

## IMPACT OF BUILT ENVIRONMENT ON MENTAL HEALTH: REVIEW OF TEHRAN CITY IN IRAN

A. Assari<sup>1</sup> B. Birashk<sup>2</sup> M. Mousavi Nik<sup>3</sup> R. Naghdbishi<sup>4</sup>

1. Department of Art and Architecture, Payame Noor University, Iran, ali\_assari1358@yahoo.com

2. Faculty of Clinical Psychology, School of Behavioral Sciences and Mental Health, Tehran Psychiatric Institute, Mental Health Research Center, Iran University of Medical Science, Tehran, Iran, birashk.b@iums.ac.ir

3. School of Behavioral Sciences and Mental Health, Tehran Psychiatric Institute, Mental Health Research Center, Iran University of Medical Science, Tehran, Iran, maryammousavinik@gmail.com

4. Department of Architecture, Rouddehen Branch, Islamic Azad University, Rouddehen, Iran, reza.naghdbishi@riau.ac.ir

**Abstract-** Recently, the urban population has melodramatically increased in Tehran. This quick growth population instead of an irregular horizontal city development has considerable impact on people's mental health and their built environment. This review paper considers characteristics of the urban environment that may influence to the population health and combines the key research on built environment and mental health in urban area like Tehran city in Iran. The mental health in Tehran is related to 6 major factors. These factors highlight the impact of physical, mental, and psychological characteristics on various types of mental health outcomes. In this study try to describe the housing type, Floor Level of Dwelling, Housing and life Quality, Crowding, Noise and air pollution, and effect of physical environment on wellbeing of Tehran city. regarding to the result; construction of the building and neighborhood, addition in the number of units in each apartment, Low infrastructures in urban area and Each form of air pollution such as in inside and outside has different effects on life style and happiness.

**Keywords:** Mental Health, Built Environment, Wellbeing, Housing, Noise, Air Pollution.

### I. INTRODUCTION

The home situation is a great implication to individual beings. Most of the People in any level of society spend their time in their home [1]. Characteristics of the built environment can straight effect on the psychology and life style of people who live in the crowd city .this reason has the direct effects on mental health contain housing, indoor air quality, crowding, light and noise pollution. The residential setting is where individuals typically expend the major part of their life [2]; is the place for social communication and each part ply the part of the great chain of social network [4].

Regarding to the importance of built environment to life style of human in modern society, this question has been raised; what is the effect of housing influences on humans' mental health? Low quality of life negative

affect, psychological disorder and psychiatric problems [5]. Urbanization given the significance of the residential environment to human beings, it is appropriate to ask whether housing effects humans' mental health. Poor mental health includes negative affect, psychology and psychiatric disorders [5]. Urbanization affects psychology and mental health via the effect of increased stressors and factors such as overcrowded and polluted and poisoned environment, high levels of harshness [6], and reduced social support [7]. The built environment has a straight effect on people's wellbeing inasmuch as it inhibits or encourages physical action.

Physical aspects such as bicycle paths and sidewalk not just need to exist, but must be sufficiently extensive, maintained, attractive, well lit, and networked to other resources, such as other pathways and well-maintained, regular public transportation [8-10]. Physical activity is also affected by people's sense of community, their feel of safety, and their sense of collective political valance in preserving significant community resources such as parks community centers [11-13].

In duration of 50 years in Iran, the appropriateness of urban population has increased from 20% in 1966 to above 80% in 2006[6, 14]. All the cities in Iran especially in Tehran try to modify this urban explosion with social, environment and economic aspects. These changes make a serious influence on psychology and mental health problem in the major city of Iran [15]. A diversity of housing characteristics and different cultural behavior may affect psychological mental health in urban area.

### II. HOUSING TYPE

The result of mental health about housing type is focused on [16], House type, floor level, and housing quality, Crowding, air and noise pollution.

Many of the studies shows that number of the house that built in less community have more mental health to compare with high rise building. And also, persons living in lower floor of building have more psychological mental health difficulties than those living in lower floor in high-rise building (Figure 1).

As per as the result of some research, the best type of mental health is related to the single house or single family in each level of building. Playground and some specific area for kids make mothers beliefs; therefore it can help them to have the high level of mental health. In many high-rise buildings in Tehran particularly for low income group there is no specific space for develop and interaction of the residence such as green area, playground and parks.

