

Social aspects, external structure and internal relations at health-care centers and the impacts of these components on each other

Sania Sami

Department of Architecture and Urban Planning,
Science and Research Branch-Qeshm, Islamic Azad
University
Qeshm Island, Iran
sania_sami@yahoo.co.uk

Mohammad-Reza Daroudi

Department of Architecture and Urban Planning,
Young Researchers and Elite Club, Yadegar-e-Imam
Khomeini (Shahre-Rey) Branch,
Islamic Azad University
Tehran, Iran

Abstract— some part of human concerns in field of healthcare has been always strict, cold and lifeless forms of health centers and lack of facility in their accesses. Mental status of patients has gradually gained more attentions with the entrance to these places and with the intensification of stresses caused by disease and treatment process. The medication that has been one of the requirements of human life since last times is divided to two physical and mental branches. The first dimension affected physical improvement of individuals and the second dimension affected preparing individuals to cope with treatment process. Every medical center was composed of separated but interdependent units and encompassed the two components. One of the two components became responsible for special task and the entire complex emphasized special goal that was same individual health and as a result, collective health more than before. With the increased importance of this issue, form of these buildings and their access were the main issues discussed in these centers, so that they could complete treatment through conducting the patients in simple and fast way and in more relaxed environment with least time consumption and away from any kind of environmental stress imposing in this complex. Finally, due to various studies and advancement of science, it was found that the more the stresses caused by environment are decreased in physical and mental dimensions and the more the psychological dimensions of patients are evaluated, the improvement of patients would be faster. This study has also investigated these components and their impacts on each other. In this study, physical studies, data collection and data evaluation and analysis have been considered as initial principles. In terms of nature, this study is a qualitative-quantitative study, in which field method and content analysis have been used using two sections including qualitative studies and survey study in the section of qualitative studies and analysis. In this field, all written and oral references are investigated and collected and their contents are used to extract the principles and the basis and optimal solutions of designing an efficient medical and health

center, so that it can meet treatment and psychological needs of patients properly.

Keywords— *health-care centers; patient; internal accesses; building forms; social dimensions*

I. RESEARCH FRAMEWORK

Problem statement: as the issue of medication and health and in general, health-care center is a vital issue in human life, people should be more careful about the field of designation and construction of these places. In the discussion of hospital that is considered a health-care center, along with the issue of idea and creativity in designing the space, a transparent definition of performances, links between spaces and medical areas is needed. One of the factors that is observed in these places gradually is necessity of coherence at the same time with complexity and need for complexity at the same time with order. This place should for reduction of stresses, acceleration of taking medical measures and sense of comfort based on the existing order.

Another issue that is being considered significant currently is form of these health centers and their internal relations. At the past, in the public opinion, health centers had to follow cube-shaped form to have useful and efficient performance. This is because; the assumption was stable that cube-shaped rooms and direct corridors could have the best performance in relation with these health-care centers. As a result, they used to build the physical structure of the building in a strict and violent and completely repetitive form; although the theory is now discussing that form of health centers can affect mental health of patients. Accordingly, it could be also mentioned that all units of a health center have not sometimes same functional pattern and they are different depending on space use. Hence, the function of every building can be hidden under its upper skin; it means that through creating a completely different form compared to past forms, the building can have more useful and even better use performance than before.

II. RESEARCH SIGNIFICANCE

The existing disputes and gaps: Certainly, there are many disputes on the discussion of health-care centers. As the health-care center can be considered as one of the most important buildings constructed by human, some people believe that these buildings, whether large or small, should be identified by their physics and also they claim that one of the identity codes of a good health center is its covering structure of the middle relations in addition to good performance. However, an important issue here is the psychological dimension of patients in these places. Moreover, it has been proved in medication that recognition of mental dimensions of patients has significant effect on their treatment. Hence, the requirements could be provided in this field, so that when a patient enters to a health center, he/she can face a pleasant environment with no concerns and worry from the outside to inside spaces. In general, these centers should be safe and invitational places for personnel, patients and referees.

