Investigation on Spatial Patterns of Crime against Women Case Study: Street Offences in Zanjan

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Abstract

Presently, a major problem in Zanjan is the frequency of Social Anomies, and most specifically street offences against women. This undesirable phenomenon has most seriously jeopardized the citizen’s health and life to the extent that it has become a concern of police and judicial authorities. The purpose of this study is to analyze the judicial structure of these anomies in the city of Zanjan and to identify spatial patterns and facilitating factors for this crime to be committed, in order to fight and control the areas that are inflicted with such crimes, using statistical models and geographical data organization.

This study utilizes a comparative analytical method. To identify and recognize spatial patterns of offences in the city, graphics-based and statistical models have been used in Geographic Information System (GIS) environment. Mean center test and standard deviation ellipse include the most important statistical tests used in this study. To identify the crime spots, the closest neighborhood indicator has been used as the test of clustering. This study benefits from statistical tests as well as graphics-based statistical methods, including Kernel Density Estimation. The statistical population of this study includes total street offences that have occurred in the city of Zanjan within one year.

The findings of this study reveal that the spatial distribution of street offences against women in the city of Zanjan follows a centralized and clustered pattern. Also, the mean center of this crime is mainly located at geographic center of the city and the central district. According to the findings of this study, Zanjan is the third city where the occurrence of street offences is most highly frequent, with a rate of 14.78%. The most significant area include Enghelab Intersection, Sadi Intersection, Zeynabiyeh St., Taleghani St., Arg Sq., Haft-e-Tir Terminal, and most...
specifically the central part of Zanjan. To improve the security and to lower the anomalies in these geographic areas, it seems that we need to improve recreational and leisure-time facilities, to design uniform structures in the local space and diminishing the areas that lack an urban defense facility, organizing deserted and left areas, and balancing districts based on the occupancy in these areas.

**Keywords:** Offence patterns, Street Offences against Women, Crime Spots, Zanjan.

**Introduction**

Violence against women including rape, sexual assault, beating, humiliation, and being indifferent is an ordinary event. Today, official laws that result in sexual discrimination have been moderated more than ever. Now, the male do not disagree with the education and social activities of the female; even they confess that a satisfactory life is possible when the couple share the responsibilities of housekeeping, childcare, and making money. The analysis of the status of women in different communities reveals that despite such achievements, there are still apparent indications of the minor status of women, compared to men (Sadeghi Fasae, 2010, p.2). Women are exposed to violence in different ways, either in private environments (father or husband at home) or at public environments (community). Unfortunately, considering the irremediable consequences of violence against women both for the community and the women, the issue has not been appropriately addressed by the government authorities (Reisi Sartashnizi, 2002, p. 45). Although violence against women is a common phenomenon in all communities, such violence and its consequences are more frequent and intense in poorer, more traditional and more culturally-deprived communities (Moazemi, 2004, p. 40). Culturally, the coincidence of two factors provides the potential for sexual offence against women: the factors that incite the men to commit violence against women, and situations wherein women are placed in and become the victim of violence. Therefore, in sexual assaults against women, the victim women should have the features that encourage the offender or there should be some stimuli from her side. Sometimes an offender’s attempt to obtain the properties that the women carries with her may provide the ground for sexual crime, which is much more important than robbery and results in more serious social, familial and cultural consequences and influences. Considering what was mentioned earlier, the factors that lead to violence against women can be classified under two categories: the factors related to offenders, the factors related to victims. As both parties have this potential prior to the commitment of any kind of offence, no certainly accurate criterion can be presented that would conform to all violence types against women. It is possible that a person with no considerable deviation or offence background may commit an offence in a unique and totally accidental situation. However, such crimes are not focused here as they are rare and the criminals will confess or regret it. What is focused here is the physical and sexual crime of men against women (Alsan, 2006, p. 21). To identify and analyze the spatial structure of social anomalies of crimes causing street offences against women and to identify spatial patterns and the facilitators for committing such crimes and in order to fight and control the areas that are suffering from such crimes, using statistical models and GIS in Zanjan, this study tries to answer the following research questions:
1- How different types of this crime are spatially distributed and what is the crime rate in Zanjan?
2- How the most significant crime spot of street offences against women are geographically distributed?
3- What are the spatial factors that influence encourage and facilitate committing the crime of street offence against women in Zanjan?

