

RESEARCH PAPER

Exploring the role of architectural design in creating a sense of security and residential satisfaction in affordable residential complexes, for young Iranian low-income families

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ARTICLE INFO

Article History:

Received May 21st, 2018

Revised August 21th, 2018

Accepted August 30th, 2018

Released September 1st, 2018

Keywords:

Architectural Design

Security

Residential Satisfaction

Residential Complex

Affordable

ABSTRACT

The most important requirement of a family after food and clothing is housing. It also plays an important role in providing safety and security for the family. Due to its importance, security is placed among other human physiological needs like food, shelter and sanitation. Feeling of security is one of the main factors in stability of urban spaces. It can be said that a secure environment is essential for humans and is one of their basic requirements. Security is one of the human-environmental factors which can play an important role in the satisfaction of people with their place of living. In addition to reducing construction costs and affordable housing for increasing residential satisfaction, living expenses in housing should also be reduced. The main purpose of this paper is to establish architectural design strategies which are effective in providing security as an important factor in residential satisfaction in affordable housing. By designing acceptable space in addition to reduce costs in affordable housing, residential satisfaction will increase as well. The research methodology used here is content analysis; after collecting information through taking notes and coding we come to build security measures including creating appropriate neighborhood, creating active users, designing appropriate physical spaces, increasing visibility, not creating defenseless spaces, privacy separation etc.

How to cite this article

Afzali Grouh S, Andjomshoaa A. Exploring the Role of Architectural Design in Creating a Sense of Security and Residential Satisfaction in Affordable Residential Complexes, for Iranian Low-Income Young Families. Stud. Archit. Urban. Environ. Sci. J., 2018; 1(2): 86-94. DOI: 10.22034/saues.2018.02.03

INTRODUCTION

Security is one of the most important factors when it comes to stability in residential complexes; therefore, secure environment is among main requirements of residents. For this reason, in the following parts of the paper, the definitions of housing, residential satisfaction, affordability and security will be explored; and the role of security in residential satisfaction and affordability will also be explored.

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Objectives

The purpose of this paper is to identify architectural design approaches to provide security in affordable housing in order to enhance the residential satisfaction so that active security is possible through performing these approaches (best and cheapest approaches) to provide security in residential and defensible spaces. The focus point of this article is low-income young families in Iran. In addition to affordable housing, the satisfaction of residents of low-income new married

couples in Iran will be promoted.

Research methodology

Every scientific research requires a research methodology fit for its subject. Choosing appropriate methodology and using it in all the processes and research path is a principle of a scientific research [1]. The type of research methodology that is used here is content analysis methodology. In this approach obvious content and messages systematically relate qualitative data to quantitative data. Content analysis is a proper approach for answering questions about content of a message and the main application of content analysis is describing the features of a message. Content analysis includes three stages:

1- Preparation and organization (In the Theoretical Foundations section) this part considers collecting texts and theories related to the literature review of residential satisfaction and affordable housing in general.

2- Analyzing (Analyzing the collected research in the literature review): this part considers content analysis method to study the theories in order to find different architectural design approaches for decreasing expenses and increasing satisfaction.

3- Processing the results (In the Conclusion section): in this part, based on content analysis of the collected theories and literature, the results will be extracted in the form of design solutions and approaches.

Preparation and organization

Housing

“Housing as one of the most important primary human needs plays an important role in protecting and securing him and is a determinant factor affecting social space organization, formation of individual identity, social relationships and collective goals” [2]. The concept of housing is vast and complex and there

are various aspects relating it, therefore it is difficult to provide an universal and unique definition of it. In most resources it is not limited to one residential unit, but it includes the entire residential environment, that is, concepts like social services and public facilities needed for family well-being even employment plans, education and people’s health can be derived from it [3]. The need for housing has two dimensions: quantitative and qualitative. Quantitative dimension of the need for housing involves with recognition of the phenomena and matters which address issues like the lack of shelter and the access to it, but in the quantitative dimension the extent of responsiveness to the need of housing regardless of its quality is the case. In the qualitative dimension lack of housing, poor housing and tight housing arises and all that is matter is type of the need [4]. Housing should have two functions, the material functions include: Creating an environment with convenient access, proper facilities, optimal temperature, proper pressure, humidity, air flow and good light etc. spiritual aspect include: Creating a space which is appropriate with life style and culture social customs etc. these two together provide sense of utility and residential satisfaction of people [5]. Residential satisfaction increases with quality improvement. (Table 1) shows septet qualitative factors of housing.