On the other hand, in regard with these goals, the existing gaps can be referred as shortage or in some cases, lack of flexibility in some centers. This is because; due to the everyday advancement of science and technology and availability of modern equipment and technologies, it may be necessary every moment to add or omit some units and spaces of these health centers. On the other hand, attachment of a building to the previous structure is depended on having absolute recognition of building use and exact definition of its internal relations. Hence, omitting the spaces needs some measures in way of using the said space. Thus, a health-care center should have the ability to be expanded or declined, so that it can meet the time needs due to the situations if required.

III. RESEARCH OBJECTIVES

- Achieving to optimal models in internal spaces to meet functional and applied needs in health-care centers in better manner.
- Investigating the sociology of patients and the social environments to achieve optimal and efficient conditions to meet medical and psychological needs of patients.
- Creating different forms from common forms of past times to increase the invitational feature in these centers and to have good spatial links for better access of users.

IV. METHOLORY

In terms of nature, this study is a combined qualitative-quantitative study, in which field method and content analysis have been used through using 2 sections of qualitative studies and survey study in qualitative studies and analysis. Studied variables in this project include external structure and skin of building, along with analysis of the most useful internal functions, sociology of patients and in general, social

environment and the interaction of the two variables. The variables are presented in a different form from the past and they can present the tangible link of inside and outside the building, so that favorable performance of health-care centers, following one process almost in all buildings, could be provided properly and the functions could be encompassed in a different akin of other medical structures.

In terms of data collection methods, this study has applied field and library methods. In this project, according to the expansion of this issue in data collection, different types of data collection method are used. The processes include books, experts, electronic sites, theses and articles in this field. Qualitative data analysis is done based on down-top or top-down methods and for purpose of quantitative data analysis, statistical methods are applied.

V. INTRODUCTION

Today, hospital and health-care centers are the most important units supplying medical and health services and according to the definition of the Ministry of Health and Medical Education, hospital is a unit with at least 15 beds with required medical equipment and at least 2 wards of internal medicine and surgery with specialist teams. In other words, hospital is an institute for treatment of patients, at which caregiving is done by doctors, surgeons, nurses and specialists. In short, it could be mentioned that all medical capabilities with different ranges are available in these centers and under one roof.

Hospital is one of the main needs and foundations in field of health and medication at the society. Patients need receiving health-care services and medications based on type of their disease. According to the important role of hospitals and in general, health-care centers in protecting or improving health of social classes as a vital issue, necessity of paying attention to the architectural design of hospital is being felt more than before whether in physical or functional aspect or in terms of interior architecture (design). Paying attention to conditions of patients and assessing their needs in terms of physical and mental status and due to vulnerability of patients compared to healthy people makes the architects observe all architectural components and principles more carefully and academically. Hence, visual elements such as effective visual forms, light and color should be scientifically evaluated based on their use in the hospital and the selections should be based on scientific evidences and through investigating their impacts on mental health and physical health of patients and also on performance of medical personnel.

As the medical science is increasingly based on medical evidences, in which clinical options are selected based on the researches, designing a health-care center moves toward evidence-based design using scientific articles on the link communication between physical environment of hospital with patients and employee performance. Art therapy is

one of the treatment methods been used since ancient times. Art therapy helps treatment through different ways. First, aesthetic quality of artistic works can improve mood, happiness, self-esteem and self-consciousness of patients and second, studies have shown that when people are deeply involved in activities that they enjoy, their physiological factors like heartbeat, blood pressure and breathing are slowed down. Nowadays, health-care centers are being changes from just functionalism to create healing environment. The healing environment in health-care centers means creating a space with positive effects on treatment. According to existing evidences, changes in designation of medical and health-care centers in a way to provide more comfort, beautiful and legible environment can reduce the stress in patients and increase satisfaction of patients by the quality if treatment in health-care centers.