Review of Literature

The study of the existing relation between place and crime in modern scientific way was launched by the theory of “Social Ecology” in early 19th century. Quetele and Guerry were the pioneers of this school. Later, this theory was followed by other thinkers of Chicago’s Social Ecology School, including Show and McKay in early 20th century. However, an increasing interest has been felt in studying the role of environment in committing a crime, or the role of environmental conditions in preventing the crimes in the last few decades, especially since 1960s (Kalantari, 2001, p. 56). As a pioneer of this idea, Jacobs focused on this issue in Life & Death of Large Cities in the U.S. He concluded that there is a close relation between crime and structural environment that can be measured and controlled. He criticized modern cities that had been formed based on zoning patterns and functional separation, and he suggests a mixed occupancy. He admires crowded and lively streets and believes that security can be ensured and public peace can be effectively settled by the supervision of users on the space. This, he suggests, will end in the improving social communications. A strategy for facilitating supervision over spaces is to build windows and balconies so that they will open to streets and public places. In such a way, more eyes will be supervising the activities and the occurrence opportunities to commit a crime will be decreased (Rezazadeh & Kheibar, 2010, p. 59).

Moreover, significant shifts have been introduced to preventive policies and notions of criminologists for fighting urban offences during the last two decades. Based on this idea, not only the criminal but also the place of crime should be focused to prevent the crime, so that elimination of opportunities for committing a crime will minimize crime rate (Kalantari et al., 2001, p. 89). The study of crime committing and the place of crime in 1993 by Brantingham and Brontingham focuses on discovering the interaction between offender and the structural and social environments that are selected as the target of their crime (Kalantari, 2001, p. 89). Their theory is that crime is the result of interaction between people and movement in the urban perspective of time and place (criminals and victims). Also, there should be four major factors for a crime to be committed: 1) law; 2) offender; 3) target; 4) place (Chung, 2005, p. 10). In this regard, Bratingham believes that traditional criminology is seeking to find the criminal and his/her incentives in committing a crime. However, crime can be studied without taking personal and individual incentives of a criminal into consideration. Rather than, the crime and the environmental conditions of committing it can be focused (Brantingham & Brantingham, 1990, p. 14-49). Environmental criminology includes the study of crime, murder, harm and offence so that the cause of it is first related to special places, and then to the methods that individuals and organizations use forms their activities using spatial place-based factors (Bottoms & Wiles, 1997, p. 305). Crime Prevention through Environmental Design (CPTED) includes structural environment design and management in order to minimize the
opportunities for committing crime, murder and offence. Moreover, this notion is based on this assumption that criminals and offenders enter a process of logical decision-making prior to committing a crime. Indeed, the CPTED theories include the methodology of re-planning and redesigning the environment based on which architects and urban planners may decrease the chance of fearing crime and offence in order to improve the quality of life (Atlas, 1999, p. 11). Generally, CPTED focuses on the grounds where the crime happens and the techniques that will decrease the vulnerability of the environment (Salehi, 2009, p. 129-130). This notion is continuously being revised and evaluated and it is established based on four main strategies including territorial integrity, natural supervision, and protection of activities and control of accesses (Cozens, 2002, p. 132). The highly influential theory of “Broken Windows” suggested by Wilson and Kelling focuses on the subject of crime prevention through focusing on the residents’ awareness of suspected behaviors, environmental protection and its consequences (Wilson & Kelling, 1982, p. 29-38). According to the Defendable Space theory, the kind of urban design can also help the criminal in selecting crime place as well as committing the crime (Newman, 1973, p. 3). Another significant issue to be taken into consideration is the fact that geographic distribution of crimes is influenced by the variables of time and place of committing crime, the criminal and the victim. The studies show that due to their specific structural construction and social, economic and cultural features of residents and users, the potential and opportunity for crime is greater in some places of the city. On the other hand, crime rate is low in some urban areas due to the existence of preventive factors (Kalantari et al., 2009, p. 79-80). In fact, crime is not evenly distributed in the city. The idea of crime spots has been increasingly focused during the last few years (Nasar & Fisher, 1993, p. 187-206; Lupton, 1999, p. 1-15).