Residential satisfaction

Satisfaction is a function of individual success and satisfaction of physical and psychological needs; the concept based on theories of motivation and needs in psychology which includes all aspects of life [7]. Residential satisfaction is defined as supplying residents’ needs in terms of their wishes (understanding mental wishes and personal characteristics) regarding social facts (objective understanding of current situation). In fact, residential satisfaction is a mental

Table 1: septet qualitative factors of housing [6].

Quality indicators of proper housing
Acceptable shape of housing
Housing strength
Security
Safety, convenience and accessibility of facilities and physical services for residents (comfort, convenience and sanitation).
Accessibility to nature and open green space
Supplying needed equipment and facilities (infrastructures) for housing
Neighborhood Housing with compatible applications

response to objective environment. Residential satisfaction is a multi-factor concept [8]. The theory of residential satisfaction is used for determining a help framework for recognizing structural features of families and condition of housing which affect various aspects of satisfaction [9]. If we can choose and achieve all we desire, then we will be satisfied. However, this satisfaction can cover some various spectra [10]. Satisfaction of families with environmental conditions and housing features are among the most important measures of life quality in the process of evaluating housing policy [11]. Satisfaction is one of the key measures for measuring the quality of life. A high quality environment which provide sense of welfare and satisfaction for residents through physical, social or symbolic features [3].

Affordability

From housing planning point of view affordable housing more emphasizes on habitable houses with proper facilities and using high quality local tools which can be a useful tool in solving housing construction issues and reducing dependency on others while protecting farmlands. The concept of affordable housing is one of the tools for sustainable development. Anrews (1998) defines the term affordable housing as follows. The cost should not be more than 30 percent of household income. Milprezo and others (1985) explain affordable housing the extent that households can spend for housing, in summary affordable housing is related to the income of the population that can afford it. According to HUD standard, (which has been published for United States, but as does not concern cultural and local aspects can also be used for other cultures and places), the income population is divided between very low-income groups (below 50% average-income), low incomes (below 80%) and average-income (120% -81%). Affordable housing expresses the needs of people in different conditions with low level income and average level income [12]. Affordable housing is different to people in different areas [13]. This article considers Iranian low-income young families.

In the second conference on human settlements that was held in Istanbul adequate housing defined as such: Adequate shelter means more than a roof over one's head. It also means adequate comfort; adequate space; physical accessibility; adequate space; adequate security; security of tenure; structural stability and

durability; adequate and accessible location with regard to work and basic facilities all of which should be available at an affordable cost. Housing might be affordable but often uncomfortable and expensive for living [14]. That is why there should be an alternative which is able to decrease the cost of constructing a house, and also can decrease the living expenses as well as increasing the residential satisfaction [15].

Security

The literal meaning of security is freedom from anguish, anxiety and fear [16]. In other words, sense of calmness and peace of mind [17]. As defined in Moein dictionary security means to be secure, safe and fearless [18]. Literally security means to make comfortable, and fearless; the concept refers to defending or protecting yourself and your family, friends and properties that shows the importance of security [19]. Security is one of the most important needs of human being so that it is has the second degree of importance after physiological needs [20]. The feeling of security is a state in which one's personal and social needs are satisfied and person feels worthy, peaceful and self-confident [19]. Researchers believe that different social, economic and cultural factors are involved in providing security; environment is effective also [20].

Security and residential satisfaction

Criteria and sub-criteria of residential satisfaction in Mehr housing have been established which includes complex security, residential unit security, security measures for controlling criminals and bomb proof [7]. Marena and Rogers provide the first theoretical model on satisfaction of lodging which is based on personal understanding and evaluation of environment features such as: Cleanliness, neighborhood security and personal characteristics like sex, age social class [9]. Bhezadfar and Ghazi Zade believe that there are seven criteria which are effective on creating sense of satisfaction and security is one of them [21]. According to Kamel Kardeh and Abbas Zadeh factors which are effective on personal housing divided in four parts: Personal, social, cultural, environmental architecture. Security is a subset of social factors [22]. Zabihi et.al believes that one of the effective factors of environmental architecture in residential complexes is social and cultural criteria which include: Familiarity and relationship with neighbors, contributing in social activities and desirable security and protection [5].

