

Natural environment and its vital impact on patient women hospitalized in the maternity wards of Tehran's general hospitals

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Abstract

Experts have found that natural environment could have positive impacts on patient's treatment process. The impact of natural environment on mental state and lowering the stress level of the patients is undeniable. In this study, the impacts of natural environment on patient women in Tehran general hospitals were investigated. After conducting a topical study of the issue on hand, using field observation method, opinion of the patient women in a few of Tehran's general hospitals was asked. Moreover, number of doctors and architects were asked to furnish the study with their opinion on this issue. After analysis of the answers, interesting conclusions on effect of open and green space on patient women were drawn. Based on these findings, designing open green spaces adjoined to the maternity ward could be in a way that encourages social behaviors, personal progress and convenient interaction with others and elevates mental and physical health of the patients.

Keywords: Natural environment, Women, Maternity ward, Tehran's general hospitals.

1. Introduction:

Nowadays, new and creative ways have been thought of on how to bring the nature into the treatment centers. In fact, it could be said that all of these methods are trying to use the positive influences of nature without the climatic factors, because the patients are not able to be in open spaces most of the times and it may be troublesome to bring the nature into the hospitalization area or it may be too expensive to do it. The hospital's view often includes buildings, the spaces between them and any other landscape which could be found in inner city environment. Developments in modern medicine has led to a new understanding which pertains to the positive effects that green and open environments could have on a patient's treatment process. This open space, whether be called a treatment environment or a refreshing garden or a health garden, could lower stress and bring about physical and mental comfort and relaxation and recharge the patients spiritually and emotionally by providing them with a relaxing and refreshing view (Sherman et al., 2005; Cooper-Marcus

and Barnes, 1999; Varni et al., 2004; Whitehouse et al., 2001).

The most important theories on therapeutic effect of the environment are Kaplan's theory of renewal of mind and mental-evolutionary model. Both of these theories point out the environment's healing and refreshing effects and name it as something which is directly related to human nature and evolution (Kaplan, 1995). Positive effects of nature on improving mental state have been proven in many researches. In fact, seeing an orchard or any other natural scene could lower ones heartbeat and blood pressure very rapidly and increase the activities of that part of the brain which controls mental functions. Other positive effects of nature's presence in treatment centers such as jollies and happier mood, lower usage of pain killers and, ultimately, speedier recovery and release from hospitals have been proven (Ulrich, 2002; Hartig et al., 2003).

Besides the gardens and the green spaces of the hospital which the patients, hospital staff and the families have an easy access to them, designing windows in the visitation and waiting rooms which provide a good view of nature is an excellent option (Ulrich, 1984; Zeidler, 2005). Establishing mental connection with the outside environment will have a positive influence on the patient's attitude and, of course, on her treatment process. If the patients who are hospitalized in windowless rooms, after undergoing major surgeries, they will suffer from mental distraction. While patients recovery period has passed faster in rooms with windows and views to nature

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(Franz et al., 2005; Ulrich, 1984). Moreover, the degree of mental distraction of the patients in the emergency rooms which lack windows, in comparison with the patients in the rooms with window is higher (Wilson, 1972).

In some of the hospitals, no importance is given to green space. Using indigenous plants could, at least, decorate the abandoned and useless spaces of the hospitals in a pleasantly. This is something that which has not been done in Tehran's hospitals, and even worse, some of them does not have any open spaces at all. As this study does also show that presence of a window in patients' rooms plays a role in reducing their stress levels; therefore, in designing hospitals and waiting rooms installing them should be taken into consideration.

2. Literature review:

2.1. Therapeutic environment

Treating patients, while considering their environmental conditions, is not a new issue. Hospitals and European treatment centers during the Middle Ages used therapeutic gardens for the patients' comfort. In the 20th century, they took the patients into the open spaces using a wheel chair, and the hospital spaces were designed in a circular form (Stouffer, 2000:290).

Studies in four of California's hospitals show that the patients and their families find using gardens lowers stress and creates a positive attitude, and this increases patients and their families' being pleased with the treatment centers (Ulrich, 2002). Grass covered spaces with trees here and there and sounds of nature such as birds' singing, water and breeze possess the same effects as the therapeutic gardens. In order to put together a list of the factors which a treatment center needs, the needs of the people who are going to use it must be taken into consideration. For example, installing ramps in a garden at the hospital for sport therapy purposes is suitable. These environments should attract the clients and encourage them to interact socially and exercise. Open spaces such as the yard and the Iranian garden has a colorful role in Iran's architecture in the past. In Iranian culture, many of the social activities in the yard, near the pool and the trees creates closeness and love among the family members.

