or baby is in peril due to the occurrence of problems, caesarean delivery rescues many mothers and babies. According to the recommendation of World Health Organization, the caesarean delivery rate including all emergency and selective caesarean deliveries must not exceed 15% of all childbirths. In addition to causing physical problems and severe costs for individuals, Caesarean delivery also increases length of hospitalization, workload of manpower, and the treatment costs, and generally, reduces the efficiency of the hospital. Thus, promoting the quality of natural childbirth process in all aspects including allocation of sufficient manpower, quality improvement of the physical space of maternity wards, taking the psychological aspects into account for ambient designing of the respective ward and bringing the user's demands and priorities under consideration will enhance the tendency to normal childbirth. Generally, quality promotion in childbirth process based on mother's important demands and expectations increases their satisfaction with the services and reduces the caesarean delivery rate in childbirth centers

Today, based on various research, providers of the medical services have well realized that quality of the environment and treatment spaces play crucial roles in recovery and health of patients<sup>2</sup>. People are sensitive to the spaces constructed around them and gain information from them. As a result, their attitudes constitute a useful resource which can be used to achieve solutions for optimal design of the spaces. Research carried out in the US and UK on proper design of medical spaces aimed at improvement and health of patients reveal the fact that the spaces with proper designs positively influence the people's health<sup>3</sup>.

Some research works have been also conducted in conjunction with impact of space on the women's childbirth and to what extent space quality affects mother and baby and a couple of the respective research attempts have also proposed theories with respect to environment of maternity wards. But, it can be asserted that there are not still any suitable criteria to evaluate them<sup>4</sup>. Nevertheless, taking into account the fact that role and effect of environment and its psychological quality on the patient and users of hospitals and medical centers have been verified under the title of theories such as patient-based treatment, responsive design, and healing environments, the present research attempts to identify and prioritize the agents and factors leading to reduction of stress and enhancement of satisfaction among mothers based on their opinions via analysis of their preferences and demands with regard to their childbirth in three hospitals with different ambient conditions. Undoubtedly, utilization of the respective factors in design of maternity wards and physical promotion of the aforementioned wards, as also emphasized in the instruction of Iran's Ministry of Health, will reduce the stress level of pregnant mothers and enhance their satisfaction, and along with other medical measures and culture-making, will be effective and efficient for attaining the goals.

#### Presence of Companion during Childbirth Process

Presence of companion during childbirth process originates from family-based care principle. It means that the patient is part of a family and the family plays a significant role in her recovery process. In this medical method, the families are encouraged to get involved and be present in the care process of their patients<sup>5</sup>. Fathers have the potential to make a lifetime difference for mothers and are valuable assets to the society.

Traditionally, the focus of pregnancy and childbirth has predominantly been on the mother and the baby. However, the recent years have seen men becoming

more involved as supporting persons during their wives' pregnancy and childbirth<sup>6</sup>.

Taking into account the mental status of mother, presence of companion who is normally one of their relatives or acquaintances, brings a mental support to the mother in addition to helping the midwifery group. The respective individuals are instructed in advance about accompanying the mother during the childbirth process. This method easily enables presence of the pregnant woman's companion, particularly her husband<sup>7</sup>.

The physical environment of healthcare can contribute to preventing or reducing stress in patients, their families and staff members if it is designed to enhance physical and psychological well-being, including productivity, privacy and security<sup>8</sup>.

Right of mother and family is among the mother-friendly principles of hospitals, which in turn is composed of three factors: possibility of presence during childbirth, observance of the mother and baby's respect and dignity, and having the right to select the childbirth method<sup>9</sup>. To realize these conditions, it is vital to have a suitable physical environment during the medical treatment process and the environment shall be designed such that treatment, education, and participation of patient and family become possible during the treatment process<sup>10</sup>.

#### Existence of Window and View to Exteriors

One of the factors affecting patients' experience of hospital environment is presence or absence of window. Window can have a therapeutic role as stress reducer in patients<sup>2</sup>. Verderber & Reuman in their study about role of window in hospital concluded that existence of window and landscape would help the patient establish "a cognitive and perceptual relationship with the external environment" and leaves a highly positive effect on the treatment process<sup>2</sup>. Size and position of the window shall be selected aimed at respecting patient privacy and controlling light penetration into the room. The windows shall have the

possibility to be shut or opened so as to let the mothers control birthing room temperature, their privacy, and level of connection to the external environment.

