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The Association between Depression and Climatic Conditions in the Iran Way to Preventive of Depression

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Date of Submission: Mar 16, 2014

Date of Acceptance: Apr 14, 2014

How to cite this article: Mirzakhani L, Poursafa P. The Association between Depression and Climatic Conditions in the Iran Way to Preventive of Depression. Int J Prev Med 2014;5:947-51.

ABSTRACT

Background: Neurotransmitters, such as dopamine and serotonin, play an undeniable role in the incidence of mental illnesses. Almost all humans will experience depression. Furthermore, most humans lack the ability to control and reduce depression, the disorder can lead to physical damage. The main goal of this study was to determine the association between distribution of depression and the climatic conditions in the Iran country.

Methods: Spatial distribution maps of depression were plotted by using data recorded during 2010 year in the Iran health center registry. The geographical mapping of depression and climatic conditions were then incorporated into a geographic information system to create a spatial distribution model and in this study we used neural network to model the trend of depression and climatic conditions.

Results: The spatial distributions of depression diseases in the country, followed by were scattered based on climatic conditions. In fact, common depression was more prevalent in the parts of the country where cold and rainy weather was more abundant.

Conclusions: The findings of this study can be useful for psychologists and controlling of this disease, because lack the ability to control and reduce depression, the disorder can lead to physical damage. Data are also important to establish further effects modeling for depression. Moreover, psychologists and health professionals should consider the impact of environmental factors on their patients' health.

Keywords: Climatic conditions, depression, Iran, spatial distribution

Original Article

INTRODUCTION

According to the World Health Organization, every year about 120 million people throughout the world suffer from depression.[1] When you have depression, it's more than feeling sad. Intense feelings of sadness and other symptoms, like losing interest in things you enjoy, may last for a while.[2] And it's treatable. When you have depression, it's more than feeling sad.[3] Depression is

a medical illness, not a sign of weakness. Some people still think that depression is trivial and not a genuine health condition.[4] They're wrong. Depression is a real illness with real symptoms, and it's not a sign of weakness or something you can "snap out of" by "pulling yourself together.[5]" The good news is that with the right support, most people can make a full recovery.[6] Depression may be caused by one factor alone or a combination of factors including biological, psychological, and environmental.[7] Depressions are considered primarily as environmental diseases with 40-55% of cases attributed to environmental factors and 20-25% genetics, 10-15% Illness, and 5% to other factors.[8,9] Iran, a country with an area of about 1,873,959 km^2, is located between 25° 40 min and 44° 64 min. In this country, there are different climates and this geographical diversity has many effects on human health, weather often affects people's moods.[10] Sunlight breaking through clouds can lift our spirits, while a dull, rainy day may make us feel a little gloomy.[11] While noticeable, these shifts in mood generally do not affect our ability to cope with daily life.[12] The main goal of this study was to determine the association between distribution of depression and the climatic conditions in the Iran country.

METHODS

The depression in Iran was determined by using data recorded in 2010 years by the Iran registry program of the Iran health center. The geographic mapping of depression and climatic conditions was then incorporated using geographic information system (GIS). After producing the spatial distribution model, the spatial distribution maps of depression diseases were plotted and compared and then we used neural network (NN) to model the trend of depression and climatic conditions. Using GIS software, created, and analyzed maps that showed where depression had occurred, the frequency of depression in different areas of country. GIS is a method of digital (i.e. computerized) mapping that can show you where particular people, events, things, or conditions are, and give you other information about them as well. It links data to its geographic location. A GIS integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts. A GIS helps you answer questions and solve problems by looking at your data in a way that is quickly understood and easily shared. GIS technology can be integrated into any enterprise information system framework.

RESULTS

Depression

Depression is the most prevalent mental health disorder. The lifetime risk for depression is 6-25%. According to the National Institute of Mental Health, 9.5% or 20.9 million American adults suffer from a depressive illness in any given year. Common symptoms of depression, reoccurring almost every day:

- Depressed mood (e.g. feeling sad or empty)
- Lack of interest in previously enjoyable activities
- Significant weight loss or gain, or decrease or increase in appetite
- Insomnia or hypersomnia
- Agitation, restlessness, and irritability
- Fatigue or loss of energy
- Feelings of worthlessness, hopelessness, and guilt
- Inability to think or concentrate, or indecisiveness
- Recurrent thoughts of death, recurrent suicidal ideation, suicide attempt, or plan for
- Completing suicide.[13]