Small space for social interaction such as lobbies and lounges is not sufficient for high-rise building and also there is no proprietorship feeling for the resident [18]. The behavior of the women in high-rise building in Tehran is more loneliness and without territories control to compare the women who live in different types of building [5].

Hidden problem of high rise building against regular building in Tehran is that samples of high-rise building often include some persons who living on lower floors, and almost in Iran price of apartment will increase by height of the floor therefore potentially low income group will settle in lower floor . Less than a decade, low-cost housing projects were not attractive for the private investors and developers, and most of the construction projects that took place in Tehran were governmental buildings.

After 1930, with the disappearance of traditional architects [19], there was a notable lack of higher skilled labor in the apartment sector as well as a lack of capital to organize investing in low-cost housing [20]. In Tehran there is some in coordinate expansion of super modern neighborhoods and specify with construction of high-rises and building complexes according to international standards but far from mental health's [21].



Figure 1. High-rise buildings and Ekbatan satellite city  
Source: Atlas of Tehran metropolis

### III. FLOOR LEVEL OF DWELLING

Floor Level of Dwelling: Since 1970, the effect of the Modern architectural design, interior design and furniture became apparent. In some cases like Ekbatan, Shahrak Omid and Shahrak Gharb, modern architectural flavor of the high-rise buildings. Housing units in Ekbatan have parquet-covered floors in place of Persian carpets, but they still have their traditional Iranian culture and this mater shows the tendency of people to the psychology and mental health and traditional culture [22].

Some of the problem in mental health and human social life is the results of floor level in high-rise building [5]. Meaning of crowding will change with different floor in high rise building: the results of some studies show that the people who lived on higher floors have less crowded feeling than residence that was on lower floors. However in reality, crowding did not modify with floor level [23]. High-rise building in Parand satellite town in south west of Tehran are very crowding and building construction was very worse. Some of these building have the poor construction quality, low acoustic isolation and in some cases too many dwelling located on each floor [24].

Some studies in England show that the women who lived in high rise apartment have more mental health and psychological wellbeing to compare with women who lived in flat house [25]. They have not worried about kids play ground and usage of parks and green area are more accessible [26]. Rates of mental disease rose with floor level in an English research. Unfortunately, the high-rise building in the earliest study have the fewer social contacts, less likely to be married, reported more medical problems and less educated [27].

Tension and depression was greater in apartment and high rise building than flat houses but situation of the apartment is also have the important role on mental health [13] (Figure 2).



Figure 2. Sample of density in Tehran  
Source: atlas of Tehran metropolis

### IV. QUALITY OF LIFE

Dimensions of quality of life in the urban area include some factors such as food and clean air and water, security from crime, and protection from radiation and toxic substances and some other factors. It may also be used as a measure of the energy and power a person to enjoy the life. To obtain a general picture of quality of life in Tehran, the eight dimensions measured as shown in Table 1 [28].

Table 1. Quality of life index in Tehran  
Source: NUMBEO march 2014

Quality of Life Index	Percent	Levels
Purchasing Power Index (+)	44.48	Very Low
Safety Index (+)	42.97	Moderate
Health Care Index (+)	49.27	Moderate
Climate Index (+)	74.61	High
Consumer Price Index (-)	43.7	Very Low
Property Price to Income Ratio (-)	15.63	High
Traffic Commute Time Index (-)	53.78	High
Pollution Index (-)	87.86	Very High

The fourth first part of this table is the positive factors and the second forth factors are negative. The best items related to the climate index and consumer price index and the worsts are purchasing power and pollution index [29]. Measuring quality of life in different district of Tehran show, that is a fairly good quality in all the districts and residential type of the whole Tehran is moderate. Regarding to Figure 3 Northern, central north and northeastern districts have the best conditions and suitable for living. Housing quality in northwestern and southeastern districts is also acceptable. Just in south districts, housing quality is very bad [30].