Security and affordability

In Habitat 2 security and right to reside especially for low income people were addressed [23]. Which show the importance of security for all different strata of society and one of the important criteria in the subject of residence. Generally, providing security in residential complexes is based on two basic principles: First creating borders and barriers to prevent unauthorized people from entering and practicing control by guards. Second, creating surveillance opportunities for inhabitants and residents in building through designing defined and specific spaces or by using electronic methods. Protecting the building takes place through two methods, active and passive. Active protection: Takes place through proper building design including plan and the material used in it. This is of special importance because of its preventing role. It is possible to provide maximum security with minimum cost through systematic design of the building. Inactive protection: This kind of protection takes place through creating barrier between the interior and exterior of the building. Defensive protection includes enhancing parts of the building in order to prevent illegal entry to the building. Barriers like safe fence, special methods of access, special locks etc. [19]. (Fig. 1) Shows the security creation methods.

Theorists and security approach

Wood found the relation between physical environment and crime. That is how physical features of public complexes plan prevent communications and contacts of all inhabitant citizens in residential blocks which are the main informal cores of social control and care in the environment [24].

Jane Jacobs wrote his famous book *The Death and Life of Great American Cities* and mentioned the relations between crime and physical design of the living environment. In her opinion natural care of citizens and systematic and safe design of the buildings

and urban spaces are important factors for preventing urban crimes. According to her opinions a favored street has three main features: clear boundary between public and private space, eyes upon the street and continuous use of sidewalks [25]. Naturally, by street she means a mixed street with business, residential and other uses; it is different with merely local residential neighborhood [26].

To prevent crime Angel emphasizes on the importance of physical environment through specifying the scope of ownership, reducing or increasing accessibility to place and taking measures on monitoring and watchfulness of citizens and the police; all this is done through designing physical environment that can have direct effect on reducing crime [27].

Ray Jeffrey (1971) used the phrase (CPTED) for the first time in his book with the same name. He also published a paper with the title preventing crime through environmental design (CPTED). Physical environment settings both can help committing the crime and prevent it [20].

Oscar Newman as the most famous theorist on this area completed the theories provided by Wood (1961), Jacobs (1961) and Angel (1969). Based on his studies Newman explores three factors, unfamiliarity of inhabitants with each other, lack of inhabitants' surveillance and accessibility of escape routes that have direct effect on increasing crime in residential blocks [28].

Newman's main idea consists of four basic elements of specifying the realm, monitoring, enhancing environment quality and neighborhood housing with other compatible applications [29]. Defensible space theory is divided into two main parts: first, space should allow the inhabitants to see and to be seen; by being certain of observation, identification and eventually arresting the criminal the fear of crime will decline in them. Second inhabitants should be willing to interfere when the crime happens and report to the police because of the sense of ownership and interest in their living environment. When people feel secure in their neighborhood, there will be more social relations and involvement among them at the time of crime occurrence [20].

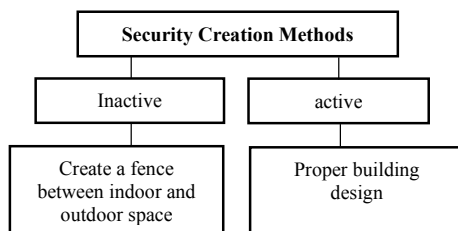


Fig. 1: Theoretical framework: security dimensions [19]

The impact of design on crime

There are three main elements needed to commit a crime: ability, opportunity and motivation. Providing

building security through systematic design is for eradicating or reducing the ability of molestation and opportunity for committing the crime. This in turn reduces the opportunity. Providing security in residential complexes is not possible only through hard physical barriers, perhaps it can mentally increase the sense of insecurity in people [30]. Creating the sense of security is possible indirectly and through utilizing combined preventing policies and social-cultural relationships [19].

