**Spatial analysis of COVID-19 Pandemic in Rural Area of Damavand**

**Abstract**

As information about disease and mortality grows, so do appropriate methods for analyzing this type of data that meet different needs. One of these methods is spatial analysis of the disease, which considers its geographical distribution along with other risk factors. The present study is an attempt to depict the spatial pattern of coronary heart disease distribution in rural settlements of Damavand and to explain the factors affecting the spatial distribution of this disease in the study area. Spatial analysis of corona prevalence using spatial statistics analysis methods can extract and analyze the spatial patterns governing the geographical distribution of this disease. For this purpose, the present study seeks to answer the following questions:

1. What pattern does the spatial distribution of coronary heart disease in the rural area of Damavand city follow?
2. What factors have influenced this spatial distribution pattern?

Due to the nature of the subject, the present study is of the combined type and in terms of applied results. The method of data collection is based on documentary-library and survey-field data. Initially, the statistics of the number of patients with coronary artery from the beginning of April 2020 to the end of July 2020 were collected by referring to Damavand health center. Then spatial analysis is applied to them. In order to study the spatial pattern of corona disease distribution and to recognize its non-random structure from various statistical indicators such as mean, percentage, hot spot analysis and also to properly understand the pattern of hot spot clusters by measuring directional geographical distribution (standard ellipse) in GIS software environment. Used. After describing the structure and pattern of dispersions, one should look for the cause and reasons of dispersions. Thus, in field surveys, after determining the number of patients with coronary artery disease, snowball interviews were conducted with 23 residents of Damavand city in order to identify and analyze the factors affecting the spatial distribution pattern of coronary heart disease in this city. After conducting the interviews and collecting the data, in order to analyze them, the underlying theory in the Maxiquida software environment was used. Pearson correlation coefficient was used to determine the relationship between the factors affecting the prevalence of the disease in the study area as independent variables with coronary heart disease as a dependent variable in SPSS environment. Then, Moran's spatial autocorrelation analysis model was used to know the type of distribution pattern of the identified factors.

This part of the findings is divided into two parts according to the questions raised in the research: ***Spatial distribution pattern of coronary heart disease in rural areas of Damavand city***

Out of a total of 67 villages, 21 rural points (31.34%) and 1 rural point (1.49%), respectively, have the lowest and highest number of patients with coronary heart disease. Based on the analysis of clusters of hot spots and elliptical curve of geographical distribution, most hot spots are located in the west and northwest of the city and the villages located in these spots with low health centers have almost high population density that are adjacent to each other and They are close to the cities and on the main road. Most of the cold spots are located in the east and southeast of the region.

***Factors affecting the distribution pattern of coronary heart disease in rural areas of Damavand city***

After determining the spatial pattern of corona disease distribution in the rural area of ​​Damavand city, the effective factors in the spatial distribution pattern of this disease should be identified and analyzed. These factors include: Weak official information on coronary heart disease; Weak local community attention to the principles of health exposure to corona risk; Simplifying the risk of coronary heart disease; Short geographical distance between settlements; High level of inter-residential interactions; Weakness in providing health services. Pearson correlation coefficient was used to determine the relationship between the factors affecting the prevalence of the disease in the study area as independent variables with coronary heart disease as a dependent variable in SPSS environment. The results of Pearson correlation test indicate that among the six factors affecting the prevalence of corona, which include weakness in health care delivery (0.23), high level of inter-residential interactions (0.21), short geographical distance between settlements (20.0), simplification of corona risk (0.19), lack of local community attention to the principles of health exposure to corona risk (0.17) and weakness in official information on corona risk (0.16). According to the results and interpretation, coronary heart disease and its prevalence (in the framework of spatial analysis) in rural areas has a pattern of cluster spatial distribution. Spatial objectification of this model, although influenced by various factors (weakness in health care delivery, high level of interaction between settlements, short geographical distance between settlements, simplification of corona risk, weak local community attention to the principles of health exposure to Corona and weakness in official information from Corona in the prevalence of the disease), but in the meantime, the role of weakness in the provision of health care and high level of interaction between settlements is more effective than other factors. Accordingly, conceptually (theoretically) can be claimed in the spatial analysis of diseases (including corona) the formation of spatial distribution patterns affected by access to health services, the level of interaction between settlements, geographical distance between settlements, the risk of disease, The attitude of the local community to the principles of health exposure to the disease and how to inform officially about the spread of the disease. Given the importance of these factors, paying attention to them can play an important role in management and planning to deal with the disease. Therefore, conducting similar research is important to increase the validity of these factors.

**Keywords:** Spatial distribution, Corona disease, rural settlements, Damavand city.