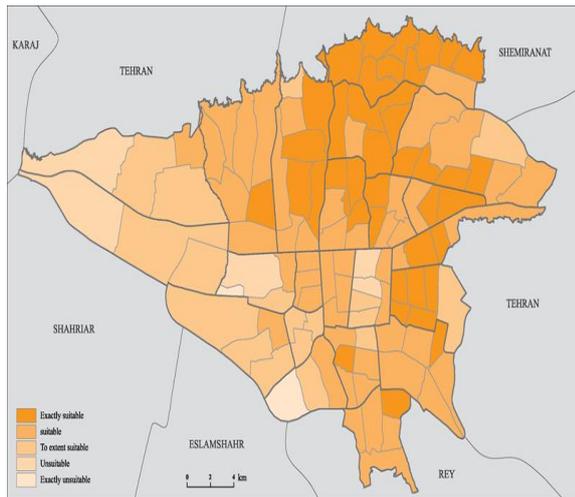


Figure 3. Quality of life and distribution of population density in 22 districts of Tehran  
Source: atlas of Tehran metropolis

Physical quality of house, that usually integrates some aspects of, maintenance, structural quality and physical hazards, is related with social wellbeing [32, 34]. In Iran level of house quality divided into three parts: low income group (LIG) with maximum area of 40 m<sup>2</sup>, medium income group (MIG) with area of more than 70 m<sup>2</sup> and high income group (HIG) with area of more than 100 m<sup>2</sup>.

So many researches about quality of house have focused on low income group or some area with high population density. But in Tehran most of the family live in the (MIG), therefore quality of house in this part of income level is more essential [36].

Furthermore, housing quality scales often contain few objectives that we cannot reliability estimates [35]. In some studies relationship between housing quality and residential satisfaction will increase when improve the housing quality measurement instruments therefore mental health also have been increase [37].

### V. CROWDING IN BUILT ENVIRONMENT

Crowding population is a social condition, which performs the lack of privacy condition [40]. in other word crowding means taking the place when the physical places are less than standards or specific area is completely blocked [41, 42].

Housing in the word is shelter or defined as a place for living. A household as the character of housing, is gathering some families or individuals persons who make common provision for food or other essentials of living. The other characteristic of housing is change with the spatial distribution and value of properties in different part of the city.

Some of these indicators show number of households in a building, with dividing to high, low and medium income group. It seems that the families who are living in crowded situations have not the healthy social life because they are in low level of income groups [38].

This concern in last five decades was concentrate the hygienic and sanitation issues. But recently concern about the mental health and social life in developing countries, mostly overcrowding was measured at the level of room, household members, level of the floor and green areas around the living house but in develop country over crowding has the direct effect on whole part of social life [39]. The psychological effect of crowding divided into two groups: firstly in some community of urban area and secondly overload from high inside density which has been cause of with many bad outcomes [43].

A studies of Bronx from low income group who live high rise building to compare with same level in flat house shows that, family with high inside density felt more crowded and reported a lower feel of control to compare with flat house families [44]. Crowding may have the different meaning in floor level; in some research shows that the family who lived on higher floors in high rise building has sensed lesser crowding than those who lived on lower floors but in other study mention that crowding didn't differ with floor level [45].

### VI. NOISE POLLUTION

In the Iranian towns Sound pollution is hitting an all-time high. The large towns like Tehran are the worst. Sound pollution can be any unwanted or attacking sounds that unreasonably intrude into our daily activities. When an individual drives by open windows in a road, the sound is something like 70 decibels. A whisper is 35 decibels and a usual room has a sound strength of 40 db. At 45 db. An individual cannot sleep. At 85, the ears are injured, and at 120, it can hurt your ears [41].

Most research on noise and mental health nearby airport shows that effect of the air craft noise to people who live near the airport is much higher to compare in other place. the result of 1053 residents around the busy Kadena military airport in Japan applied shows that Mental health subscales included depressiveness, nervousness, neurosis, and mental variability is very higher than standard to compare any other place.

The noise pollution in Tehran was mainly dependent on type of the traffic. Study on Navab Street shows Navab traffic noise using vehicle flow data considering the working time at 6 to 9 early at the morning and 5 to 8 at evening. And also there is some significant relationship between noise pollution and huge traffic.

These effective factors on noise pollution and traffic are:

- noise pollution when contacting tire with the road surface
- sound of spiral road and types of tires
- kind of vehicle for example 2 or 4 wheels drive
- Age and type of asphalt in highways.
- Flat, good maintenance, absorbent asphalt, without grooves and cracks.

Increasing distance between residential buildings and working place with road decreases the noise pollution will reduce. All the green area with considering height, width and enough density can reduce the noise pollution. But this matter has not reality in Tehran specially Navab street (Figure 4).