Crime prevention approach

Generally, there are two prevention approaches that are common among theorists:

1- Non-spatial approach: It implies reducing or eradicating personal motivation of committing the crime through ethical training, enhancing social, economic and cultural conditions; codification and penalty. In some resources this approach also is called social approach [31]. The theorists of this approach are experts in humanities [32]. As non-spatial approach deals with non-physical measures, it is beyond the field of urban design [31]. The strength of non-spatial approach is that in spite of availability of conditions for committing the crime, the crime does not happen; its weakness is that it requires a lot of changes in social, economic and cultural conditions (low possibility for realization) [26].

2- Spatial approach (local): The main purpose of this approach is to make it difficult to commit a

crime through applying special techniques in certain places [31]. Theorists of this approach like Wood, Angel, Newman and Hillier were active in architecture and urban designing or like Jacobs make comment according to their experiences. Spatial approach to prevent crime commitment in the field of urban designing is for eradicating or reducing the possibility of committing the crime through changing urban physical environment and encouraging people for using urban spaces. The strength of spatial approach is high possibility for realization, low time for implementation and visible arrangements; its weakness is that it is not radical with the problem of crime, it does not eradicate the crime and its motivations and the possibility of occurring the crime in other places remains. Now, given the evident conflicts between

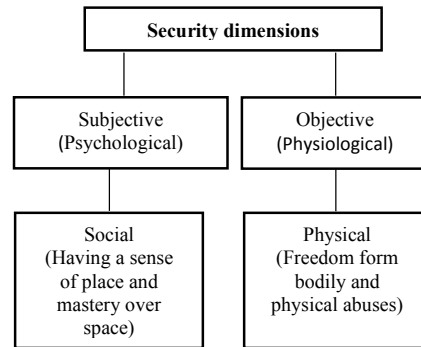


Fig. 2: Security dimensions

Table 2: Six principles of security [30]

sextet principles of security	
1	surveillance Focusing on natural or inactive surveillance of housings and public spaces around Main and essential element for reducing crime is revealing intruders; for determining the extent of surveillance provided in a neighborhood direction of houses is very obvious.
2	Neighbors The principle of neighbor and neighborhood is related with the principle of surveillance Meaning recognizing the identity and protecting their specific neighborhood.
3	Public and personal spaces It has a close relationship with the concept of neighborhood and is focused on the distinction of public and private space, the main purpose is creating an environment which is encouraging for neighborhood relationships
4	Potential hidden spaces The importance of removing potential hidden spaces
5	Extensive and inclusive views Laying out safe places. Security of private places like parking is safer for the car Making it difficult to enter the house
6	Collaborative views First the importance of daily management of completed estates. Second including management in designing process.

these two approaches, in spite of the contradiction that is perceived through superficial view, these approaches are complementary to each other. Generally, given all the theories about enhancing the sense of security it can be said that through physical design it is possible to reduce crime in urban spaces to a large extent [26].

Security dimensions

Security has two dimensions: objective and subjective. Subjective dimension mostly deals with social elements and objective dimension refers to physical elements [19]. One of the legitimate rights of citizens is safety in urban spaces. There are two aspects of this safety that should be considered. 1. Physiological security: Is that freedom from bodily and physical abuses 2- psychological security: meaning to have a sense of place and sense of mastery over space whether in terms of geographical or social in the society [33]. (Fig. 2) shows the dimensions and types of security.

Six principles of security

According to scientific basic, the key principal for architects, designers, planners and housing managers is that, instead of architects and planners, the responsibility for security is more given to people by assuring of collaborative approach. [30]. Six principles of security are described in (Table 2).

Analyzing

Analyzing strategies for security design in affordable residential complex

Studying the literature review related to affordability, security, residential satisfaction and analyzing the content of theories by coding and codification the similarities and differences of the theories and researches some architectural design approaches for improving residential satisfaction were extracted.