#### Routing (Ease of Access)

Routing problem causes stress for people inside hospital, and the pregnant women deeply feel such stresses. Appropriate instructions for routing such as printed maps and compatible signs, detectable entry points, and easy access to the birthing room are among the solution that might be helpful in mitigation of mothers' stress<sup>11</sup>.

#### Space Control Possibility and Unmet information needs

Control refers to the person's power and ability in affecting the situations and making decisions about what happens to them<sup>12</sup>. The preference in health cares is giving the right of selection to the patient; the concept which is greatly significant from the perspective of environmental psychology and proof of its impact on treatment trend is expanding. The first objective of patient-based treatment is enhanced control of patients over their surrounding environment<sup>12</sup>.

For mothers who have just given birth, the postpartum hospital stay is meant to promote an environment where resting, healing and bonding can take place. New mothers, however, face many interruptions throughout the day including multiple visitors and noise caused by medical equipment, corridor conversations and intercom announcements<sup>13</sup>.

There are two ways for changing the traditional role of patient and enhancement of his/her control in the hospital: increased freedom of selecting daily programs, and access to training and information<sup>2</sup>. If the medical centers are designed such that they lead to enhanced sense of having control over stressors in the patients, the negative consequences of stress are mitigated, and accordingly, medical results are improved. Mounting light controllers beside the beds, enabling control of room temperature by the patient, availability of TV set with the option of control by the patient, presence of headphones with the possibility to choose

music for the patients, architectural elements for easy access in large hospitals are some of the plausible solutions for promoting sense of control in the hospitals<sup>12</sup>.

Women were asked about the sort of information they felt they needed on discharge home from hospital. For many women it was information that would help them to develop their confidence in 'basic' practical aspects of care of their baby such as nappy changing and bathing the baby. For many women giving birth was the first time they had been admitted to hospital. As a result, they were unfamiliar with the ward environment and hospital routines. Inadequate orientation and explanation by staff often increased women's anxiety, especially if staff did not explain routines to them or show them where to find what they needed on the ward<sup>14</sup>.

The benefits for pregnant women to not only be informed but to take part in decision making during pregnancy, labor, and delivery generally include greater coping with the physical and psychological demands of labor, which in turn help produce healthier outcomes for the woman and the infant<sup>15</sup>.

### Use of Nature

While modalities to combat patient stress have abounded in recent years, the use of nature, specifically gardens, has not been well studied in the hospital setting.

The hospital garden not only provided pleasant nature views but also alleviated stress and promoted restoration by providing an opportunity for positive escape from interior clinical spaces<sup>16</sup>.

Nature can be utilized in two ways in medical centers: 1-Natural gardens and lawns; 2-Windows opening to the nature<sup>2</sup>. Natural sceneries lead to reduction of stress and fear based on biophilia hypothesis. Research findings demonstrate that hospital gardens might reduce stress by creating tranquilizing and reviving views and improve the medical results through mechanisms like creating context for enhancement of social supports and interactions, disease avoidance and increased sense of control in medical

complexes. There must be natural scenes, natural elements like aquarium, plants, and fountains in decoration of birthing rooms<sup>17</sup>.

### Light Conditions

The goal of the healing environments is to provide noninstitutionalized surroundings and a sense of calmness for patients, staff, and visitors. Daylighting is one of many adopted strategies to create these. In addition, human preferences in building design are based on occupants' satisfaction with their indoor environments. Views and daylight through windows in buildings are recognized as an important factor in increasing the Indoor Environment Quality<sup>18</sup>.

In the most optimal conditions, there should be natural light in all spaces. Natural light causes control of body rhythm and recognition of day and night affecting the mood and emotions both psychologically and physiologically. The lights existing in the center of the room and over the head, as normally observed in delivery rooms, causes an increase in women's anxiety<sup>4</sup>. Color and light quality are greatly significant in medical centers. The recommended light is a mild and indirect light<sup>2</sup>. Increase of colors along the route, reduction of intense light radiation, daylight augmentation, decreased lighting inside the building, use of milder lights, and emphasis on the residentialism aspect of light work are among the effectual solutions in this regard. Control of light intensity is one of the simplest ways to control the childbirth environment<sup>19</sup>. Stenglin & Foureur recommended use of warm light reminiscent of home. Light controllability causes the room atmosphere to be changed easily. More light encourages the individuals to have further activity and less light creates a space for relaxation and some sort of private environment<sup>19</sup>.