2.2. Nature and positive distraction

Distraction factors are referred to a set of social-environmental conditions that by taking the mind away from the existing conditions lowers the stress and improves the attitude. for example, actions such as using music, pets like cats and dogs, laughter or comedy, art and, especially using nature, are samples of what could be done.

In the 1930's it was found out that there are some psychological diseases that when the patient is exposed to nature, the positive distraction which is created has proven to be very effective in treating them (Dilani, 2005; Antonosky, 1996). As it was mentioned before, there are studies continuing presence in nature and/or having a view of it causes the patients to relax and have positive effect on the process of treatment and its results. There is a hypothesis that says

indirectly experiencing nature causes mental relaxation, but guided and intentional attention to nature for a long period of time causes tiredness; "The new theory of attention".

Presence of positive entertainment in a hospital could also distract the patient's mind and take it away from concentrating on the pain and lower her anxiety. This ultimately could influence body's physiological functions. Ulrich (1992) indicates that: "stressed patients lying on gurneys who are exposed to "serene" pictures (primarily displaying water or other nature scenes) have lower blood pressure than patients exposed to either "exciting" pictures or no pictures".

Positive entertainment in hospital is divided into three groups of nature such as trees, plants and water, happiness and laughter and none-dangerous domestic animals.

In a research in America, the researchers at the University of Washington compare the treatment results and the degree of satisfaction of the patients whose treatment environment contains art works and scenes from nature with the patients whose treatment environment lacked all these factors. The results indicated that those patients in the hospitals with art works and entertainment expressed a higher level of satisfaction about the training, duration of hospitalization and their participation in their own treatment process (URL3). Art works and scenes from the nature affect the cold environment of the patient's room, and as the result of the variety created, the patients are saved from having to have a monotonous and boring hospitalization time, while the patients in the other rooms, due to lack of any variety have no other choice but to think about their sickness. The following examples are samples of the studies which show that creating positive distractions has led to very satisfactory results with the patients.

At the Angiography section of Detroit's Grace Hospital, a picture of a wooded area is lit from behind (URL1). At the Saint Mary's scan department, in Grand Rapids Michigan, pictures of waterfalls and underwater marine environment has been designed on the ceiling. The patients, who are placed under a ceiling with picture of a scene from the nature during Bronchoscopy, feel less pain than the normal patients (URL2). Two studies on the women with cancer shows that when scenes portraying taking a nature walk with the sound of the birds is simulated for them, the symptoms and the anxiety of stress is lowered. If the burn patients watch a movie on nature (jungle, flowers, sea and waterfall) while their burn is getting dressed, suffer from less pain and anxiety (Arjomand, 2010).

In public places, many different issues could cause positive distraction. Classical music, the smell of freshly baked bread, fountains, entertainment, serving food and social relationships are a few of these positive distractions. These things are to be accessible for all patients. In the patients' rooms, with climatic and pictorial control capabilities, a view, and even the smell, taste and appearance of the patients' food affects their health. In some hospitals, baking pies and bread in an open space causes the smell of the freshly baked bread spread throughout the hospital and lead to great deal of satisfaction on the part of the patients (Stouffer, 2000:291).

The researchers in this study have concluded that considering feeling the need for creating a green space in hospitals, the obtained results could be investigated based on Tehran's

climatic conditions. In Tehran's warm and dry climate, excessive heat during the day is a factor that must be dealt with, but considering the psychological needs of the patients, it is not suitable to have small windows with large shades in the hospitalization areas, because the hospitalized patients need a wide open view of the outside environment to benefit from the nature's view and the air movement inside the rooms during the evening and nighttime. However, having big windows causes a lot of hot air to enter the rooms from the windows. To resolve this dilemma, blinds and construction materials with high heat capacity such as brick and dense cement or clay could be used. Moreover, the outer surface should be painted using bright colors, preferably white. Even though, nowadays, as the result of the advances made in science and technology, using modern materials has been made possible, but using indigenous raw materials and paying attention to conservation of energy issue in constructing hospitals are a few of the major factors which must always be kept in mind. Sanitation and cleanness of the air in hospitals' hospitalization areas, especially in all maternity wards, must be taken care of. To this end, these areas must benefit, both, from natural light and proper ventilation. Moreover, the automatic doors must be placed in the southwest direction or, at least, on the higher floors. Since in a warm and dry climate, the number of the cold days is fairly high, making sure that suitable construction materials are selected and used and thinking of the necessity of having good heating system in place are of great importance. Even though noticeable dryness of the air is an effective help in sterilization of the various departments in a hospital and prevents, up to a certain limit, fungus from growing on surfaces, for taking the comfort of the patients into consideration, proper humidity must be supplied with the aid of suitable ventilation. Furthermore, creating appropriate green spaces, while providing the needed humidity, is an effective psychological factor for the patients. By planting trees, exposure to direct sunlight and production of heat could be prevented. Also, trees in the northern part of Tehran's buildings produces reflections of soft light on these structures. However, it must be remembered that the plant coverage must not block or limit the buildings' exposure to sunlight. Trees humidify the air by absorbing water from the soil and releasing it in the air. By doing so, a great deal of the heat energy is absorbed. Ultimately, trees lower the speed and severity of the wind by changing its direction. Moreover, plant coverage could be used to reduce the amount of dust in the air.