If the vehicle speeds going more than the standard level the noise pollution will increase, because contacting between vehicle and road surface will increase. but in many region of Tehran the density of the vehicles is very high, therefore the speed cannot going more than standard levels except in mid night. Drivers honking are cause of high traffic noise pollution, playing loud music, change the gear and braking are another factor to increasing noise pollution.

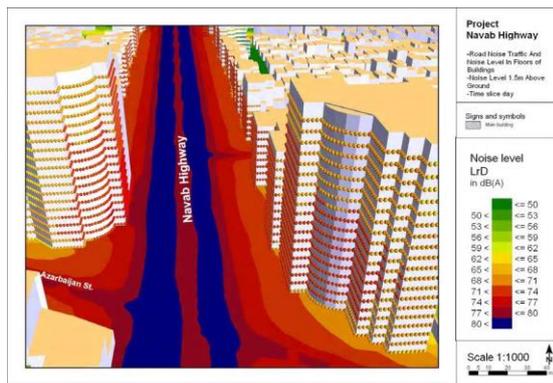


Figure 4. 3D road traffic noise map of Navab highway  
Source: Mehravaran 2011 [45]

## VII. INDOOR AIR QUALITY

In the recent year with increasing the modern life tension and stress also came to family house. Indoor air quality is a reason for this issue; regarding to Figure 5

indoor air pollution depend on making food in the kitchen, pollution from smoking, chemical things, dust, mold and bacteria, and so many things that shows in the Figure 5.

Changes in structure of the living and use of artificial building materials design for energy efficiency make airtight to compare with traditional building. whoever these improvements have led to more comfortable buildings with reducing consumption of energy and cost of living, they also provide indoor pollution and build up to much higher stress and tension than are found outside of the house. Some pollutants can cause of many diseases that show up much in next years, such as respiratory diseases or cancer and it is better to remove the source of the pollution from the living area.

Another pollutant is rising from building materials known as volatile organic compounds (VOCs) arise from sources including paints, varnish, solvents, preservatives and maintainer [60]. Asbestos also is a significant risk factor for breathing disease that is arise from deteriorate and old building. Totally indoor air pollution has the same effect and some times more effect on the mental health.

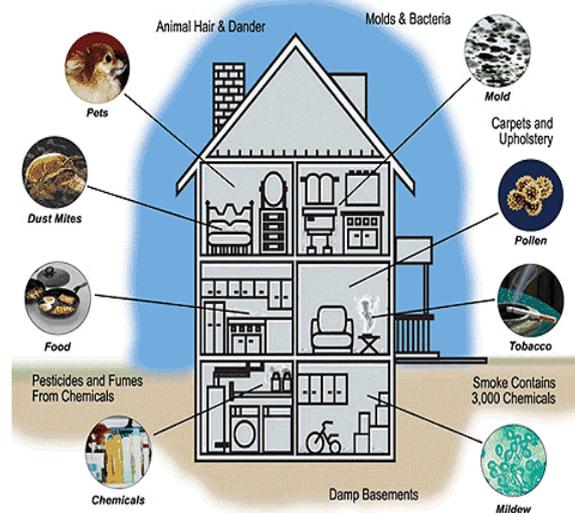


Figure 5. Indoor Air Quality pollution  
Source: Florida health department (floridahealth.gov)

## VIII. CONCLUSION

This research identified that aspects of the built environment can play an important role in supporting life style choices that result in either beneficial or adverse health results for individual and at the community level. This review documents deals with six major factors that have the direct effect on the mental health in the framework of built environment (housing type, floor level of dwelling, quality of life, crowding, noise pollution, and internal air quality)

Through choice of these aspects can be built to support the life style with characteristics of improved physical and mental health. Healthy communities, when design well and maintained, can improve the quality of life for residents who live there.

Reviewing research literature showed that there is the direct relationship between mental health and built environment these notes are point out from this review article:

- It is clearly that construction of the building and neighborhood has most effect on mental health of the resident.
- Worse mental health of the participants was associated with an addition in the number of units in each apartment.
- The effect of urbanization on mental health is the results of increased tension, adverse events, overcrowding, air and noise pollution,
- Low infrastructures in urban area have created neighborhoods with low quality of life and decrease the mental health of people.
- The research indicates that human in a condition free of any interfering sound pollution will present the best function in problem solving.
- Each form of air pollution such as in inside and outside has direct effect on mental health and wellbeing.

