Constant Design in Hospitals and its Influence on Operation and Increasing their Efficiency

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Abstract: Hospitals include big buildings that consume abundant amounts of energy. So, extolling the constant design in the hospitals is a necessary affair. This paper, as a tool for decreasing environmental tension in hospitals, surveys the constant architecture in hospitals and medical centers, and declares its positive influences. Now, this question is posed that constant design in hospitals, with regard to their valuable role, how they can be in a way in order to achieve the improvement of results in these places, so that this will be by using the effective approach and constant design. So, extolling the design of remedial places is included in the priority of constant design. The researchers of this paper, with regard to analytical-descriptive method and library data and sources, finally indicates that it is possible for suggesting joint solutions for designing such places that will cause creating more suitable environment that will be compatible with constant architecture. The findings of this study shows that some joint solutions for constant design in the hospitals include: using natural light and day light, accessibility to the nature, suitable ventilating of fresh air, and choosing suitable and stable materials in the hospitals.
[Saeed Mikaili Meykhosh, Feridoun Nahidiazar. **Constant Design in Hospitals and its Influence on Operation and Increasing their Efficiency.** *Researcher* 2014;6(8):57-61]. (ISSN: 1553-9865). http://www.sciencepub.net/researcher. 8

Key words: Spaces of the Hospitals, Suitable Environment, Stable

1. Introduction:

Various factors such as suitable physical space has effect in the main aim of forming hospital that satisfaction of the patients is considered as remedial services(Brad well PL, Saba JL, 2004). One of the most important discussions in the stable architecture is decreasing environmental destructive effects of the buildings on environment and also health of humans. Among the various users, the hospitals with great amount of production of wastes are considered from pollutant users that, in grading various users and from the point of view of producing pollution, are placed in the fourth degree. So, they will be in certain priorities of stable design (Litkuhi, Sanaz, 2011). New changes in the style of architecture and internal design of the hospitals can play an important role in improving condition of the patient's health. Internal architects and designers-in a joint action with doctors, staffs of the hospitals and even the patients, are going to find new works in changing the architecture style and internal design of the hospitals, and they wants to improve the patient's health. Using modern methods in design means that hospitals and remedial places, by using special remedial facilities, should have spaces like hotels. Because, the researches have indicated that this affair will help for preparing mental calm of the patients. Today, obtaining this importance with considering facilities and various materials will not be impossible (Architect, 2014).

From the other hand, it will not be researchable, if we accept that hospitals, for all districts and area should be designed and performed alike. Certainly, in addition to social customs, weather and climate conditions are very effective in designing the remedial spaces. The hospitals, in which, without regarding to environmental characteristics and only is constructed with repeating, producing and imitation the map of a hospital from a country, city, or other district, from the attribute of accessibility and success and influence of services, productivity and economical performance will face with problem. Due to this reason, copying never will not be considered a successful work in designing and architectural maps of the hospitals (Architect, 2014). So, this can be resulted that the hospitals such as big public buildings have considerable effects on around environment and the economy of society. In this point, the present paper attempts, by recognizing environmental influences of these applications, to give practical solutions for decreasing these destructive effects.

2. Main question of the research:

Should we consider a hospital and sanitary and remedial space just from the attitude of framework and from and volume, or should we also consider its environmental aspects in the designing?

3. Declaring the problem:

Preparing a quiet environment, satisfying and breezy for the patients and remedial staff, along with observing exact technical standards, poses difficulty special limitations in designing the hospitals. From the other hand, by considering this point that; preparing this quiet and satisfying environment consumes great amount of energy sources, and also it

produces great volume of the wastes. As a result, surveying the effect of designing, particularity, stable designing are significant on performance of the hospitals.

4. The purpose of the research:

In the present paper, the aim is surveying the effect of solutions of stable designing on remedial performance of the hospitals. By recognizing these effects, it will be possible to increase the quality of remedial spaces and also the stability of the spaces. So, the stable designing in remedial centers is accomplished by three aims that include:

- Decreasing the negative effects of hospitals on the environment.
- Improving remedial performance in the hospitals.
- Decreasing the costs.

5. Background of the research:

New Odense hospital in the middle of the jungle:

These buildings have been designed with the aim of maximum usage of the natural light, and their height in compared with the height of oldest trees of the complex has been considered in a less amount. Site of the complex has been situated near the downtown in the middle of an old forest in which its aim will be using the green spaces for improving the patients. These comprehensive facilities that introduces the nature as a space for creating peace and quietness, is an effective solution. Natural light has been entered to the building through the main building. Also, the rainwater is collected for preparing the water of the artificial lake and watering the enclosure. Buildings of the hospitals have been gathered in a complex of circle from; and have been surrounded by a walking way. So, spectaculars and patients are admired for using the enclosure, forest buildings and being present beside the lavers and water-channels. Western part of the complex completely has been stayed intact. This sensitive part has indicated the suburban space, and it provides the field for revealing the next creativities. Even, there are, also, views into the building that include such a sense. These buildings has been posed with the aim of maximum using of natural light, and their height has been considered lesser, in compared with the height of oldest trees of the complex. Rainwater much as possible has been collected, and it is used for watering the surrounding water and protecting plant and animal species. The architect of the complex declares that: many research designs have cleared that the nature has a suitable influence in improving the patients. The aim of this project is constructing a hospital that truly has had a survival role that simultaneously merges the cases such as space, landscaping and technology (Architecture News, 2014).