The term “crime spot” was first used by Sherman, Guartain, and Burger in 1969 in order to analyze the offence based on site features. This term refers to a place or geographic area where the offence rate is very high. The limits of this area may include a section of a city, a neighborhood, several neighboring streets or even a residential house or complex. Some have defined “crime spot” as small areas with a high predictable crime rate at least within one year (Kalantari et al., 2009, p. 80).

Many thinkers, specially the followers of “Routine Activity” theory have counted the combination or convergence of three activities as the cause of concentration of crime distribution in certain geographic areas. These will result in the formation of crime spots:

A) The presence of Crime Targets;
B) The presence of offenders who have sufficient incentive, ability and skill to commit a crime;
C) Lack of appropriate care and control on people and authorities’ side in order to encounter the offences (Felson & Clark, 2008, p. 11).

Some researchers have considered the existence of some occupancy as effective in the formation of crime spots. Sherman, Guartian and Burger have referred to such a relation between the occupancy and the formation of crime spots (Sherman, 1989, p. 27-55).
In this regard, Wisbird and Eck have referred to four essential concepts that influence the formation of crime spots:

A) The presence of the facilities needed for an offence to happen;
B) Site Features such as easy access, unavailability of guards and patrols, lack of appropriate management of sites, and the presence of some facilities encourages the criminals to commit crime in certain places;
C) Crime Targets or the existence of properties and assets that are the offender’s favorites;
D) The presence of a higher number of offenders and sufficient incentive and ability to commit crime is another effective factor in the formation of crime spots (Eck et al., 2009, p. 160).

Offence Diminishing Center in UK defines crime spots as follows:

A geographic area where the frequency of offence is higher than normal (average) or where the occurrence of offence is more frequent compared to the crime distribution in the whole region. According to this definition, a crime spot is a certain area where hosts a high portion of the total crime in the whole area (Kalantari & Tavakoli, 2007, p. 4)

Based on the above-mentioned definition, a crime spot is an area where the mean frequency of offence is more than the surrounding area. This place can be a house, a street corner, a shop or any other place (Sherman, 1989, p. 27-55). Researchers and police forces use this term in a quite different style. Some refer to it when speaking of places with very high density of crime. Some other attributes it to crime blocks and others consider it to be clusters of blocks. The most common public belief is that crime spot is a region where the frequency of criminal or chaotic incidents is higher than average or where the public are exposed to violence and crime to a degree higher than average. It should be noted that crime spots are of different intensities. For example, cool spots refer to those area where the rate of crime, chaos and riot is lower than average. There are also some crime spots where the frequency of crime, chaos and riot might be higher.

Materials & Methods

This study is a comparative Analytical study that aims to identify and recognize the site patterns for offence in the city using statistical models and graphics-based models in the GIS environment. The most important statistical tests used in this study include Mean Center test and Standard Deviation Ellipse. The Nearest Neighbor index has been used among the tests for clustering in order to identify crime spots. This study also benefits not only statistical tests but also graphic statistical methods, including Quadric Kernel Density Estimation. In this regard, the statistical data related to the crimes of the case study have been studied as spot incidents within the legal jurisdiction of Zanjan.

An integrated statistical method helps the analysts to understand the general and public patterns of offence. The Mean Center spot can be used as an approximate standard for comparing the spatial distribution of different kinds of crime or analyzing the frequency of a
certain crime in different periods of time. The index of distance from standard deviation helps us to explain the level and way of crime data distribution. The more the distance from standard deviation, the more scattered the offence data. The level of distribution can also be presented by Standard Deviation Ellipse. The size and shape of the ellipse shows the level of distribution and its direction shows the direction of criminal activities. The most useful comprehensive statistical test is the test for clustering. Several methods can be used for clustering test in crime distribution. The Nearest Neighbor Index (NNI) is a test of clustering. The Nearest Neighbor Index is a simple and fast method of crime accumulation test in a certain geographic region. In The Nearest Neighbor Index, the real distribution of crime data is compared with a collection of data with the same number of samples with an irregular distribution (Eck et al., 2009, p. 15).

The most appropriate method for illustrating the offence data in a cohesive level is the Quadric Kernel Density Estimation. This method is an interpolating and leveling method of continuous levels in which the number of crime spots are summed up within the area assigned for research and create an even and continuous level that present the size or density of crime distribution in the studied area. The method of estimating the kernel density instead of clustering some crimes and omitting the rest, takes the level of concentration in all levels of crimes (Eck et al., 2009, p. 26). It should be said that this study uses Office/Excel to form a database and it uses Arc View software for comparative and graphic analysis in GIS environment and Crime Analysis and Case software.

