Prevalence of Neurotic, Somatoform and Stress Induced Disorders in Relation to the Seasons and Climatic Factors During the 2010/2011

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ORIGINAL PAPER

ABSTRACT

Introduction: Psychiatric disorders have been considered to have seasonal variation for a long time. **Goal:** the goal of this research is to study the admissions rate of neurotic and somatoform disorders, as well as stress induced disorder in relation to season and climatic factors during 2010/2011. **Material and method:** The research was conducted at the Psychiatric Clinic, Clinical Center of University in Sarajevo. Randomly selected subjects (aged 5-89 years, 1316 males and 1039 females) N=2355, were interviewed by the Structural Clinical Interview (SCID) which generated DSM-IV diagnoses. In this retrospective-prospective, clinical-epidemiological study subjects were divided into groups according to type of disorders. Correlation between the impact of seasons and the rate of admissions to a Psychiatric clinic was analyzed. Certain data were taken from Federal Hydrometeorological Institute in Sarajevo about the climatic situation for period of the study. **Results and conclusions:** From the total number of subjects who were admitted to the clinic in the period of 2010/2011 the most common diagnoses were F10-F19, F20-F29, F30-F39, F40-F48, and the suicide attempts as the separate entity. It was found the correlation between certain seasons and the effects of the certain weather parameters at an increased admission rate of subjects with the neurotic, somatoform and stress induced disorders.
Key words: climate, stress related disorders, meteropathy.

1. INTRODUCTION

It has for long been noticed that the incidence of psychiatric disorder varies in relation to the seasons, and climatic factors.

In ancient times, before any clinical studies, it was believed that most suicides occur in the fall and winter, when there are less light, which in humans leads to mood swings (1, 2). The human body is very sensitive to changes in temperature, humidity, wind, air pressure, insolation, precipitation, positive or negative ionization of air, particularly when these factors increase or decrease (3). With the increasing number of publications and increasingly rigorous studies, it became clear that the period of spring and early summer is the period with most frequent occurrence of suicides (4, 5). The prevalence of neurotic disorders is closely related to the seasons (6). Statistically significant variation with neurotic disorders and stress disorders is most prominent in the spring (7). The cooperation between meteorologists and doctors initiated a specific subset of weather prognosis – the bio prognosis. The term meteropathy in recent times is increasingly used.

Meteropathy term comes from the Greek word Meteoron (celestial phenomenon) and pathos (disease) (3). Meteoropaths are the persons which emergence of health problems or a deterioration of basic disease are regularly associated with poor weather conditions (5, 6).

It is widely believed that weather conditions affect human mood and many people believe that they are happier when the days are longer with sunny intervals, rather when the days are shorter, darker and rainy. Season of certain psychological disorders is a theory that has for long been „pushed" forward and has been particularly linked with affective disorders and tragic consequences of them - suicides (5, 6). The fact that certain physiological and psychopathological

processes are significantly altered during certain times of year or season, suggesting a direct exposure to climatic variables. However, it can also be an expression of autonomous biorhythm and the question of whether climatic conditions and climatic variables have an impact on the mental state of humans remains (6).

Contemporary definitions define climate as a dynamic system in which both participate and influence each other the atmosphere, oceans, lithosphere, ice and snow cover and biosphere including human impact (7, 8).

Some weather parameters in a certain way alter the functions of the human organism and are considered „stressful weather" (9).

2. GOALS

Determine the number of patients with stress-induced disorders as compared to subjects with other psychiatric disorders admitted to the Clinic at certain seasons during the 2010 and 2011.

Determine whether the seasons and the weather factors influence the increase in admission rates of subjects with neurotic and somatoform disorders and disorders caused by stress during the 2010 and 2011.

Determine whether a specific weather parameters affect the increased incidence of stress disorders (correlation).