6. Research Method:

Subject of this research is the constant design in the hospitals and also its effect on performance and increasing the efficiency of hospitals that, by reviewing and collecting the papers and accomplished research in this field, and with analytical-descriptive approach presents a general principal and patterns for constant design in the hospitals so that they can be effective in the trend of treatment.

7. The targeted population:

The targeted population is the designing of personnel, patients, and also accompanies of the patients in hospitals that each of them shares in consuming energy in the hospitals.

8. Research Findings:

Research findings indicate that some of joint solutions for constant designing in hospitals are as follows:

- Using natural light and day light.
- Correct choosing of materials in the way of constant designing.
- Accessibility to the nature.
- Suitable ventilation of the fresh air.

9. Using natural light and day light:

Mental need of humans to the natural light has changed the usage of day light as one of the main needs of designing the hospitals. Designing the windows and pop ups, as an entrance way of light to the hospitals, can have a significant role in the method of light entrance and level of light of internal space of the hospitals. So, by using the designing and also with help of simple and practicable tools, it is possible to correct the approach of distributing natural light in the internal spaces of hospitals and also it is possible to obtain a suitable light (Tahbaz, Mansureh, Jalilian, 2011).

The hospitals are usually doorway with small rooms that are originated from them. Considering the patient's attitude is a vital factor in internal communication of spaces of the hospitals. For being apart of uniformity of such view, we can design the doorway with a suitable and attractive spaces. The case that we can use direct solar energy, is arranging the rooms in four geographic sides. The other activities that can be considered the trend of doing work are the method of using solar energy in office buildings and remedial centers.

10. Applying factors of solar energy:

- Construction of building in the side of sunlight and declivities towards the south.
- Leaving open the southern facade of the building.

- Choosing suitable framework forms towards decreasing development and scratching plan in the side of eastern and western axis.
- Observing suitable depth in the window and construction.
- Considering suitable awnings for the windows.
- Designing reflective levels in the floors towards the sunshiny windows, balcony and glasshouse attached to the internal space.
- Using building materials with a lot thermal capacity.
- Using walls with heavy building materials in the southern view of building.
- Choosing dark color and harsh contexture for external levels (Ghanavati, Niloofar, 2012).

Many studies have been accomplished on the light effect of sun on the health of man that all of which are confirmer this matter that natural light has positive effect on the health of man. Some of these researches that directly are related to the natural environments of the hospital are as follows:

- In a case survey in MACHENZI HEALTH SCIENCE CENTER in Canada showed the patients that have depression, with accessibility to sunlight, needs in average 16/9 days to hospitalization. While the depressed patients stay 19/6 days in dark rooms in the hospitals(Benya, 2007).
- A similar research in INHA University in Korea indicates 41 percent of decreasing the average of hospitalization period of the patients that have been in the light rooms.
- Based on Doctor Richard Habdy's researches, from western University of England, day light helps to control disease. Also, it controls the bacterial and virus, and it creates healthier environment. Also, he claims that the day light prevents from clinical depression and accelerates the period time of improvement (Commission for Architecture & the built environment, 2004).

Now, the positive effects of natural light in the hospitals can be summarized in the following cases:

- Decreasing stress and depression.
- Increasing the patients and personnel satisfaction.
- Acceleration in improvement trend of the patients.
- Decreasing the usage of tranquilizers.
- Disinfecting the spaces and decreasing the pollutions of remedial environment.

11. Correct choosing of the constant material:

Constant designing of remedial center considers the security matters related to the staff and patients. First extensive survey in facing the users of the hospitals in America has been on 1500 nurses in 50 states (Environmental Working Group, 2007).

The findings of these researches describes that there is any secure standard to guarantee their health. There are abundant suggestions in choosing materials in designing solutions of the hospitals that some of them are as follows:

- Using of recoverable materials that decreases the consumption of sources and wastes.
- Using of materials with less effluence of VOC and or without dispersion of VOC that causes increasing the quality of interior air.
- Using natural and environmental materials that have been constructed from the renewed sources(Bernheim,2008).

Positive effect of this suggestion and solutions in the hospital summarily are as follows:

- Increasing efficiency of remedial centers.
- Decreasing the rate of patients from environmental pollutions.
- Increasing security and satisfaction of users in the hospitals.
- Parsimony in the costs in period life of the building.

12. Suitable ventilation:

So many years ago, accessibility of the patients to the fresh air has been from remedial tools (Bernheim,2008). Importance and sensitivity of discussing about suitable ventilation in hospital has been caused that the designing mechanical installations of the hospitals have special complexity. As a result, accuracy in the calculations and observing the principal international standards that have been considered about the hospitals should exactly be paid attention by installations. From the other hand, also discussions of treating the patient besides creating welfare condition of men are the fundamental points of suitable ventilation in the hospital.