VI. DISEASE

Disease refers to abnormality in physic or psych that is created because of problem, disorder or stress in patient or other people in relation with the patients. In fact, disease is the opposite point of health and according to the definition of health; disease refers to any kind of deviation from physical or mental health that can be state or trait. According to definition of WHO, health refers to absolute physical, mental and social comfort and not only having no disease or maim. Health means being in complete physical, mental and social welfare and as it is currently considered as one of the main human rights, all people should have access to the resources required for providing health.

The most common and usual dimension of health is physical health. Lack of physical health is in fact caused by disorder in function of body organs, cells and their inadaptability with each other. Different dimensions of health and disease can affect each other and be affected by each other. As physical disorders can affect psyche of people, mental disorders can affect their physical health and both of them can have negative effects on the society and the disorders within the society. Hence, the measures taken to improve physical health of patients should pay attention to all aspects of individual health (physical, mental and spiritual) and general health of the society and this is necessary for the designers.

VII. PATIENTS AND SOCIOLOGY OF PATIENTS

Patient refers to a person, who suffers from mental or physical disorder or both of them. Hospitals and other health-care centers are regarded as places that patients refer to them for diagnosis and treatment of their disease. Hence, environmental impact of health-care centers on the patients is important due to sensitive conditions and vulnerability of the patients. Health-care center is one of the social organizations affected by various environmental factors. These factors with effect on material structure and human organization play vital role in the process of

movement and axis of activities of these centers and in fact, they can be considered as a small society surrounded by larger society. Health-care centers are created to fight diseases, especially those diseases that can't be treated at home or through referring to doctors. On the other hand, they need use of modern and complicated instrumental technology that using it in health-care centers is easy and affordable. Moreover, in some cases, because of protection of social interest, the patients are not allowed to move at the society freely and the risk of disease transmission to the society makes patients be hospitalized in these centers.

VIII. PATIENTS AND SOCIOLOGY OF PATIENTS

In the planning for construction of hospital, it is necessary to consider social, environmental, usefulness, efficiency and effectiveness indices:

- Social indices: it is related to social, cultural and economic environments where people bear, live, work and die. The indices include measurement of education level of people, sufficiency of nutrition, communications and transportation issues, accommodation, crimes, violations, productivity, economic and social welfare, the indices are associated with health issues and other issues.

- Environmental indices: it refers to physical and biological environment where disease is created and patients should live in there. The indices include measurement of pollution of air, water and food by wastewaters, radiation, noise, toxic materials and waste disposals. These factors can threaten physical and mental health of individuals individually or synergistically.

- Usefulness indices: it refers to usefulness of the interventions taken by health and medical systems. The indices include measurement of access to goals and comparison of old and new methods of prevention, diagnosis and treatment. The above mentioned indices should be considered by health policy makers in terms of biomedical researches and development of technology with the attitude that what should be strengthened, developed and tested, used or credited.

- Efficiency and effectiveness indices: it refers to duties of health and medical systems. The indices include measurement of disease, disability, disorder and mental pressures related to them. The measurements are required for purpose of using health services, effect of insurance on meeting public needs and goals of health and medical interventions for effectiveness and efficiency of this system.

IX. IN ORGANIZATION OF HOSPITALS, MAINLY 3 FACTORS INTERFERE

- Cultural system that sets the goals (system of beliefs and values)

- Technology that is the means to achieve goals.

- Social structure of the organization (division of labor, power and responsibility)

The 3 factors are interrelated. The first factor could interfere in long-term, second factor in mid-term and third factor could interfere in short-term. Therefore, it is essential for these 3 factors to be constantly in relation with each other and their dynamic relations should be specified. Another important issue is that in the developing countries that mostly use imported technology, cultural system and social structure caused by the imported technology is changed in imbalanced manner. In this field, the most emphasis is on social system and its structure on one hand and treatment of patients and creating favorable environment on the other hand. Hence, the issue of physical form of building that is in field of construction technology is very important.