**Statistical Population**

The data of this study is extracted from the offences of street assaults against women in Zanjan based on the data included in the penal records of those who had committed the crime of street offence against women in the city of Zanjan from Mar. 20, 2004 to Mar. 20, 2005 in police stations. The analysis of the total crimes committed in Zanjan within this time limit reveals that the offence of street offences against women is 14.78% of the total crimes committed in Zanjan and it is the third frequent crime in this city. For spatial and geographic analysis of crimes committed in this city, first the crime site has been saved as individual spots in the spatial database and these crimes have been extracted for the city based on analytical (statistical and graphic) models. Accordingly, the formation of crime spots for the street offences against women has been assessed. As it was mentioned earlier, the spatial area of the research is the legal jurisdiction of Zanjan. Therefore, this study analyzes the crimes that have been committed in the legal jurisdiction of Zanjan. This study also considers all crimes committed in the city of Shiraz is investigated for one year.

**Introduction of Zanjan**

Zanjan is one of the middle-sized cities of Iran and the political and economic capital of Zanjan Province. With a civilization of more than 1400 years, Zanjan is one of the cities that has experienced several eras of prosperity and abyss of civilization. Today, it is regarded as one of the most important cities in the region. For its specific location in the region and the province, this city is has experienced an increasing growth, especially in physical and structural aspects in
the last few decades as a result of which the area of the city has grown several times (Abbasi, 2009).

The geographic status of the city is 48 degree and 29 minutes of the east longitude and 36 degree and 40 minutes of north latitude. It is located within a set of heights from northern, northeastern, southern and southwestern directions. Zanjan is located on a development corridor in Iran, i.e. the international corridor of Tehran-Tabriz-Bazargan border and it is used as a station for the merchandise and the travelers in this part of the country. The proximity of this city to the capital and other metropolises of Qazvin, Karaj, Tabriz and Hamedan have provided an appropriate situation for the attraction of the population, activity and capital overflow in this city.

The structure and features of this city during the period of its growth and development have been influenced by topographic features, especially the northern heights, as well as the location of this city at the bank of Zanjanrood River (Armanshahr Consulting Engineers, 2004, p. 29-48). The existence of heights and mountains at the northern and northeastern side of the city as well as drastic decline of the steepness at the vicinity of river bed, the establishment of railway, and lack of sufficient land for the development of urban spaces, and finally the specific topographic features of the southern area which ends to the river immediately after a steep slope intense height difference, are among the most significant factors for the lack of physical development and extension of the city on the southern direction, so that the city has mostly been extended northward.

Based on the documented statistics of 1859, the population of Zanjan had been 20000 people. The population of this city has reached 39450 in 1941. According to first official census in 1956, the population of this city was 47159 in this year. Then the population growth rate for this city has been 1.2% from 1941 to 1956, i.e. in a period of 15 years. The population of this city was 58714 people in 1966, then the population growth rate had been 2.21% from 1956 to 1966; that is to say this rate has increased 1.01% as compared with the previous period.

The population of Zanjan grew considerably in 1976, so that it increased from 58714 in 1966 to 100351 in 1976. The population of this city experienced a growth rate of 5.5% within this period of ten years. So, the population of this city increased three times within 35 years. The population of this city reached 215261 in the census of 1986, experiencing a 7.94% growth rate that had increased 2.44% compared with the previous period. The population of the city reached 286295 in 1996; the population growth rate of the city has been 2.89% from 1986 to 1996 which shows a 5.05% decrease. The last public census in 2006 showed that the population of Zanjan was 349713 with a 2.02% increase.

As it can be inferred from table 1 the lowest population growth for Zanjan has occurred between the years 1996 to 2006, i.e. 2.02%, and the highest growth belonged to time span 1976-86, i.e. 7.94%. The improvement of development indices such as total literacy, female literacy, health level, treatment and nutrition, improvement of infrastructural facilities and facilities for families, especially deprived families has played a significant role in this regard.
The ratio of the population of Zanjan to the whole province has always been increasing. This ratio for the time span of 1956 to 2006 has been 12.21, 12.56, 17.16, 27.36, 31.75 and 36.3 respectively. The population growth of Zanjan has been influenced by factors such as fertility, decrease of mortality rate, especially child mortality, as a result of health promotion, and immigration in the city of Zanjan. The studies reveal that the ratio of the urban population of Zanjan to the total urban population of the province has experienced a descending process, so that the ratio of the population of the city of Zanjan has been 69.39%, 67.88% and 66.73 in 1976, 1986 and 1996, respectively. According to the last census, this descent has been experienced up to 2006. 62.52% of the urban population of the province resided in Zanjan in 2006.