3. Research method:

After doing research on the impact of open and green space, and in general on the impact of natural environment, on patients women and their health status, it was tried to determine the degree of such impact, on patient women who were hospitalized in Tehran's general hospitals' maternity wards. Furthermore, the doctors' and the architects' opinions on this issue were obtained so that all aspects of the issue could be investigated. To this end, samples from the population of the women patients who had visited Tehran's general hospitals, architects and the doctors were randomly selected and were asked to provide the researcher with their opinions

via answering a questionnaire. After conducting library and Internet research, the questionnaire was designed. For the three groups, the patients, doctors and the architects, three different questionnaires were designed. The expertise and the function of each group were the key factors in selecting the questions for the questionnaires. The statistical population in this study was the ladies who just had a baby or were to have one, the gynecologists, the nurses in the maternity wards and the architects. A few of the general hospitals were selected randomly from all across Tehran as the statistical sample. The independent variable was the physical structure (maternity wards in Tehran's general hospitals), and the dependent variables view, green space, etc. After the data was gathered, descriptive and inferential statistical methods were used to analyze the data. Then, a fair and unbiased analysis of the answers to the questions in the questionnaires was carried out to truly investigate the effect of the natural environment on patient women. In order to analyze the data descriptively the researchers benefited from descriptive statistics including mean, standard deviation, Frequency, percent (density and valid) and in order to generalize the results to the studied community the authors used One-sample t-test, two sentence test, Chi square test, Repeated measure test, Multiple comparison test (Least Significant Differences).

The number of the patients was 131, expert hospital designers (architects) 10 and the doctors was 72. Features of the participants are as follows:

A) age: 22.9% of the patients were between the ages of 15 to 23, 35.9% of them 24 to 32, 28.2% 33 to 41 and 9.9% were over 42.

B) Occupation: 61.1% of the patients were homemaker, 26.0% government employees, 6.1% university student and 3.6% worked for private companies or had other jobs. As it could be seen, majority of the women in this study are homemakers.

C) Number of children: 38.9% of the women had one child, 25% of them had 2 children, 15.7% had three children, 11.1% had 4 children, 2.8% had 5 children and 6.5% had no children.

4. Data analysis

The questions with regard to view, scene, open space, green space and connection of inside and outside environment were designed based on the experts' opinions. The result of the analysis of the responses to the questionnaires is as follows.

- Doctors' and architects' opinions on having a suitable view for the patients' rooms

The results of the two-sentenced questions of the questionnaires administered to the patients and the doctors indicate that both, with 99% certainty, find having a suitable view from the patient's room very important. 99.6% of the patients and 100% of the doctors find the importance of having an outside view from the patient's room to be of medium to high importance on the scale of low to high.

As it could be seen from the results, having a view is one of the most important factors in designing healthcare environments for the women, but other factors are important as well. For example, the designers (architects) when designing hospitals and treatment centers, must take the required

Table 1 Two-sentence questions' results on the importance of having an outside view from the patient's room from the doctors and the patients' point of view

patients	Category	the number observed	Proportion of observed	proportion of the test	level of significance
Group 1	important	5	.04		
Group 2	unimportant	123	.96	.50	.000
Total number		128	1.00		
doctors	Category	the number observed	Proportion of observed	proportion of the test	level of significance
Group 1	important	0	0.00		
Group 2	unimportant	71	1.00	0.50	0.000
Total number		71	1.00		

measures to make sure take in consideration the patients who are put to bed-rest and cannot even sit on their beds have a nice view of the outside. Designing the window sills is even considered important here. by far, the most important factor which should be considered by the architects when building a hospital or a treatment center is selecting the location of the construction. They must choose a piece of land that is surrounded by quality landscape and nature view; otherwise, they must design suitable open spaces.