The most important functions and responsibilities of hospitals are as follows

- Rapid reception and treatment of patients
- Participation in social health
- Taking educational measures in relation to medical sciences
- Training medical sciences

X. HOSPITAL PERFORMANCE EVALUATION

Services and cares given by the hospitals include major part of costs of the hospitalized patients. At the same time, hospitals can form small part of health system; although they possess most costs yet. In early 1980s decade, scholars, advisors and experts across the world took measure to define quality in hospital and to determine the way of measuring it. After that, different tools and strategies were innovated for evaluation of hospital services and if the evaluations are used practically and logically, they can be effective means to understand the deficiencies and inabilities or probably bad intentions.

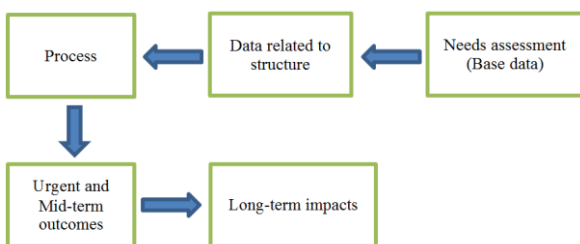


Fig. 1. Hospital performance evaluation

XI. CORE RELATIONS OF HOSPITAL

Hospital is a building with strong and hundred percent functional aspect, which its functions and the ways of using these functions can form the foundations of its designation. In order to assess the relations, the circulation of all patients, service givers, visitors and instruments are studied. An important issue in regard with designation of interview and checkup spaces in health-care centers is separation of circulation of personnel from circulation of patients.

A. In-patient circulation:

The circulation that patient passes since the time of entering to hospital to the time of entering to hospitalization bed is presented in following graph:

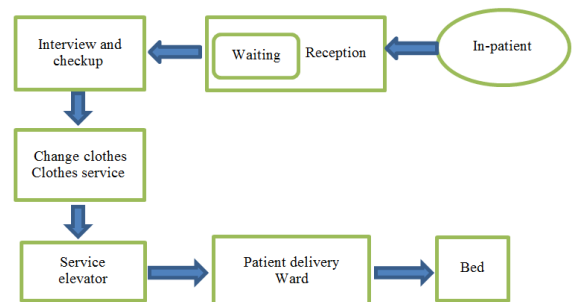


Fig. 2. In-patient circulation

B. Out-patient circulation:

A hospital is a place to give treatment services to outpatients. In general, the patients referred to hospital are divided to two groups: first group is related to patients needing checkup and interview with doctor and diagnosis of disease and in fact, main part of the patients is in this group. The other group includes patients referred to hospital for partial affairs such as Injections, dressings and ECG, etc. The latter group patients are previously checked up by doctor (in clinic or infirmary) and for secondary services. In fact, something that determines the circulation in these health-care centers is circulation of first group; because the patients for partial affairs form small part of all referees of a health-care center.



Fig. 3. Out-patient circulation

C. Emergency patients' route:

Emergency unit of hospital responds to two groups of patients because of boarding activity. The first group includes patients referred to this ward because of accidents, heart attack and similar problems and need urgency and caregiving. In this case, after primary measures, patients are transferred to surgery and hospitalization and ICU if necessary. Second group includes patients refer to this ward because of availability of medical services of infirmary and after being checked by the doctor and brief services like injections and dressing, they are sent to clinic.

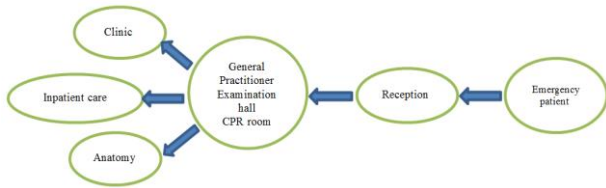


Fig. 4. Emergency patients' route

D. *Personnel circulation (specialist and non-specialist):* In general, internal circulation of personnel and office in hospital could be summarized as follows:

1) *Specialized technical personnel:* specialized technical personnel of hospital include General practitioners and specialists, residents, interns and head nurse with high activities. Facility of the circulation and lack of its intersection with patient circulation can improve performance of hospital.