By systematic design and active security approach it is possible to achieve best and cheapest strategies for providing security in affordable housing by enhancing residential satisfaction. By practicing these elements in designing residential complexes it is possible to take effective step toward providing sense of security in affordable residential complexes. Some of these strategies are presented in the following. (Fig. 3)

Dividing private, semi private and public territories

Privacy is one of the most important elements which provide solitude and security controlling territories is possible through taking possession of space by a certain confine. Territory can be private (like open spaces of the complex), semi private (like joint interior and exterior areas) and public (like the space of streets and sidewalks). Among this semi private territories are not clear and usually weakly taken care of [34].

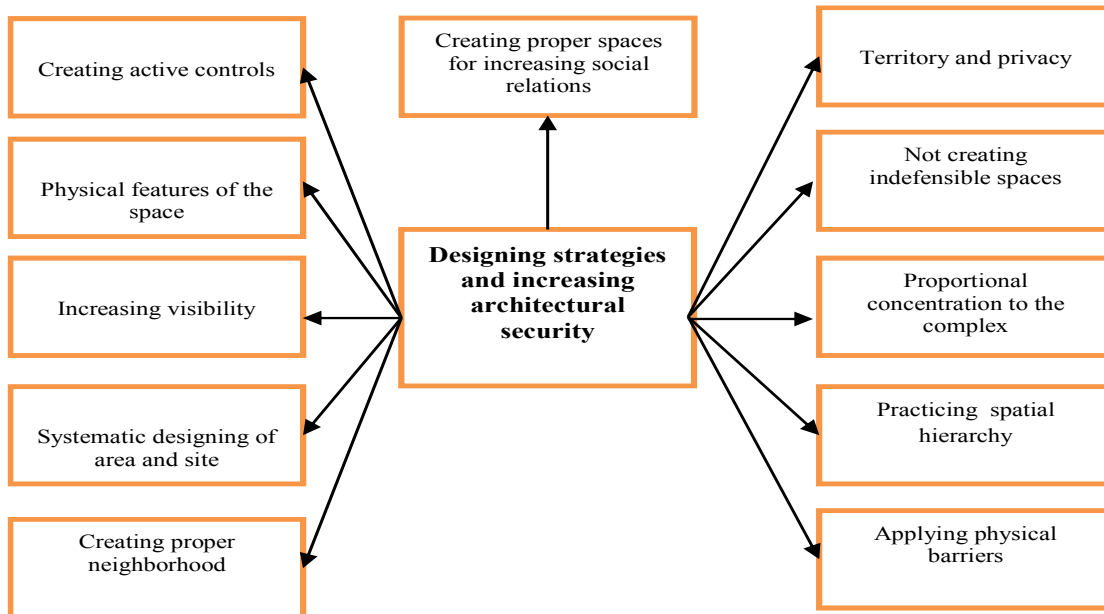


Fig. 3: Designing strategies and increasing architectural security and enhancing residential satisfaction

Common spaces work only when are managed by at least half of inhabitants who are using it; this does not mean that creating these spaces should always be avoided. Shared spaces are sometimes useful, there are many cases that are not possible to convert them to public or private places, even if it seems favorable (for example shared spaces in residential blocks), Each public space should be under natural surveillance by around houses [30]. Defining clear borders among public and private spaces that defines the ownership of a space; by this definition it is possible support spatial hierarchy in residential complexes [19].

Various and congruous controls

Creating controls in residential complexes that are active 24 hours a day. Neighborhood of occupations in the buildings should be done in a way that the issue of domination and view from other properties to residential properties through openings of windows or gates be reduced as much as possible. Entrance neighborhood and other spaces in residential properties should be in a way that limit the view of stranger from gates to interior spaces and their dominance get as small as possible. Residential complexes established in neighborhoods which are dissuasive from crimes. In other words, the place of buildings should not strengthen the insecurity. This includes compatibility of neighborhood controls with residential complex; the more compatible the environ controls are the more security is possible. Increasing visual visibility of urban spaces so that it is possible for inhabitants to observe public places [19]. Spaces around the building and semi open public spaces should be designed in a way that are visible for inhabitants from inside the building, and make people feel exposed; this subconsciously leads to prevent committing wrong actions [35].

Proportional concentration

Establishing proportion between population concentration and residential complexes, so that there are not low and high population densities. Just average population density is suitable for secure spaces. Increasing the density can have positive and negative impacts on security of the inhabitants. The number of flats in an entrance hall, the number of apartments in a building and the number of buildings in the plan can make this clear that small numbers have better results [19].