12.1. Conditions of design out of the building:

For a city that a hospital will be constructed in it, we should gain necessary information about dry and humid weather in the summer and winter seasons that there is in the statistics of weather organization, and based on statistical criteria, we should determine a temperature for winter and summer for that city.

12.2. The condition of designing of inside hospital:

Medical researches have been shown that controlling temperature and humidity and using suitable ventilation is very effective and useful for treatment and curing the patients. For example, preparing a warm environment, for a long time, causes the improvement of the patients affected to rheumatism (Sadeghi, 2014).

So, relocation of the weather can directly or indirectly have effect on welfare of men. It should be

declared that ventilation, also, has two different performances in the building that include:

- Ventilation for health: for preparing needed fresh air for breathing the people that are inside the building.
- Ventilation for welfare: through impressibility of current air to the framework of the building.

Control of stream of air in different spaces can be partly performed by suitable designs and creating relative, positive and negative pressures. The following solutions are suggested for controlling the stream of air:

- Using the streams of air with calm stream.
- Creating relative negative pressure in spaces like doorways and services.
- Creating positive pressure in sensitive spaces.
- Using airtight strips on doors and windows that air are not permissible from them.
- Sending air into the spaces through ceiling and cleaning it through the valves near to the floor (Ghanavati, et al; 2012).

13. Accessibility to the nature:

Spending long hours in medical environments is usually a tense experience for the patients, callers and personnel. Every attempt in decreasing this tension will have a positive result in the trend of treatment and increasing the quality of these spaces. About between the years 1950-1990 in so many countries, the value of remedial accessibility to the nature decreased in remedial environments and it almost has been annoyed. Many floored hospitals that have been made in international style, were like office buildings. Ventilation machines were replaced by natural ventilation. Making terrace and balcony has been annoyed, and the nature was surrendered to automobile and garages. But in the early years of 1990s, under influence of a movement called looking after "patient axis", the trend of designing of medical environments has been converted in west. Managers of the hospitals noticed the negative reaction of people to the present office designing. Competition between the hospitals caused more attention to the needs of the patients. Gradually, designing of the hospitals changed from international style to the designing in the local environments, and they again have been considered by applying nature in clinical centers. Also, in our country, with regard to important aims like improving the quality of medical spaces and responding to the patient's human needs, it is possible to use green spaces and its remedial characteristics as a useful tool. The necessity of this affair is awareness of accomplished researches in this field and also recognizing the effects and their accurate applying (Today's physician editorial, 2014).

The research findings indicate that relationship with the nature in a short period of time causes saliently the decreasing of stress. Other researches show that long term relationship with natural views not only decreases the pain, but also it has a lot effects on remedial results and improves the patient. For example, study on the patients there were windows with natural views beside their beds, will have a better recovery period in compared with the patients that windows of their room is opened towards brick wall.

The effects of accessibility to the nature in hospital:

- Decreasing the patient' stress and meters.
- Life with higher quality for permanent patients.
- Increasing pain tolerance and decreasing depression in patients.
- Improving the environmental behaviors.
- Decreasing the period time of hospitalization.
- Improving the sense of independence in patients.
- Increasing personnel's occupational satisfaction and patient's satisfaction.

14. The existent limitations in constant designing of the hospitals:

Now that the advantages and solutions of the designing of hospitals have been surveyed, also it is suitable to survey the present limitations in obtaining these solutions. Due to about constant designing in remedial centers is originated from two fundamental interests: costs and un-supporting of constant projects.

14.1. Cost:

According to the research of organization ASHE, worry about the costs, more than every other cases, prevents hospital managers and experts of health affair from applying the strategies of constant designs(Carpenter, 2008).

14.2. Nonsupport of constant projects:

Nonsupport of constant projects is considered as one of main concerns of investors on these projects. But, today with supporting of abundant group from the constant projects and presenting some governmental facilities to them, these concern parties has been solved, and movement in the way of constant buildings has a better place and condition for them.

Conclusion:

Constant architecture, through increasing the efficiency of the hospital, parsimony in consuming energy, advancement in using modern energies and

generally accompany with the nature, plays an important role. In this middle, attitude to the constant architecture approaches among architectural experts of remedial centers has special station, and its main principal in the designing of remedial centers is accompany with general principal of constant architecture. This paper, in addition to introducing new approach in designing remedial centers and hospitals, declares that purified energies should be used such a way that, with regard to the increasing population, to prevent a lot pollution. So, using the solutions of constant designing in remedial centers and hospitals has more positive effects on remedial performance, spatial quality of hospitals and satisfactory of the patients and personnel. With considering these advantages and destructive effects that impermanent hospitals have on its surrounding environment, the problems related to the constancy in hospitals should be considered in designing stage and performance.

This findings of this study shows that if the atmosphere of the hospitals to be designed and used according to the presented principal in this paper, they will have advantages such as decreasing patients, personnel and caller's stress, patients satisfactory, decreasing their depression, increasing occupational satisfactory of the personnel, decreasing period time of hospitalizing the patients and destructive environmental effects and so on.

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8/8/2014