### Privacy against male strangers (non-family members)

The women had to leave their own community to deliver their babies in the hospital with unfamiliar staff. In this process, women need to be supported



additionally by their husbands, friends and caregivers.

Based on the Iranian cultural values, men do not attend in the labor and birth room as a father or a doctor. Usually, the mothers accompany the daughter in the ward during labor and childbirth as the midwives were often busy doing other tasks besides attending to mothers who are in need of their care<sup>20</sup>.

The physical environment can alter the hormonal process of childbirth via creating the sense of control. Private control on social relations, especially strangers, is important for women's childbirth. In assessment of single rooms of mothers' care (when the pregnant mother stays in the same room from the beginning of hospitalization up to delivery), significance of privacy has been clearly recognized as one of the reasons leading to women's preference of such type of hospitalization. Most of positive effects resulting from design of medical environments are associated with improvement of privacy. Wide entry spaces and absence of internal windows are significant in design of delivery rooms because this type of designing create a balanced relationship between the public and private spaces. The women shall not feel that they are seen by others<sup>17</sup>. Home Resemblance (Home-like)

Devlin quotes McLaughlin, Verderber and Fine as saying "residentialism is an attitude and an architectural style" which is "utilized by the service providers, architects, and general people as a philosophy for patient-based medical cares"<sup>22</sup>. Patients' perceptions of the hospital environment are influenced at the very beginning of hospitalization by factors like sense of place, feeling of security or insecurity, and level of respect exhibited by the hospital staffs toward them. Other factors pertain to their capability in control of the surrounding environment and their empowerment in resumption of their daily life process in the hospital, including switching the lights on and off when necessary, central heating control, making a cup of tea, and so on<sup>3</sup>. The patients and the group participating in the research hold the

opinion that sense of independence is very important to them. For instance, this feeling can be established with a suitable designing and creation of spaces for movement. The patients require environments in which they can have their and their family's home-like life. They prefer the designs that provide them with respect, privacy, territory, and fulfill their demand to access and movement in the public spaces. In another section of the same research, when the patients are asked about what annoyed them most during the hospitalization time, loss of the sense of independence and control was the most frequent response. Lack of option in choosing the drink and watching TV, inability to contact the family members and friends were extremely awkward for them, in particular the individuals with limited abilities stated that they have lost all of their sense of independence in the hospital and they relied on other even for the smallest routine tasks<sup>3</sup>. Proper selection of artworks in the medical environment might lower the patient's stresses, provide them with a feeling of security, establish a connection between the patient and nurse, and leave a tremendous impression of the medical centers<sup>21</sup>.

### Flexibility

Personalizing the environment would help the women have control over their surrounding physical and social environment. Other elements in the designing of childbirth environment also undergo the same personalization, especially with regard to lighting, windows, noises and decoration<sup>17</sup>. Preferably, the surfaces and spaces shall be used which remind the women of their personal items and memorable things. To reach this goal, certain measures shall be taken into account in designing Ambient Smells

There is a strong relationship between emotions and sense of smell. Favorable scents reduce distress and pain and bad smells increase stress, fear, and anxiety<sup>22</sup>. Smell of disinfectants immediately provokes fear reaction. Therefore, this fear shall be prevented and replaced by milder and more pleasant smells generated by electronic burning of special oils<sup>4</sup>. One of

the simplest ways to mitigate this smell in hospital environment is to request the women to bring personal items like blanket from home<sup>17</sup>.

### Pavement

While an improved patient experience stemming from enhanced service and an aesthetically pleasing environment contributes to better evaluations by patients in terms of satisfaction ratings, and subsequently higher reimbursements to hospitals, there is a growing international awareness that the quality of the design of physical environments in healthcare facilities can affect patient medical outcomes and care quality<sup>23</sup>.