Seasonal affective disorder

Weather often affects people's moods. Sunlight breaking through clouds can lift our spirits, while a dull; rainy day may make us feel a little gloomy. While noticeable, these shifts in mood generally do not affect our ability to cope with daily life. Some people, however, are vulnerable to a type of depression that follows a seasonal pattern. For them, the shortening days of late autumn are the beginning of a type of clinical depression that can last until spring. This condition is called SAD.[14] SAD is a pattern of major depressive episodes that occur and remit with changes in seasons. It may be seen in major

depressive or bipolar disorders, as described in the Diagnostic and Statistical Manual of Mental Disorders-IV. The most recognized form of SAD, "winter depression," is characterized by recurrent episodes of depression, hypersomnia, augmented appetite with carbohydrate craving, and weight gain that begin in the autumn and continue through the winter months. Physicians have many options for treating SAD. While questions regarding the validity of SAD as a syndrome and the mechanism of action of light therapy continue to be investigated, the established effectiveness of light therapy in patients with winter depression supports the usefulness of assessment for this seasonal pattern and consideration of light therapy as an option in addition to existing treatment choices. Although our research is classed as weather conditions, but the idea is near to this researches.[12]

However, overall 9,873,200 medical records of patients with documented pathology report of depression in 2010 were recruited from the depression registry data.[15] The prevalent depressions are presented in Figure 2 in years 2010. It shows that depression was more abundant in north and northwest, of the country. Mapping the climatic conditions is presented in Figure 2. Depression was more prevalent in provinces of Azarbayjan, Mazandaran, Gilan, Half of Golestan, Ardebil, and some the other province [Figure 1]. The rate of depression was correlated with climatic conditions in the province, that is, it was lower in areas Southern that was warmer than Northern areas.

Association between depression and climatic conditions with neural network

For modeling the possibility of the depression in the 2010 future years, the NN technique was used in this research, the feed forward network for depression in 2010 was used for network training data, the independent variables, such as the input age individuals gender, population density depressed segregated city, the weather city, as well as the depression was the dependent variable. Be noted that the NN analysis of multivariate regression analysis were extracted.

For training network was nine repeated for 3 times after the solution has converged weight coefficients and bias of each neuron was determined [Figure 3].

Training and testing data were divided into two groups: Depression and climatic conditions values for each group in figure can be observed [Figure 4].

Figure 5 shown was approximately 88% correlation between depression and climatic conditions.

DISCUSION

The paper by Rosen *et al*. (1990) is something of a classic, finding an increasing community prevalence of SAD across four locations, moving progressively north up the east coast of the USA from Florida to New Hampshire. More recently, Mersch *et al*. (1999) have reviewed the relationship between SAD and latitude of residence. Perhaps surprisingly, this relationship exists in North American studies.[16] Patients with climatic