Applying physical lines and barriers

Designer uses lines for controlling visual and physical movements. By doing so the designer can lead the eye of the observer to a certain place. Hedges, walls, edges, sidewalk curbs and margins are considered lines and obvious elements of the design. Gates, paths with short steps, plants, variation in the textures of sideway surfaces and lightings are among the symbolic barriers; it is possible to limit the entrance spaces using above mentioned barriers [19].

Increasing social relations

Increasing social relations between neighbors and enhancing the sense of solidarity among people and inhabitants of residential complexes. Enhancing the relationship between neighbors through physical structure of the tall buildings, strengthens people controls over their living environment and increases the security; this can be considered as one of the designing objectives [36]. Creating multiple urban and social spaces like conference halls, local parks, recreational spaces for playing children, gatherings and increasing interaction between inhabitants of residential complexes [19]. Children (2-5-year-old) usually play near the home. If this space enriched by play equipment's and enclosed by benches, it provides proper space for inhabitants. Also limiting playground of children using symbolic barriers can have suitable outcomes [35].

Proper view and physical features of the building

Shape and physical features of the building should not be such that it creates conditions for secrecy and committing wrong actions [19]. Not creating dark and sightless spaces and cozy corners (indefensible spaces), prevents the opportunities for committing crimes. In some settings enhancing the lighting can help reducing the crime and fear of the crime. In hallway entrances and common corridors low consumption lights are needed which are resistant to subversion [30].

Systematic designing of the area and site

Landscaping plays an important role in creating friendly and desirable environment. Landscaping should not decrease the sight of the sidewalks; it should not be a cozy place for the intruders. Landscaping and planting flowers and plants should enhance the security of sidewalks and it is positioned by the side of sidewalks generally should not be more

than one meter. Planting flowers and plants should be such, that tall plants are planted in front of walls and shorter ones and shrubs be planted in the vicinity of sidewalks. Tall shrubs and trees should not be positioned in front gates, entrances and windows. For the security of public areas, tree should not be hidden and in critical spots should not come down more than 5.1 meters [30].

Systematic design of parkings

In order to have enough assurance of surveillance over parked cars, parkings should be constructed near the car owners as much as possible. Personal garages should be built in the yards if possible; the entrance of these garages should be visible for inhabitants. The position of the garages and car entrances should not be dim and dark. In places which large spaces cannot be assigned to the parkings, spaces should be divided to smaller parts so that it is possible for inhabitants to be familiar with cars and their owners thereupon they can easily recognize intruders and strangers [30]. As it is can be seen in (Fig. 3), by designing acceptable space, residential satisfaction can increase as the expenses decrease. some of the strategies are: Systematic designing of the area and site, neighborhood units and their positions, territory and privacy divisions, limited accessibility, neighborhood and creating active controls, no creation of indefensible spaces, physical features of the space, increasing visibility, proportional concentration to the complex, practicing spatial hierarchy, applying physical barriers, creating proper spaces for increasing social relations, proper positioning the ways, windows, stairways, doors, elevators and applying barriers and using psychological elements etc. are among the techniques that can have good result in creating defensible spaces so that in addition to reducing affordable housing costs, it can increase the residential satisfaction.

Processing the results

CONCLUSION

By designing acceptable space in addition to reducing costs in affordable housing, residential satisfaction will increase. Creating defensible spaces by using physical elements and various architectural plans.

In dividing the levels in housing construction plans, if the facilities utilized by inhabitants take place in defined spaces, these spaces will have better function

as defensible spaces [19].

As it was written in the goals section, the main goal of this paper was to provide solutions for increasing different aspects of Security in residential complexes for low-income young families by applying architectural solutions in designing a building. Considering affordability or satisfaction, one by one, has been performed by some other researchers frequently which has been presented in the literature review section extensively. But affordable and satisfaction have not been yet the topic of one unified research together. The new approach of this article which distinguishes it from other similar researches, is its focus on residential satisfaction simultaneously with affordability. This is one of the first researches which has considered and taken in to account these two cases at the very same time and this is the turning point of this article which has been combined with the security component.

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