#### REFERENCES

- [1] J.A. Leech, W.C. Nelson, R.T. Burnett, S. Aaron, M.E. Raizenne, "It's About Time: A Comparison of Canadian and American Time-Activity Patterns", *Journal of Exposure Analysis and Environmental Epidemiology*, Vol. 12, No. 6, pp. 427-432, 2002.
- [2] D. McCarthy, S. Saegert, "Residential Density, Social Overload, and Social Withdrawal", *Human Ecology*, Vol. 6, No. 3, pp. 253-272, 1978.
- [3] B. Urie, G.W. Evans, "Developmental Science in the 21st Century: Emerging Questions, Theoretical Models, Research Designs and Empirical Findings", *Social Development*, Vol. 9, No. 1, pp. 115-125, 2000.
- [4] A. Assari, T.M. Mahesh, E. Assari, "Conservation of Historic Urban Core in Traditional Islamic Culture: Case Study of Isfahan City", *Indian Journal of Science and Technology*, Vol. 5, No. 1, pp. 1970-1976, January 2012.
- [5] G.W. Evans, N.M. Wells, A. Moch. "Housing and Mental Health: A Review of the Evidence and a Methodological and Conceptual Critique", *Journal of Social Issues*, Vol. 59, No. 3, pp. 475-500, 2003.
- [6] A. Assari, T.M. Mahesh, "Urbanization Process in Iranian Cities", *Asian Journal of Development Matters*, Vol. 5, No. 1, pp. 151-54, 2011.
- [7] F. Agha Ebrahimi Samani, E. Salehi, H. Irani Behbahani, H. Jafari, "Urban, Landscape Planning and Design for the Interface Conflict between Urban Development and Landscape in Historic Cities - A Case Study: Isfahan City in Iran", *International Journal on Technical and Physical Problems of Engineering (IJTPE)*, Issue 11, Vol. 4, No. 2, pp. 122-127, June 2012.
- [8] A. Assari, M. Mousavi Nik, M.B. Saberi Zafarghandi, S.R. Eshaghi Farahmand, R. Naghdishi, "Investigation of Sustainability in Road Transportation: A Case Study in Isfahan, Iran", *The Neuroscience Journal of Shefaye Khatam*, Vol. 2, No. 4, pp. 80-80, 2015.
- [9] M. Mousavi Nik, M.B. Saberi Zafarghandi, B. Birashk, A. Assari, S.R. Eshaghi Farahmand, "Identifying and Reducing Occupational Road Safety Risks", *The Neuroscience Journal of Shefaye Khatam*, Vol. 2, No. 4, pp. 84-84, 2015.
- [10] M. Mousavi Nik, M.B. Saberi Zafarghandi, B. Birashk, A. Assari, S.R. Eshaghi Farahmand, "Evaluating Quality of Well-Being, Marital Adjustment and Dysfunction between Infertile Women", *Iranian Journal of Reproductive Medicine*, Vol. 2, April 2015.
- [11] M. Mousavinik, "Effect of Rational Emotive Behavior Therapy on Depression in Infertile Women", *ZENITH International Journal of Multidisciplinary Research*, Vol. 2, No. 10, pp. 77-84, 2012.
- [12] M. Mousavinik, "The Implicate of Irrational Beliefs in Depression among Infertile Women", *Journal of American Science*, Vol. 8, No. 8, pp. 853-857, 2012.
- [13] M. Mousavi Nik, A. Assari, A. Khaneh Keshi, R. Eshaghi Farahmand. "P32: Effect of Rational Emotive Behavior Therapy (REBT) on Anxiety and Irrational Beliefs among Infertile Women", *Shefa Neuroscience Research Center*, No. 3, pp. 56-56, October 2014.
- [14] A. Assari, "Isfahan Urban Conservation: An Analytical Study on Urban Heritage Conservation", *Lambert Academic Publishing*, Vol. 1, January 2014.
- [15] V. Sharifi, "Urban Mental Health in Iran: Challenges and Future Directions", *Iranian Journal of Psychiatry and Behavioral Sciences*, Vol. 3, No. 1, pp. 9-14, 2009.
- [16] T.D. Matte, D. Jacobs, "Housing and Health-Current Issues and Implications for Research and Programs", *Journal of Urban Health*, Vol. 77, No. 1, pp. 7-25, 2000.
- [17] I. Bernard, D. Hooper, "Wives Mental Health and Children's Behaviour Problems in Contrasting Residential Areas", *Social Science & Medicine*, Vol. 8, No. 6, pp. 369-74, 1974.
- [18] A. Assari, T.M. Mahesh, E. Assari, "Role of Public Participation in Sustainability of Historical City: Usage of Topsis Method", *Indian Journal of Science and Technology*, Vol. 5, No. 3, pp. 2289-94, March 2012.
- [19] A. Assari, T.M. Mahesh, M.R. Emtehani, E. Assari, "Comparative Sustainability of Bazaar in Iranian Traditional Cities: Case Studies in Isfahan and Tabriz", *International Journal on Technical and Physical Problems of Engineering (IJTPE)*, Issue 9, Vol. 3, No. 4, pp. 18-24, December 2011.
- [20] A.P. Jones, "Indoor Air Quality and Health", *Atmospheric Environment*, Vol. 33, No. 28, pp. 4535-4564, 1999.
- [21] A.A. Noorbala, S.A. Bagheri Yazdi, M. Asadi Lari, V. Mahdavi, "Mental Health Status of Individuals Fifteen Years and Older in Tehran-Iran (2009)", *Iranian Journal of Psychiatry and Clinical Psychology*, Vol. 16, No. 4, pp. 479-483, 2011.
- [22] D.G. Talin, "Construction of History: Revivalism, Nationalism, and Monumental Architecture of Tehran, 1951-1979", *Massachusetts Institute of Technology*, 1998.
- [23] R. Gifford, "The Consequences of Living in High-Rise Buildings", *Architectural Science Review*, Vol. 50, No. 1, pp. 2-17, 2007.