- Doctors' point of view on the impact of patient's room being connected to open and green spaces on the patient's recovery

The results of the two-sentence questions show with 99% certainty that from the doctors' point of view, patient's room being connected to green and open spaces has significant effect on the patient's recovery. In other words, 100% (72 people) of the doctors rate this effect medium to high on the scale of low to high.

As it was discussed before and taking the opinion of the doctors, such an impact becomes more obvious. Having a view of an open and green space creates positive distraction and by doing so, induces positive psychological effects and speeds up the patient's recovery.

- Patients' point of view on their preference on spending their time in an open space

With more than 99% certainty, most of the patients rate their preference on spending their time in an open space medium to high on the scale of low to high. Only 15% of the patients do

not prefer to do so. The doctors do also find spending time in an open space very useful and beneficial to the patients; of course, after considering the patient's physical and psychological condition.

- patients' doctors' and the architects' point of view on having an open space in the maternity ward

The results of the two-sentence questions indicate with 99% certainty that both the doctors and the patients find having an open space in the maternity ward is suitable for the patients. 93% of the patients and 97% of the doctors rate it medium to high on the scale of low to high.

Moreover, the result of the Chi-square test indicates that there is no significant difference between the doctors' and the patients' point of view on this issue. In other words, they both emphasize on having such a space. Finally, 90% of the architects rate having such space high and only 10% rate it medium on the scale of low to high.

Thus, it could be concluded that the architects do also agree with having such spaces in the maternity wards. Providing a private open space, in the patients' rooms by bringing the nature indoor without the climatic elements such as wind, not only improves the quality of the patient's room but also gives the women feeling of extra independence. Such a private space gives them the feeling of not being limited and thus, interacts with others and moves around easily.

- Doctors' patients and the architects' point of view on the patient's room having an easy access to an open space and the yard.

Table 2 Two-sentence questions' results on the influence of connection between open and green spaces and the patient's recovery, from the doctors' point of view

doctors	Category	the number observed	Proportion of observed	proportion of the test	level of significance
Group 1	ineffective	0	.00	.50	.000
Group 2	effective	72	1.00		
Total number		72	1.00		

Table 3 Two-sentence questions' results on the Patients' preference on spending their time in an open space

patients	Category	the number observed	Proportion of observed	proportion of the test	level of significance
Group 1	Not prefer	19	.15	.50	.000
Group 2	prefer	111	.85		
Total number		130	1.00		

Table 4 Two-sentence questions' results on the Desirability of having an open space in the maternity ward from the doctors and the patients' point of view

patients	subject	Number of observed	Proportion observed	Proportion of the test	Level of significance
Group 1	unsuitable	9	.07		
Group 2	suitable	120	.93	.50	.000
Total number		129	1.00		
doctors	subject	Number of observed	Proportion observed	Proportion of the test	Level of significance
Group 1	unsuitable	2	0.03		
Group 2	suitable	68	0.97	0.50	0.000
Total number		70	1.00		

The results of the two-sentence questions indicate with 99% certainty that both the patients and the doctors rate the patient's room having an easy access to an open space and the yard suitable. 91% of the patients and 90% of the doctors rate this medium to high on the scale of low to high. Moreover, the result of the Chi-square test indicate that there is no significant difference between the doctors' and the patients' point of view on this issue. In other words, both agree that having such a space is necessary and beneficial to the patients' recovery. 60% of the architects, rate necessity of having this type of space high and 40% rate it medium on the scale of low to high.

Therefore, it could be said that the architects do also agree with patients having access to an open space and the yard. Considering the responses to this question, connecting spaces could be designed that connect the patient's room to open and green spaces. These connecting spaces could be flexible in form of half open spaces.

5. Research limitations:

Despite the advances taken place in doing research, the difficulties in doing research in healthcare environments is noticeable. Besides the cosmetic and renovation issues of the hospitals and treatment centers, architectural therapy field has not yet been developed as an independent branch of research. Lack of research related to healthcare staff's functions which are related to the interactions between human beings and their environment, has led to rarity of suitable environmental designs compatible with the patients' needs. Up till now, the rules of physical design of treatment centers have been discussed theoretically more than carrying out practical tests on it. Another problem which exists is incorrect or improper

research method used in many of the existing researches. This usage of incorrect methods was so widespread that out of 38000 articles on change of treatment results of the patients by the environmental factors and variables, only very few met the required standards. Moreover, according to Sloan Devlin and Arneill (2003) these articles were deemed to be very weak from the science of metallurgy's point of view.