Few but growing studies are being carried out on effect of pavements and flooring in the hospitals; the respective studies investigate the result of using different materials like carpet, hard or flat materials such as vinyl compounds and plaster pavement. Citing Harris' research in 2000, LITKOUHI states that most patients prefer carpet due to lower risk of slipping and higher sense of comfort<sup>12</sup>.

### Methods

The current research is a survey – correlation study. The research was carried out in two parts namely basic and complementary. In the basic part, the theoretical framework (factors affecting design of childbirth ward) were extracted via analysis and study of concepts and theories and search of library references. Then, semi-structured interviews were performed with 10 mothers who have given birth to children in previous year, and consequently, a list of design criteria and impact of the factors affecting architecture of medical centers was prepared. Due to lack of comprehensiveness of the respective list, following review and analysis of the

successful samples around the world in this scope, a questionnaire of the factors affecting design of architectural spaces was prepared and its reliability was verified and confirmed based on Cronbach's alpha value. Validity of the questionnaire was also approved by the consensus of the experts.

The investigated sample size was 110 persons and the method was random sampling. The samples were randomly chosen among the pregnant women in public hospitals. The questionnaire was read out for them individually and completed based on their responses in the presence of the researcher. The samples were collected from three different centers:

1. The mothers admitted in Tehran's Akbarabadi Hospital following the childbirth
2. The mothers referring to Tehran's Ali Asghar Hospital for treatment of their babies.
3. Pregnant women or mothers referring to the maternity clinic of Amol City's Public Hospital for examination

Data analyses were performed by SPSS software (version 21) and the final results were acquired. Parametric data are reported as means  $\pm$ SD. Descriptive statistics using Chi-Square program was applied for the analysis of frequencies. An independent student t-test was considered to compare the mean scores of questionnaire dimensions between natural and caesarean groups. A p-value of less than 0.05 was considered as significant.

### Results

Frequency distribution of samples from Akbarabadi, Ali Asghar and Amol Public hospitals was 59.1%, 9.1% and 31.8%, respectively.

**Table 1.** Frequency distribution of the statistical sample based on hospital

| Hospital   | Absolute Frequency | Percentage |
|------------|--------------------|------------|
| AKBARABADI | 65                 | 59.1       |
| ALI ASGHAR | 10                 | 9.1        |
| AMOL       | 35                 | 31.8       |
| Total      | 110                | 100        |

In terms of type of childbirth, the mother had undergone both natural and caesarean childbirth. Frequencies distribution of samples based on childbirth type can be observed in Table 2.

**Table 2.** Frequency distribution of the statistical sample based on type of childbirth

| Type of Childbirth | Absolute Frequency | Percentage |
|--------------------|--------------------|------------|
| Natural            | 58                 | 52.7       |
| Caesarean          | 47                 | 40.9       |
| Unknown            | 7                  | 6.4        |
| Total              | 110                | 100        |

### Overall Prioritization of Questionnaire Dimensions

Friedman test was used to rank the dimensions of the questionnaire. According to Friedman test results, the significance level

obtained for the test (0.000) was less than the acceptable error value (0.05); it is therefore concluded that priority levels of the major dimensions of the questionnaire are significantly different from each other at confidence interval of 95% (Table 3).

**Table 3.** Results of Friedman test

|                                |         |
|--------------------------------|---------|
| Frequency                      | 110     |
| Chi-2 statistics               | 255.429 |
| Degree of freedom              | 16      |
| Significance level of the test | 0.000   |

The average of ranks and priorities of questionnaire dimensions is presented in Table 4. The presence of husband during childbirth (13.33), existence of window and view to exteriors (10.99), and use of nature (10.95) were the most important dimensions, while privacy against strangers (5.74) was the less important parameter.