3. MATERIAL AND METHODS

This study was conducted in the period from January 1st 2010 to December 31st 2011 at the Psychiatric Clinic, Clinical Center of Sarajevo University and includes respondents selected randomly. Forming a total sample of 2355 respondents, aged 5 to 89 years, 1316 males and 1039 females. During the 2010 there was 669 (58%) male respondents and in 2011 647 or 54%. Female respondents in 2010 was 486 (42%) and in 2011–553 (46%).

Within total number of respondents in the study period (N-2355), the most frequent age was 51-60 years (35%), followed by age group 41-51 years (29%). Respondents aged 31-40 years makes 14%, and 19-30 years 8%. Over 60 years of age there is 7% of respondents, while 4% are children under 14 years. The least represented age group was from 15 to 18 years with 2%. Of the total respondents 38% were unemployed, 36% were employed, 18% are retired and the smallest group was students with 7%.

As the survey instrument was used Structured psychiatric interview and the diagnosis was made according to ICD-10 classification system. Conducted study is clinical, retrospective-prospective, based on observation and analysis of the variables present, the processing of diagnostic entities, and their grouping.

Made is the comparison of the incidence of neurotic and somatoform disorders and stress caused disorders by the admission rates in regard to specific seasons and weather factors, with the aim of finding a possible correlation between the occurrence of certain disorders and the seasons. Determined is a correlation between certain weather parameters (temperature, humidity, barometric pressure, and precipitation) and increased admission rates to psychiatric clinic patients with these disorders.

Also are collected data from the Federal Hydrometeo-

rological Institute in Sarajevo on the values of climatic parameters for 2010 and 2011 year that were relevant to the research (air temperature, atmospheric pressure, humidity and precipitation) and the total climatological analysis for that period. Also were collected data from the same Institute about the climatological analysis of the situation in that year and listed observations.

4. RESULTS

The data after statistical analysis (software StigmaStat 3.5 and Microsoft Office Excel 2007) are shown in tables.

Statistical significance between the groups was tested by Chi-square test and Spearman rank correlation test.

2010	F10-F19		F20-F29		F30-F39		F40-F48		Suicide attempts	
	N	%	N	%	N	%	N	%	N	%
Spring	13	22	93	27	73	28	88	23	1	50
Summer	14	24	84	25	55	20	80	20	0	0
Autumn	25	42	85	25	67	25	107	28	0	0
Winter	7	12	76	23	71	27	110	29	1	50
Total	59	100	338	100	266	100	385	100	2	100
χ^2=79.648 p=0.0001										

Table 1. Presentation of the most common diagnosis of diseases by seasons during 2010

From Table 1 it is evident that with the diagnosis F40-F48 most respondents were admitted in the winter 29%, then fall with 28%, 23% in the spring and summer 20%. Chi-square test revealed statistically significant differences in the prevalence of certain diagnostic groups according to the seasons of 2010 at the confidence level of 99% or p<0.01.

2011	F10-F19		F20-F29		F30-F39		F40-F48		Suicide attempts	
	N	%	N	%	N	%	N	%	N	%
Spring	16	30	84	25	70	26	84	24	5	33
Summer	8	15	93	27	55	20	66	18	1	7
Autumn	14	26	80	24	69	26	92	26	3	20
Winter	15	29	81	24	74	28	111	32	6	40
Total	53	100	338	100	268	100	353	100	15	100
χ^2=31.648 p=0.0001										

Table 2. Presentation of the most common diagnosis by seasons during 2011

Table 2 shows that most patients with diagnoses with diagnosis F40-F48 most patients were admitted during the winter or 32%. Chi-square test revealed statistically significant differences in the prevalence of certain diagnostic groups according to the seasons of 2011 at the confidence level of 99% or p<0.01.