2) *Non-specialized technical personnel:* this cadre consists of nurses and caregivers of hospitals and clinics on one hand and consists of different technicians in units of ECG and EEG and dressings, injections, pharmacy, laboratory and radiology on the other hand and the tasks of this cadre is more than others.

3) *office staff:* office staff consists of reception authorities, clinic secretaries, hospital office staff and office personnel, accounting and archive personnel with less mobility.

4) *service staff:* this unit consists of service givers of cleaning, kitchen and Laundry, gardening, facilities and so on. Their route is in direct involvement with the route of movement of patients and other staff.

E. *Visitor circulation:* the visitors of patients are only in relation with inpatient unit and can meet patients throughout the separated rooms in special hours.

F. *Instruments and equipment circulation:* the circulation of equipment in hospitals is summarized as follows:

1) *Equipment circulation:* different equipment is used in different wards like hospital, infirmary, and lab and surgery unit. The equipment can be sterilized in the ward by sterilization substances or after transferring them to central sterilization unit for reuse.

Some equipment and instruments that are thrown away after using them are transferred from central warehouses to warehouses of each unit and are distributed from there.

2) *Records circulation:* in a health-care center, the records of patients can't be given to the patients, but also after passing the reception steps, the records are sent from archive of reception to the relevant unit and at the end of working hour, the records are again collected from clinics and are sent to archive. In most cases, the records are sent to clinic from archive by nontechnical personnel or by nurses and they are usually in consistence with outpatient route.

3) *bed sheet circulation:* the bed sheet of inpatient unit, examination beds, radiology lab and injections of surgery unit are changed daily. This job is conducted by the servants and even nurses in some cases. Providing bed sheet and cleaning it is the responsibility of central laundry of hospital and they would be transferred from this place to the bed sheet warehouse after washing them.

XII. STRUCTURE OF HOSPITALS AND HEALTH-CARE CENTERS

Hospital architecture: Although hospitals used to be designed consciously for medical-surgeon purposes at the past, people can today observe change in orientation of hospitals towards humanism in their equipment. Current hospitals are mostly similar to hotels. Existence of accommodation space has become important compared to strict and lifeless form of hospitals of past times. The duration of hospitalization and residence of patients continuously is shortened and patients are mostly interested in single-bed or two-bed rooms (especially in private hospitals). The form of hospitals has been significantly affected by the way of access to them and the commuting routes. Regulating vertical links inside a hospital should be designed in such manner that functional unit, caregiving, treatment and access to patient not allowed visiting and service yard could be linked to each other efficiently. Because of complexity of functions and spatial communications and saving costs and human resources, construction of a hospital needs planning and comprehensive project management that can provide flexibility and development in future due to increasing advancements of medical technologies.

XIII. FORM AND STYLE OF BUILDING

The form of hospital should be able to meet following needs:

1) *It should create the freest air circulation around each unit without deadlock or closed space to prevent air stagnation.*

2) *Free movement of sunlight, so that it can radiate on top of all units at least during a few hours a day.*

3) *The possibility of isolation of each unit or a group of units, especially about infectious diseases that may be spread.*

4) *Possibility of embedding air-conditioner for all units without dependence in other parts of the building (for more ease and economic management, a group of units can be linked through roofed routes more and less)*

In old plans, giant blocks of building used to be organized in square or rectangle forms. An important issue that can be criticized in these buildings was closed spaces without air free circulation. The designs were not desirable even when they were organized in

simple linear form or in cross-sectional form; because the sections were not linked to each other and to the routes and public corridors. However, it should be mentioned that some buildings of the last century have been maybe constructed to high extent more logical than a lot of buildings of first half of last century and the old buildings have been gradually vitiated with unmeasured attachments. In places that land is expensive, 2 or multi-story buildings are easy for hospitals and in places that providing land is easy, 1-story and scattered buildings in an environment are affordable and economic. In these states, the buildings can be organized in different forms: the buildings may be linked by a corridor from one end or they may be partitioned by a central corridor with vertical angles or other types of such structures. In fact, in these cases, plan is so flexible and is adjusted with site features and certain distance that should not be less than 2 times of height of buildings should be observed between them. Through this, enough air and light circulation is provided and on the other hand, isolation of sections is also provided.