The reasons behind lack of a branch of research, specifically, on architectural therapy could be summed up as follows: these types of research being time consuming, doctors not paying attention to the role of physical environment in patients' recovery and process of conducting research in healthcare environments being difficult (Verderber and Refuerzo, 1999). Malkin (1991) claims that the main reason behind conducting these types of researches is the feasibility of controlling them, experimentally.

6. Discussion and results:

In line with the related literature on the effect of nature on patient's recovery and improved health, this paper has tried to prove the effect of open green space on attitude and process of recovery of patient women. To this end, the questions were designed in a way that they were architecturally inclined. Moreover, the doctors' and the architects' opinions along with the patients' opinion were looked for so that the results, after the required statistical calculations and analysis, could be scientific, reliable and valid. To sum it up, nature affects recovery and health in many ways: Creating opportunities for personal growth and being goal oriented, reduction of stress, encouraging exercise and physical activities and establishing social interaction. In the presented paper, these efforts were

Table 5 Two-sentence questions' results on the Desirability of having an easy access from the patient's room to an open space and the yard from the doctors and the patients' points of view.

patients	Category	the number observed	Proportion of observed	proportion of the test	level of significance
Group 1	undesirable	12	.09		
Group 2	desirable	118	.91	.50	.000
Total number		130	1.00		
doctors	Category	the number observed	Proportion of observed	proportion of the test	level of significance
Group 1	undesirable	7	0.10		
Group 2	desirable	65	0.90	0.50	0.000
Total number		72	1.00		

made in two areas, the area related to the view and the sight and the area related to the open and green space and the physical connection between the inside and the outside.

On one hand, having a suitable view is an issue that hospital staffs have pointed out to as being, both, being there and the patients' opinions and wish. There are other evidences which show that the length of recovery period decreases when the patients have a nature view, but this topic must not be looked upon as merely a cosmetic issue. There was no evidence indicating that the patients want special and new scenes. Even if there were request on patients' part, they were only for having access to normal and day to day scenes. Views and scenes which take place in the hospitalization areas seem pleasant. For example, view of the nature from the patients' rooms, and if possible from the lobby, waiting areas and other stressful areas could be very beneficial. Having access and view to nature and relaxing therapeutic gardens, spiritual spaces, relaxation rooms and art pieces which portray the nature are what causes the patients feel better.

On the other hand, as it is obvious from the results, medical expert approve the importance of creating an open and green space in the hospitals and the treatment centers. As it was mentioned before, the most important advantage of such spaces is creating a positive distraction and their positive psychological effects on the patients. Presence of a patient in an open space, as long as it doesn't harm her (from the doctors' point of view), could be very beneficial for her. As it is known, many of the doctors recommend their patients to move around after a certain point during their treatment. Of course, this is highly up to the patient's psychological and physical conditions. Wanting to have a private open space of their own in the maternity ward originates from the women's need for independence. Naturally, anybody would want to have a space of her/his own. A private space or area in the maternity ward could be designed in a way that this space is located in the patient's room or designed in a way that nature is brought into the hospitalization areas without the climatic elements such as cold and wind. This issue finds much more importance in the maternity wards of Tehran's hospitals, because it would be totally compatible with Iranian women's culture and religious beliefs. By doing so, much better privacy could be provided for them and their families so that they could move around and enjoy the open and green spaces dressed in a garb and covering which is much more comfortable. Out of the obtained results, the idea of designing connecting areas which connect the hospitalization area to the outside open and green spaces could be mentioned. This connection could be in a way that; of course with permission from the doctor, the patient could enjoy the outside environment. Being exposed to nature has positive impact on physiological recovery from stress. Watching movies about nature such as natural environments containing body of water, beaches and the waves, jungle, etc. causes reduced heartbeat, blood pressure, muscular distress in facial muscles and rapid physiologic improvements. It has been proven that being exposed to nature, even for a short period of time, has a great deal of impact on morale and physiologic stress.

Based on the presented results, the authors recommend the designers to high consideration in the environment and nature

about therapeutic spaces and also recommend the researchers in considering social concerns for their future studies in the mentioned spaces, especially in Iran general hospitals.

7. Disclosure:

The authors acknowledge that none of them has any potential conflict of interests and they had no income and have not paid for any contracts with any companies about the presented research.

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