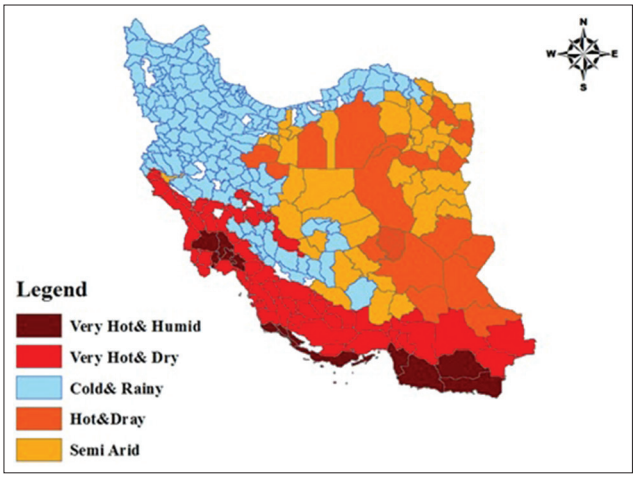

Figure 1: Climatic conditions in Iran

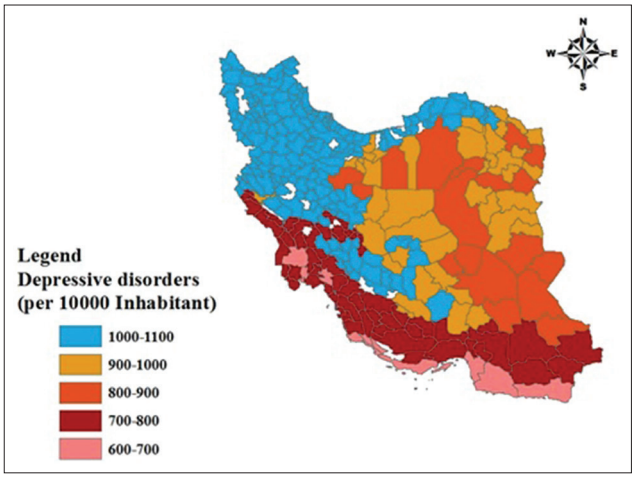

Figure 2: Spatial distribution of depression in Iran in 2010

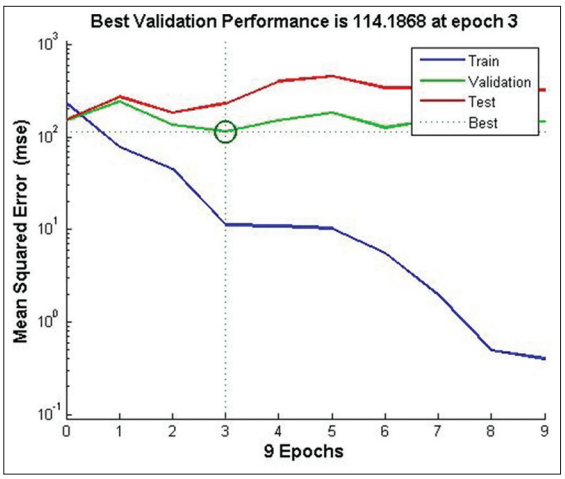

Figure 3: Training result fit for spatial distribution and climatic conditions in Iran

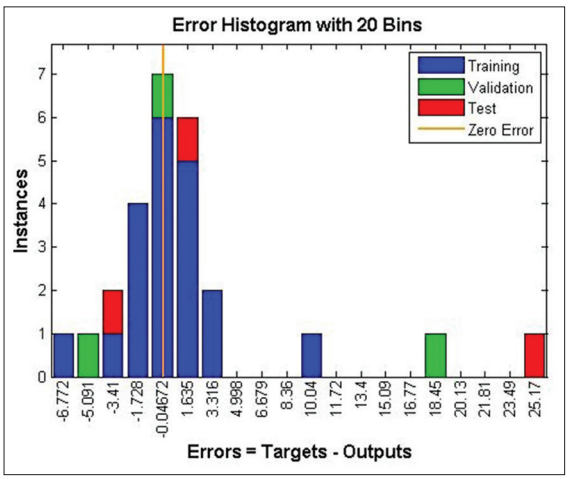

Figure 4: Training associated between depression and climatic conditions

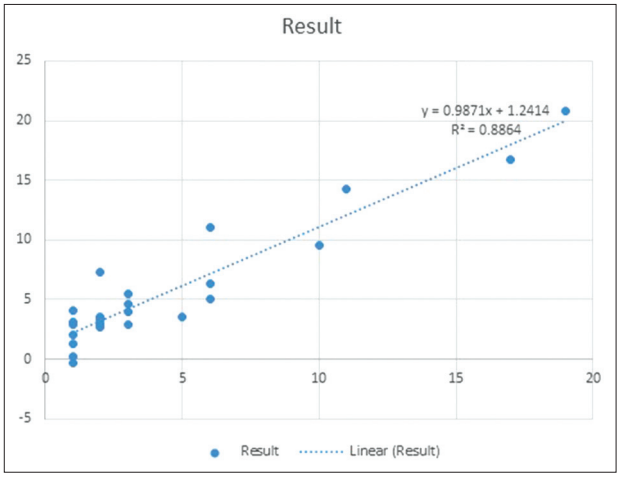

Figure 5: Associated between depression and climatic conditions

conditions affective disorder have episodes of major depression that tend to recur in cold weather. Although several screening instruments are available, such screening is unlikely to lead to improved outcomes without personalized and detailed attention to individual symptoms. Physicians should be aware of comorbid factors that could signal a need for further assessment. Cold climatic conditions affective disorder often can be treated with thermal therapy and light therapy, which appears to have a low risk of adverse effects. Light therapy and thermal therapy is more effective if administered in the morning. It remains unclear whether light and thermal are equivalent to drug therapy, whether drug therapy can augment the effects of light therapy, or whether cognitive behavior therapy is a better treatment choice. Plotting the spatial distribution of depression diseases and climatic conditions showed significant associations between mapping for depression and climatic conditions distribution in the provinces of Iran. This finding suggests that climatic conditions may contribute in the incidence of depression. We should acknowledge that in addition to the possible association of depression with climatic conditions showed significant associations between mappings for the higher prevalence of diagnosed depression might have been a result of better medical facilities and health centers in other countries of the world. However, our data comprised the records from the whole provinces including smaller cities for 1 year.

CONCLUSIONS

According to the results of this study, not all diseases are caused by inheritance or genetic factors. In fact, environmental factors could also be responsible for some diseases such as depression. The findings of this study underscore the importance of preventing effect of climatic conditions in human health's. Control climatic conditions effecting to improve work related human health and increasing the knowledge of health professionals and the general population in this regard are also of high importance. Programs aiming at lowering the depression risk will thus have to consider effective measures to reduce and exposures to effect of climatic conditions are currently.

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Source of Support: Nil, **Conflict of Interest:** None declared.

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