Fig. 5. Craiglockhart Hospital

XIV. FACTORS AFFECTING HOSPITAL BUILDING FORM

1) In building of hospitals, deployment of clinical units is done in building blocks. In small size hospitals, there is one or two blocks that length of each block should not be more than two times of their width.

2) Blocks are connected to each other in different forms; like the letter E (3 clinical parts in each block similar to wing attached to a longer block) or like letter T or Y (in each block, two parts are existed or similar to wing with a block on its branch) or similar to letters U, L, X and H.

3) In general, number of beds in each floor should be more than upper stories, so that the elevators are used less and the commutes are controlled.

XV. TYPES OF ORGANIZATION OF HOSPITAL BUILDING

1) Horizontal organization: this building type has some advantages: the problem of water pressure in vertical buildings is not existed in this form of building. The urgency exit, development of the building and traffic of wheelchairs among units of hospital is done easily. The duration of construction is short and affairs are done more rapidly. Moreover, the natural light is provided under such conditions and it is at least resistant against storm and strong winds.

2) Vertical organization: in this type, the construction, repairing and maintenance costs are decreased compared to horizontal design per m^2 in each story. The communications of personnel with each other is easy and the central core including elevators, stairs or ramps decreases the length of corridors, so that circulation of people could be done easily and with no confusion and they can be repaired and maintained easily. To transmit the patients, the materials and equipment, less personnel are needed.

3) The Rounded organization: the construction cost in this type is lower than previous types. Rooms are close to each other and to the center of the building. However, this type has also some disadvantages. For example, providing light and air conditioner in center of building is impossible; less visual control and monitoring is available and there are some problems in field of development of the building and use of materials.

XVI. TYPOLOGY OF HOSPITAL COULD BE CLASSIFIED IN 3 GROUPS

1) Pavilion system: in this system, in terms of areas, hospital is as follows: medical unit, administrative unit and supplies. In this type, each section forms an independent building. As a result, the connection of sections passes through the free space. This system is uneconomic because of increased foundation and the medical and technical equipment and the area of foundation per each bed is at least to $100m^2$.

2) Jamming (dense) system: in this system, the hospital has used maximum area of foundation, personnel and technical and medical equipment of the hospital. This system is on the basis of factoring similar tasks, so that each group takes similar measures to the center and this center gives services to all other parts. The area of foundation of this hospital is at least $75m^2$ per bed. An important issues in this system is exact organization, so that because of neighborhood of different parts and their close relations, the spread of diseases could be prevented; which could be divided to following types depending on size of the hospital: semi-centralized semi-opened system (poly-block), adjusted system, vertical symbolic system (hospitals with about more than 1000 beds). The foundation area of these hospitals is at least $75m^2$ per bed and for small hospitals, 200-250 beds could be reasonable in case of sufficient land.

3) Mixed system: in this designation system, both abovementioned cases are used and the building is constructed in centralized form in required case and it is constructed separately where needed.

XVII. CONCLUSION AND SUGGESTIONS

With the advancement of science and technology and spread of various diseases, the medical sciences have been emphasized more than before and the insight of doctors and architects to health-care centers is changed. Today, the health-care centers, especially

hospitals, are mostly being considered as temporary residences that the trend of people to spend time in these centers has become more important than before. In terms of high emphasis on internal horizontal and vertical relations to create useful and optimal functions, forms of hospitals at the past times were mainly constructed in strict and lifeless form because of following these relations. However, the outcomes gained by attending these places has conducted experts to found that the communication of health-care center buildings, whether in outside or inside space, with their users plays key role in function of these centers. The communication and routes have been considered as sensory chain to link the people with these centers. The stronger the attachment of this chain is, the higher satisfaction of individuals would be by the medical center.