Table.1. The population of the city of Zanjan and the urban population of Zanjan from 1966 to 2008

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<tbody>
<tr>
<td>The city of Zanjan</td>
<td>58714</td>
<td>100351</td>
<td>215261</td>
<td>286295</td>
<td>349713</td>
</tr>
<tr>
<td>Urban Population of the Province</td>
<td>82596</td>
<td>146612</td>
<td>317113</td>
<td>429013</td>
<td>559340</td>
</tr>
<tr>
<td>Population Ratio of Zanjan to Total Urban Population of the Province</td>
<td>71.09</td>
<td>66.73</td>
<td>67.88</td>
<td>69.39</td>
<td>62.52</td>
</tr>
</tbody>
</table>

Source: Iranian Statistical Center.

Table.2. Population Growth of the city of Zanjan and the urban population growth of the province from 1966 to 2006

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<tbody>
<tr>
<td>The City of Zanjan</td>
<td>5.5</td>
<td>7.94</td>
<td>2.89</td>
<td>2.02</td>
</tr>
<tr>
<td>Provincial Urban Population</td>
<td>5.76</td>
<td>0.17</td>
<td>3.07</td>
<td>2.69</td>
</tr>
</tbody>
</table>

Source: Iranian Statistical Center.

Zanjan is among those cities of Iran that have experienced significant problems in the process of urbanization, as well as considerable population and structural growth during the last two decades. This growth has most greatly resulted from immigration from different areas of the province to Zanjan. This immigration that mostly consists of village-city immigrations has resulted in population growth, especially within the time span of 1986-1996 (Mokameli, 1994, p. 48). The occurrence of problems such as imbalance between the population and the facilities, high population density, lack of housing facilities, traffic problems, formation of
unofficial settlements, and most significantly, the social anomalies include the undesirable consequences of outnumbered immigration to this city.

**Figure 1.** Political Situation of Zanjan

![Political Situation of Zanjan](image)

Source: Authors

**Findings**

As it was mentioned in the Materials and Methods section, this study has utilized graphics-based statistical models including mean center, standard deviation ellipse, Kernel Density Estimation in order to identify and analyze the site patterns of street offence in Zanjan in a spatial term. The purpose of this study is to identify this crime based on the crime hot and critical regions of the city, i.e. crime spots. The results of the statistical and graphic analysis are listed below:

**Graphics-Based Statistical Analysis**

The first statistical method that was used in order to spatially analyze the intended crimes in Zanjan was a graphics-based statistics, by which the level of tendency to the center and the spatial distribution of the whole crimes were identified for the geographic area of this study. The mean center and standard deviation ellipse were used to assess the level of tendency toward the center, distribution and the distribution direction of the crimes committed in the city of Zanjan. According to the maps produced by the above-mentioned statistical methods, the spatial patterns of street offences against women have largely been focused at the geographic center of the city and the central district of Zanjan. Standard deviation ellipse of street offence has been extended in a northeastern-southwestern direction. This ellipse is less
extended. This means that the location of this offence have been close to each other. The standard deviation ellipse is also contracted; this means that the total crimes committed in this region have occurred in limited areas with a limited range, and most crimes have been committed in the geographic center of Zanjan. It seems that the high weight of street offence in the central district of Zanjan, especially Enghelab Intersection, Sadi Jonoubi, Zeinabiyeh St., Haft-e-Tir Terminal, Taleghani St., Arg Sq. has influenced the shape and direction of standard deviation ellipse and the location of mean center of street offence spots in the city of Zanjan.

**Figure 2.** Mean Center and Standard Deviation Ellipse of Street Offence in the city of Zanjan

Source: Authors

**Clustering Test**

There are several methods for the test of clustering the offence distribution among which the Nearest Neighbor Index is the most useful one. The Nearest Neighbor Index is a simple and method for the test of offence accumulation concentration in a geographic area. The results of this easily can easily reveal whether the crime data enjoy a clustering concentration or not. If the result of the crime data test does not reveal a clustering shape, then there is no crime spot, and the researcher does not need to spend time on specifying the crime spot.