[24] M. Chatterjee, "Perception of Housing Environment among High Rise Dwellers", *Journal of the Indian Academy of Applied Psychology*, Vol. 35, pp. 85-92, October 2009.

[25] N. Richman, "The Effects of Housing on Pre-School Children and Their Mothers", *Developmental Medicine & Child Neurology*, Vol. 16, No. 1, pp. 53-58, 1974.

[26] M. Goodman, "The Enclosed Environment", *The Journal of the Royal Society for the Promotion of Health*, Vol. 94, No. 4, pp. 165-68, 1974.

[27] W. Lindinger, A. Hansel, A. Jordan, "On-Line Monitoring of Volatile Organic Compounds at PPTV Levels by Means of Proton-Transfer-Reaction Mass Spectrometry (PTR-MS) Medical Applications, Food Control and Environmental Research", *International Journal of Mass Spectrometry and Ion Processes*, Vol. 173, No. 3, pp. 191-241, 1998.

[28] A. Assari, T.M. Mahesh, "Demographic Comparative in Heritage Texture of Isfahan City", *Journal of Geography and Regional Planning*, Vol. 4, No. 8, pp. 463-470, June 2011.

[29] M. Sadatsafavi, A. Moayeri, H. Bahrami, A. Soltani, "The Value of Bayes Theorem in the Interpretation of Subjective Diagnostic Findings: What Can We Learn from Agreement Studies?", *Medical Decision Making*, Vol. 27, No. 6, pp. 735-43, 2007.

[30] H. Mehravaran, S. Zabani, G.H.R. Nabi Bidhendi, R. Ghousi, H. Keshavarzi Shirazi, "Noise Pollution Evaluation Method for Identification of the Critical Zones in Tehran", *International Journal of Environmental Research*, Vol. 5, No. 1, pp. 233-240, 2011.

[31] S.H. Faryadi, S.H. Taheri, "Interconnections of Urban Green Spaces and Environmental Quality of Tehran", *Int. J. Environ. Res.*, Vol. 3, No. 2, pp. 199-208, 2009.

[32] T. Yoshida, Y. Osada, T. Kawaguchi, Y. Hoshiyama, K. Yoshida, K. Yamamoto, "Effects of Road Traffic Noise on Inhabitants of Tokyo", *Journal of Sound and Vibration*, Vol. 205, No. 4, pp. 517-522, 1997.

[33] F.M. Carp, "Impact of Improved Housing on Morale and Life Satisfaction", *The Gerontologist*, Vol. 15, No. 6, pp. 511-515, 1975.

[34] K. Hiramatsu, T.Y. Amamoto, K. Taira, A. Ito, T. Nakasone, "A Survey on Health Effects Due to Aircraft Noise on Residents Living around Kadena Air Base in the Ryukyus", *Journal of Sound and Vibration*, Vol. 205, No. 4, pp. 451-460, 1997.