In the field of vision, people are constantly tending to find order and continuity in forms and hence, they try to meet or order the partial disorders in forms and at the same time, if the order is too much or repetitive, people go away from that. Although this form encompasses internal links of spaces, they can simultaneously show the internal circulation in different form in beneath of its skin and this is same point that differentiates the process of designing in ancient health-care centers from the today's buildings, so that when people watch it from outside, a positive feeling and sensation is created in them and when they enter to the building, the positive feeling is not decreased, but also it is increased with the proper definition of these spaces. Every building with any kind of function, whether small or large, is judged at the first by its outside skin. Through watching a dynamic structure and active design, sense of curiosity, attractiveness, movement and happiness is empowered in people. The less that mental and psychological concerns of people are in the process of treatment, the less their enthusiasm for improvement would be and the treatment process would be also accelerated. The efficiency of hospital personnel and mental status of patients' families are also affected by same pattern.

In order to achieve reliable results in field of designing outside structure and inside spaces if health-care centers, following points could be noted:

- The society using health-care centers should be evaluated. Measurement of social traits of the community getting services from a health-care center like average revenue, job evaluation, the population in the region, education level, awareness of medical services, people's attitude towards the healthcare issue and the ruling culture of the society play key role in the manner of supplying health services and generally, qualitative level of medical environment.

- At the health-care centers, in addition to physical dimensions, mental dimensions of individuals should be also considered. The spirits of people plays key role in acceleration of their improvement process (for patients), the interest of families in nursing the

patient and the process of acting based on commitments desirably (for personnel).

- Structural form of health-care centers can take different patterns depending on the environment, at which the buildings are constructed. These patterns could be affected by factors such as population size, climate of region, land type and type of servicing by the health-care center. It is necessary to measure the said factors to design a form to meet all needs of uses in best way .

- In terms of overemphasis on internal vertical and horizontal relations in design of health-care centers, it is suggested to place the internal relations under different skin, so that more dynamic and living forms could be designed for these buildings. Hence, all people from patients and referees to personnel are attracted by these buildings with more satisfaction and sense of comfort and consider these centers differently and this can affect their mental dimension and manner of their activity directly. On the other hand, inside space in terms of form can be different from the physical form encompassing them and their landscape could be empowered as independent object. The contrast in form can be reflection of functional difference or two spaces or symbolic importance of inside spaces .

- In addition to structure of form, it would be better to use the factors such as color, bright and opaque surfaces of walls, height of building and the area of building according to existing conditions to create attachment of the space with the users. These factors can directly affect vision of people and their spirits.

- Entrance of each building plays key role in attraction of users in terms of utilization of the building. It is necessary to define entrance of health-care centers properly and also, they should have high inviting effect with right designation in right route.

- As many people work in these centers, it is necessary to separate people with different responsibilities in internal spaces and every one should have separate and independent moving circulation. The patients should be separated from working space of personnel as much as possible. For the referees, defined routes should be specified. Transmission of equipment should be done from special routes. Under such conditions, additional crowd and stresses in outside and inside spaces are significantly decreased.

REFERENCES

- [1] P. Arthur, R. Passini, "Wayfinding: People, signs and architecture," New York: McGraw-Hill Inc, 1992.
- [2] A. Baskaya, C. Wilson, and Y. Ozcan, "Wayfinding in an unfamiliar environment. Different spatial settings of two polyclinics". *Environment and Behavior*, 867-839, (6)36, 2004.
- [3] B. Faber, "Color Psychology and Color Therapy". New Hyde Park: University Books, Inc, 1961.

[4] D. Alison, C. Nichol, "An interview with Alison Demarco and Nichol Clarke: light and colour therapy explained". *Complementary Therapies in Nursing and Midwifery*. 103-7:95, 2001.