The Nearest Neighbor Index in the distribution of street offence sites is 0.39. Then, the distribution of the location of this crime is clustering in statistical terms. As the Nearest Neighbor Index that is less than one is the indicator of clustered crime data. It should be added that considering the amount of Z for these crimes, i.e. -27.47, and as it is used to check the accuracy of the Nearest Neighbor test, these crimes have a totally clustered distribution in Zanjan. Therefore, the distribution of street offence follows a clustering pattern in Zanjan. It indicates that the offence is concentrated in certain areas of Zanjan and it follows a centralized pattern. On the other hand, many areas are considered as cool spots, regarding this offence.
Kernel Density Estimation Test

The analysis of the spatial pattern of street offence against women in the city of Zanjan based on Kernel Density estimation method verifies the results of the previous test, and it shows that the crimes under study follow a clustered distribution in the city. In other words, some districts of Zanjan experience a high level of offence and other districts experience a low or zero level of offence. Figure 3 illustrates the offence spots for street offences against women in the city of Zanjan, based on Kernel Density estimation.

The analysis of crime sites distribution in the city of Zanjan reveals that the main spot for street offence against women is formed in the central district of Zanjan, i.e. Enghelab Intersection, Sadi Intersection, Zeynabiyeh St., Taleghani St., Arg Sq., Haft-e-Tir Terminal. It seems that the being crowded with young population, lack of recreational centers, proper sport stadiums, library and parks and many other facilities for the young to send their spare time include the factors that cause many abnormal behaviors in the youth and teenagers of the central districts of the city of Zanjan. That’s why we witness that the young are wasting their time in groups in non-recreational places such as streets, shops, and malls with no certain plan or purpose. Obviously, we should expect abnormal behaviors such as street offences. Another cause of committing such a crime in the central parts of Zanjan is the lack of presence of social supervision and powerful involvement of police forces. Other than the afore-mentioned main crime spots, there are also two minor spots in Panzdah Khordad Sq., the educational complex between Bisim and Kachmashki neighborhoods.

Figure 3. Identification of offence concentration spots for street offence in the city of Zanjan, based on Kernel Density Estimation method
Conclusion

In geographic analysis of urban crimes, the relation between the urban space and environment and social behaviors (undesirable and abnormal ones) is of utmost significance. In fact, such a relation that has been introduced into urban geographic studies during the last few decades provides a practical framework for spatial and environmental analysis of crime and the study of the relation between anomies and time and place in the urban areas. Generally, this study analyzes the occurrence, quality and the distribution of crimes in the geographic area of Zanjan. Benefitting from spatial representation of crimes and integration of these data and the spatial data of the crime spots, as well as socioeconomic indices and place of residence, the grounds have been provided for identification of crime spots, and prediction of potential spots for the occurrence of anomies in the city. Finally, such data can effectively help decreasing the level of crimes in the city. Identification and analysis of urban crime spots provides the opportunity for the police to react faster and more effectively and to try to detect the crime and prosecute and arrest the suspects, or to try to identify the suspects and criminals with previous penal records as well as their place of residence or activity. The utilization of the results of these analyses will help the police to increase the level of its monitoring and care in these areas and to decrease the level of the offences committed in these areas, through allocation of more resources such as facilities and equipments. On the other hand, this method helps us to understand the series of factors and time, place and community conditions the result in the formation of such areas. The application of the results of this study can also help us prevent the formation of such spots in the future or to identify and control the spots that are highly potential to be corrupted. As the spatial patterns of offence distribution is influenced by the type of land occupancies and structural and population features, which help the formation of crime spots, then the spatial analysis of offences can help us change and modify the situation and to revive and redesign the spaces. On the other hand, some barriers and preventive conditions can be provided for committing offences. In this way, social security can be enhanced and waste of resources and facilities can be avoided and the community will also tread on the safety and security path more easily.