[35] H. Behruz, A. Safaie, A.P. Chavoshy, "Tehran Traffic Congestion Charging Management: A Success Story", *Urban Transport XVIII: Urban Transport and the Environment in the 21st Century*, No. 18, p. 445, 2012.

[36] D.L. Christensen, F.M. Carp, G.L. Cranz, J.A. Wiley, "Objective Housing Indicators as Predictors of the Subjective Evaluations of Elderly Residents", *Journal of Environmental Psychology*, Vol. 12, No. 3, pp. 225-236, 1992.

[37] M. Mousavi Nik, M.B. Saberi Zafarghandi, B. Birashk, A. Assari, S.R. Eshaghi Farahmand, "Cognitive Behavioral Treatment of Post Traumatic Stress Disorder

(PTSD) After a Car Accident", *The Neuroscience Journal of Shefaye Khatam*, in press, 2016.

[38] A. Kearns, R. Hiscock, A. Ellaway, S. Macintyre. "Beyond Four Walls - The Psycho-Social Benefits of Home: Evidence from West Central Scotland", *Housing Studies*, Vol. 15, No. 3, pp. 387-410, 2000.

[39] E. Chase-Lansdale, P. Lindsay, "Home Sweet Home (S): Parental Separations, Residential Moves, and Adjustment Problems in Low-Income Adolescent Girls", *Developmental Psychology*, Vol. 38, No. 5, p. 792, 2002.

[40] N. Kaya, M.J. Weber, "Cross-Cultural Differences in the Perception of Crowding and Privacy Regulation: American and Turkish Students", *J. of Environmental Psychology*, Vol. 23, No. 3, pp. 301-309, 2003.

[41] A. Assari, E. Assari, "Urban Spirit and Heritage Conservation Problems: Case Study Isfahan City in Iran", *Journal of American Science*, Vol. 8, No. 1, pp. 202-109, 2012.

[42] G.W. Evans, "The Built Environment and Mental Health", *Journal of Urban Health*, Vol. 80, No. 4, pp. 536-55, 2003.

[43] G.W. Evans, S.J. Lepore, K.M. Allen, "Cross-Cultural Differences in Tolerance for Crowding: Fact or Fiction?" *Journal of Personality and Social Psychology*, Vol. 79, No. 2, pp. 204-210, Aug. 2000.

[44] F.B. Astudillo, A. Moch, D. Hermand, "The Predictors of the Feeling of Crowding and Crampedness in Large Residential Buildings", *People, Places, and Sustainability Conference*, pp. 220-228, 2000.

[45] A.I. Schiffenbauer, J.E. Brown, P.L. Perry, L.K. Shulack, A.M. Zanzola, "The Relationship between Density and Crowding Some Architectural Modifiers", *Environment and Behavior*, Vol. 9, No. 1, pp. 3-14, 1977.

## BIOGRAPHIES



**Ali Assari** has Ph.D. degree in Urban and Regional Planning from Mysore University, India with Civil Engineering background. His research interests are in the heritage area, urban conservation, cultural heritage, urban morphology and the Iranian bazaar. He is the member of ICOMOS and Construction Engineering Disciplinary Organization of Iran.



**Behrooz Birashk** is an Associate Professor of Psychology in Faculty School of Medicine, Tehran University of Medical Sciences (Tehran, Iran) and Tehran Psychiatric Institute, Mental Health Research Center (Tehran, Iran). He received B.A. degree from Melli University of Iran (Tehran, Iran) in 1973 and M.A. and Ph.D. degrees in Counseling Psychology from University of Illinois, USA in 1975 and 1979, respectively. He received his Postdoc from Simon Fraser University of Vancouver, Canada in 2006.



**Maryam Mousavi Nik** received B.A. and M.A. degrees in Clinical Psychology and completed her Ph.D. degree in Clinical Psychology in Mysore University, India in 2013. Further she has supplementary Internship in Mental Health Research Center, Tehran Institute of

Psychiatry, School of Behavioral Sciences and Mental Health, Iran University of Medical Sciences, Tehran, Iran.



**Reza Naghbishi** received the Bachelor of Architecture in 2007 and M.A. in 2010. He received the Ph.D. in the field of Architectural Education (Behavioral Science Approach) in 2014. He an academic member in Department of Architecture, Faculty of Art and

Architecture, Roudehen Branch, Islamic Azad University, Tehran, Iran.