**Table 4.** Ranks and priorities of questionnaire dimensions

| Priority | Questionnaire dimensions                   | Average ranks |
|----------|--|---------------|
| 1        | Presence of husband during childbirth      | 13.33         |
| 2        | (Existence of window and view to exteriors | 10.99         |
| 3        | Use of nature                              | 10.95         |
| 4        | Routing (easy access)                      | 10.43         |
| 5        | Use of delighting and diverse colors       | 10.28         |
| 6        | Control of comfort conditions              | 9.98          |
| 7        | Space controllability                      | 9.26          |
| 8        | Appropriate light conditions               | 9.25          |
| 9        | Home-likeness                              | 8.85          |
| 10       | Proper separation of beds                  | 8.35          |
| 11       | Use of artworks                            | 8.17          |
| 12       | Flexibility                                | 8.00          |
| 13       | Ceiling height                             | 7.15          |
| 14       | Pavement and flooring                      | 6.94          |
| 15       | Ambient smells                             | 6.90          |
| 16       | Privacy against strangers                  | 5.74          |

Independent t-test was used to compare the major dimensions of the questionnaire between individuals with natural or caesarean childbirth. The results showed a significant difference in mean of each score between two groups (Table 5).

**Table 5.** Significant correlations based on the type of childbirth (natural or caesarean)

| Questionnaire Dimensions | Mean   | Type of Childbirth | Significance Level |
|--------------------------|--------|--------------------|--------------------|
| Use of artworks          | 3.2586 | Natural            | 0.007              |
|                          | 2.7556 | Caesarean          |                    |

| Questionnaire Dimensions                  | Mean   | Type of Childbirth | Significance Level |
|---|--------|--------------------|--------------------|
| Control of environmental comfort          | 3.1638 | Natural            | 0.044              |
| Existence of window and view to exteriors | 3.5222 | Caesarean          |                    |
|   | 3.5690 | Natural            | 0.047              |
|   | 3.2222 | Caesarean          |                    |
| Presence of husband during childbirth     | 4.3103 | Natural            | 0.001              |
|   | 3.6444 | Caesarean          |                    |

## Discussion

Our data have revealed that the top priority of mother for having an appropriate maternity ward is the possibility of presence of their spouses during the childbirth process. This finding is also consistent with the above mentioned arguments and is also taken into account in the Ministry of Health's instructions for promotion of mother-friendly hospital, as well as guidelines regarding safe maternity ward of hospitals. The up-to-date researches of the world also corroborate this fact that presence of mother's favorite companion might be effective in mitigation of the mother's stress and encourages her to have a successful and safe labor.

In the next priorities come factors related to the ambient design of the hospital indicating significance of the respective agents in deriving satisfaction of patients and reducing their stresses. View to outsides, use of nature, use of decorations and materials and furniture with delighting and diverse colors and patterns are among the factors barely seen in Iran's hospitals. Based on the theoretical concept (i.e. principle of patients' non-concentration on the disease and creation of positive distraction), the mentioned factors would cause reduction of their stresses, and hence, increase the likelihood of having a faster recovery process.

Another part of the questions focused on factors and agents causing mother's control over the ambient conditions and the respective part can be divided into two sections including physical and mental conditions. In both sections, mothers demanded the possibility to apply changes in the environment and have control over it with the priority of controlling the physical conditions. This result is consistent and in accordance with other previous research works (Devlin AS, Arneill AB, Douglas CH, Douglas MR, Jenkinson B, Josey N, Kruske S, Stenglin M, Foureur M).

Entailing a number of other questions whose responses would help the designers in knowing

about the pregnant women's preferences regarding the environment of the maternity wards, the factor with the lowest rank in the list is privacy against strangers (non-family members). Although privacy is among the most significant factors to be taken into account in all medical centers, the low rank of the respective parameters might probably result from gender segregation of the personnel in the maternity wards, which has almost resolved the privacy issue to a great extent. Also, inappropriate and minimalistic physical conditions of the analyzed hospitals (Akbarabadi and Amol hospitals) have caused the mothers to consider higher priority for any sort of renovation or beautification and having control over the environment than observance of privacy against male strangers in a hospital ward where all the personnel are female. However, this issue requires psychological analysis which is out of scope of the present study. Yet, based on the observations in the analogous researches around the world, observance of the mother's private space is among the significant priorities in design of maternity wards and lack of emphasis of the respondents might signal success of Iran's health and medical system in securing the privacy conditions.

Furthermore, with respect to the type of childbirth (natural or caesarean), significant differences were observed in dimensions of use of artworks, control of ambient comfort, existence of window, and presence of husband during the childbirth process.