[5] E.A. Edelstein,), "The laboratory experiment. In AIA College of Fellows 2005 Latrobe Fellowship: Developing an evidence-based design model that measures human response: A pilot study of a collaborative, trans-disciplinary model in a health care setting". Washington, DC: American Institute of Architects, 2008.

[6] K. Hamilton, "The four levels of evidence based practice". *Healthcare Design*, 26-18, 3, 2003.

[7] K. Jo edge, "Wall color of patient`s room: Effects on recovery". University of Florida. http://etd.fcla.edu/UF/UFE0000857/edge_k.pdf. Available from: www.ufdc.ufl.edu/UFE00001/0000857. Date access: 20/3/2014, 2003.

[8] P. Leather, D. Beale, A. Santos, J. Watts, and L. Lee, "Outcomes of environmental appraisal of different hospital waiting areas. *Environment and Behavior*", 869-842, (6)35, 2003.

[9] J. Malkin, "Hospital interior architecture". New York: Van Nostrand Reinhold. Mahnke, F., & Mahnke, R. T. (1987). "Color and light in man-made environments". New York: Van Nostrand Reinhold, 1992.

[10] S.J. Bosch, R. Cama, E. Edelstein, and M.J. Malkin, "The Application of Color in Healthcare Settings," 2012, Sponsord by Ki Jain Makiin Inc. Available from: www.ki.com/pdfs/Color_in_Healthcare_Settings_Paper.pdf. Date access: 20/3/2014.

[11] R.S, Ulrich et al., "The Role of the Physical Environment in the Hospital of the 21st Century: An once-in-a-lifetime opportunity". Concord, CA, Report Sponsored by the Robert Wood Johnson Foundation and the Center for Health Design. Available from: www.herg.gatech.edu/Files/ulrich_role_physical.pdf. Date access: 20/3/2014, 2004.

[12] C. Vernolia, "Healing Environments". Berkeley: Celestial Arts, 1988.

[13] R.L. Miller, E.S. Swensson, and J.T. Robinson,"Hospital and Healthcare Facility Design", ISBN 978-0-393-73309-9, 2012.

[14] G.E. March, "Hospital Interior Architecture: Creating Healing Environments for Special Patient", 478 pp., illustrated, 1993.

[15] A.D. Swaan, C. Jencks, and S. Verderber, "The Architecture of Hospitals", Publisher: nai010 publishers, 512 pages, 2006.

[16] G. Vittori, R. Guenther, "Sustainable Healthcare Architecture", Second Edition: 2013, 480 pages, ISBN: 978-1-118-08682-7, 2008.

[17] S. Verderber, "Innovations in Hospital Architecture", New York: Routledge, 373 pages. ISBN-13: 978-0-415- 77795-7, 2010.

[18] H. Dargahi, "Hospital standards: Adapted from International hospital, accreditation standards", 664 pages, second edition, Tehran University Institute Press, 2012.

[19] S. Khani zad, "Hospital Design: Principles of architecture and interior design hospitals", 252 pages, The Art of the Century press, 2010.

[20] A. Moshabaki Isfahani, "Architecture design guide therapy (Hospital Architecture)", 260 pages, Parham naqsh press, 2013.

[21] M. Farzam Shad, "Foundations planning and design of health-care centers (clinics)", 176 pages, Ayandegan press, 2011.

[22] K. Mahmoodi, "Basic concepts in architectural design of hospitals", 250 pages, Soroushe Danesh press, 2011.

[23] G. Shamgholi, "Basic concepts in architectural design of hospitals", 250 pages, Soroushe Danesh press, 2011.

[24] Ministry of Health, "Treatment and Medical Education, Hospital Accreditation Standards," Translated by Hassan Emami Razavi and Mahmood Mohaghegh, 2008.

[25] Plan and Budget Organization of Tehran.

[26] Handbook of Architecture, Architecture and Civil Engineering Site Chosen lovers.