Zanjan is one of the middle-sized cities of Iran and it is one of the cities that have experienced a rapid growth concerning its population, area, structure and economic, social, cultural and political functions. In line with these changes and adopting new roles, this city is facing several problems and issues. The increase in structural anomies together with social anomies includes the problems of this city at present. Among the crimes committed in this city, street offences against women have inconsiderably increased. Based on former studies, this offence includes more that 14.8% of total crimes in this city during one year. Graphics-based statistical models were used in order to analyze this offence with regard to the spots it happens and the places it is concentrated in. First, mean center index was used to identify the center gravity of this offence for the occurrence of all crimes in the city. The result of this test revealed that the center gravity of this offence is greatly conforming to the geographic center of the city and the central district. This reveals that the high rate of offence should also be added to the present
problems of the central district. Although the standard deviation ellipse for street offences has a northeast-southwest direction, the total surface of the ellipse is located in the central district. The contraction of the ellipse is also illustrating the geographic vicinity of the offence spots and where the offenders have been arrested. It shows that the streets located in the central district of the city, such as Amirkabir St., Enghelab St., Sadi Vasat St., Ferdowsi St. and the alleys that lead to these streets include the main spots for the offence.

To identify the accidental and clustering distribution of the crimes studied in this article, the Nearest Neighbor Index was used. The result of this test revealed that the index equals 0.39 which means the geographic distribution of crimes has been clustered and focal. That is to say the offences are concentrated in specific area of Zanjan and they follow a central pattern. On the other hand, many parts of the city are considered as cool spots, concerning these crimes. This is a significant issue in making decisions on increasing security and safety of the passages and planning for regular and irregular patrols in the critical areas.

To identify and analyze the features of crime spots in Zanjan, Kernel density Estimation method was used as one of the most useful methods in illustrating offence data in a cohesive manner. Based on this method, it was identified that major crime spots for street offences is concentrated in the geographic center of Zanjan, i.e. Enghelab Intersection, Sadi Intersection, Zeynabiye St., Taleghani St., Arg Sq., Haft-e-Tir Terminal. Two less important crime spots for this offence is Panzdah Khordad Sq. and the educational complex between Bisim and Kachmashki neighborhoods. The crowdedness of these areas at day time as well as early hours in the evening, the lack of spaces, appropriate occupancies of spending leisure time, specially parks and green spaces and lack of recreational facilities on the one hand, and the young population and considering the fact that the main way of spending spare times for the youth is to walk the streets, and to visit trade centers, all have caused the main streets of the central area that encompass most commercial centers to be crowded by the youth. Some self-seekers have turned this area to places for street offences. This shows that the existence of anomies in this area of this city, lack of security for citizens, especially the female in certain hours of the day results from self-seekers. This needs to be taken into consideration by the authorities. Then, the following strategies seem to be effective in controlling offences and increasing security in the central district of Zanjan:

- Encouraging the community involvement for the people to participate in the preventive measures and ensuring social security;
- Prioritizing police activities based on application of modern technologies of Geographic Information System (GIS), so that the crime analysis based on crime spots, that is a fundamental research on crime and place, and preparation of a comprehensive offence map that helps the authorities to be aware of and responsive to the crime growth;
- This system has high potentials for preparing database, offence maps and analysis of crime patterns, identifying the crime spots in the future or allocation of residential places to offenders;
• Changing the design of spaces that cannot be easily seen. Such places provide an appropriate space for committing these offences, because of the structural causes, lack of light, and invisibility of the crime due to darkness;

• The increase of police stations in the crime spots of the central district so that a more appropriate police control may be possible in this area, and as a result, the opportunities for the offenders to commit an offence would be diminished. Therefore, police stations, even as small units, are needed to be located and established in such places, especially in commercial areas;

• The formation of a cohesive, efficient, participatory and responsive management that takes advantage of all facilities and initiatives to attract opportunities and to eliminate threats and to ensure security;

• Designing uniform structures in the neighborhoods, and omitting the spaces that lack an urban defense;

• Appropriate lighting of passages and streets, fencing the deserted and empty buildings, organizing and strengthening structural mechanisms and social development in the quarters of Zanjan;

• Providing appropriate recreational centers, sport stadiums, library, parks and many other recreational facilities for the youth to spend their leisure time. This will be highly effective in preventing crimes.

Then, considering what was mentioned above as well as several problems in the crime spots, including structural, social, economic and cultural features, and for the crimes to be diminished, appropriate strengthening and organizing policies seem to be needed to be included in the agenda of urban managers, and other authorities for the structural mechanism and social, economic and cultural development of the residents.

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