## Competing interests

Authors declared no competing interest regarding this study.

## Authors' contributions



Authors are equally contribution in the article.

## References

1. Medical Treatment Deputy of Iran's Ministry of Health, Medicine and Medical Education. Set of Instructions of Health Transformation Plan - Instruction on Program for Promotion of Natural Childbirth; 2014.
2. Devlin AS, Arneill AB. Health care environments and patient outcomes: A review of the literature. *Environ Behav* 2003,35:665–94.
3. Douglas CH, Douglas MR. Patient-centred improvements in health-care built environments: perspectives and design indicators. *Heal Expect* 2005,8:264–76.
4. Foureur MJ, Epi GDC, Leap N, Davis DL, Forbes IF, Homer CSE. Developing the birth unit design spatial evaluation tool (BUDSET) in Australia: A qualitative study. *HERD Heal Environ Res Des J* 2010,3:43–57.
5. MARDOMI K, et al. A Plan Based on Evidences for Medical Centers. Tehran: ASR-E KANKASH Press; 2013.
6. Xue WL, Shorey S, Wang W, He H-G. Fathers' involvement during pregnancy and childbirth: An integrative literature review. *Midwifery* 2018.
7. Ministry of Health, Medicine and Medical Education. Standard of Planning and Designing of Safe Hospitals. Tehran: PENDAR NIK Press; 2012.
8. Iyendo TO. Sound as a supportive design intervention for improving health care experience in the clinical ecosystem: A qualitative study. *Complement Ther Clin Pract* 2017,29:58–96.
9. Ministry of Health, Medicine, and Medical Education, Office of Family and Population Health, Bureau of Mothers' Health. National Guideline for Providing Midwifery and Childbirth Services in Mother-friendly Hospitals; 2006.
10. Gaeta, M., Giplin, L. Arneil, B. P.Nuelsen PH. Design Guidelines and process for Planetree facilities. Derby, CT Planetree 2000.
11. Zimring C, Joseph A, Choudhary R. The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity. Concord, CA Cent Heal Des 2004.
12. [12] Litkouhi, S et al. NAME *PhD Thesis*. University of Science and Technology Tehran, Department of Psychology 2008.
13. Adatia S, Law S, Haggerty J. Room for improvement: noise on a maternity ward. *BMC Health Serv Res* 2014,14:604.
14. Beake S, Rose V, Bick D, Weavers A, Wray J. A qualitative study of the experiences and expectations of women receiving in-patient postnatal care in one English maternity unit. *BMC Pregnancy Childbirth* 2010,10:70.
15. Craig BJ, Kabylbekova Z. Culture and maternity care in Kazakhstan: what new mothers expected. *Health Care Women Int* 2015,36:41–56.
16. Ulrich RS, Perkins RS. The Impact of a Hospital Garden on Pregnant Women and Their Partners. *J Perinat Neonatal Nurs* 2017,31:186–7.
17. [17] Jenkinson B, Josey N, Kruske S. BirthSpace: An evidence-based guide to birth environment design 2014.
18. Alzoubi HH, Al-Rqaibat SM. The effect of hospital design on indoor daylight quality in children section in King Abdullah University Hospital, Jordan. *Sustain Cities Soc* 2015,14:449–55.
19. Stenglin M, Foureur M. Designing out the Fear Cascade to increase the likelihood of normal birth. *Midwifery* 2013,29:819–25.
20. Taghizadeh Z, Arbabi M, Kazemnejad A, Irajpour A, Lopez V. Iranian mothers' perceptions of the impact of the environment on psychological birth trauma: A qualitative study. *Int J Nurs Pract* 2015,21:58–66.
21. Kaiser CP. Careful fine art selection

- stimulates patient healing: Serene nature views, rather than abstract art or no art, helps heart patients recover faster. *Diagn Imaging* 2007,1:7–8.
22. Schweitzer M, Gilpin L, Frampton S. Healing spaces: elements of environmental design that make an impact on health. *J Altern Complement Med* 2004,10:S-71.
23. Suess C, Mody M. Hospitality healthscapes: A conjoint analysis approach to understanding patient responses to hotel-like hospital rooms. *Int J Hosp Manag* 2017,61:59–72.

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