So, the most commonly diagnosed in the period of 2010 and also 2011 are diagnosis from group F40-F48 with 33% in 2010 and 29% in 2011. The second most common diagnoses were F20-F29 with 29% during the 2010 and 28% during the 2011. The third most common diagnoses were F30-F39 with 23% during the 2010 and 22% during the 2011 year. Diagnoses from the group F10-F19 are the fourth most com-

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total
2010	31	35	44	33	19	36	21	29	30	41	32	34	385
2011	45	25	41	33	28	23	19	25	22	33	35	24	353
Total	76	60	85	66	47	59	40	54	52	74	67	58	738

$\chi^2=11.929$, p=0.3693

Table 3. Number of patients per month admitted to the Clinic in 2010/2011 with diagnoses F40-F48

mon with 5% during the 2010 and 4% during the 2011 year. Analysis by chi-square test confirmed the above differences and indicates statistical significance at p<0.05.

The table 3 shows that the percentage of subjects with diagnoses F40-F48 in the month of January 2011 is 12% and for the same period 2010 is 8%. In the month of March there were 11% of patients in both years. In October 2010 there was 10% of patients and 9% in 2011. There were no statistically significant differences in the number of respondents who were admitted by months of 2010 and 2011 with the diagnosis from the group F40-F48 (p>0.05).

The weather parameters, whose influence has been studied in the course of the study with their values for all months of 2010, as well as an increase or decrease the number of patients during the month in which significant changes were observed. So it is established that for diagnosis F40-F48 increase in number of patients was in March and October and a decrease in May. For diagnoses F40-F48 increase was recorded in January and March, while a decrease in July.

In relation to weather parameters and seasons of the 2010 respondents with a diagnosis of F40-F48 was mostly seeking treatment during winter 29%, then fall 28%, spring 23% and summer 20%, while during 2011 most of the patients seeks treatment during the winter 32%.

	F40-F48	Suicide attempts
Month	r=0.625 p=0.001	r=0.025 p=0.852
Temp. (C)	r=0.128 p=0.627	r=0.052 p=0.726
Precipitations (l/m2)	r=0.147 p=0.529	r=0.124 p=0.534
Humidity (%)	r=0.246 p=0.429	r=0.063 p=0.625
Air pressure (mb)	r=0.056 p=0.952	r=0.152 p=0.506

Table 4. Correlation of climatic factors and admission rates

Statistical analysis by Spearman rank correlation coefficient shows that in the case of the diagnostic group F40-F48 was found a strong correlation with the months of the year which indicates a greater number of hospitalizations in the second half of the year (July-December).

5. DISCUSSION

By analyzing and processing the collected data showed that the frequency of admission at the Clinic during the two studied years are patients with diagnoses F40-F48, Neurotic and somatoform disorders and stress induced disorders.

The total number of patients with diagnoses F40-F48,

which were admitted during the 2010, was 385. During the 2011 353 respondents were admitted. Most of the respondents during the 2010 were admitted in March or 44. The temperature values were then lower than the average, precipitation was higher than the average, with normal humidity and the air pressure was slightly lower than normal values. In October was admitted 41 patients. The temperature then was higher than average as well as precipitation and humidity, while air pressure was normal. The least number of patients was admitted in May or 19. The temperature was increased, with precipitation, humidity and atmospheric pressure within normal values. During the 2011 the majority of patients were admitted in January or 45. The temperature was higher than average as well as precipitation and humidity, while atmospheric pressure was lower than average. In the month of March was admitted 41 patients. Air temperature was increased as well as the amount of precipitation, with normal air pressure and humidity. The smallest number of respondents was admitted in July or 19, when the air temperature was lower than average as well as precipitation with normal pressure and humidity. From the obtained data we can say that the information on certain weather parameters were the same for 2010 and 2011 when it comes to increase in the number of admission, but only for two months, for other months when there has been an increase in admission did not come to the same changes in weather parameters and it can be concluded that there is not a specific, constant form which could explain why patients with these diagnoses are seeking more treatment just in certain months or circumstances of some weather parameters.

Therefore, for the diagnostic group Neurotic and somatoform disorders and stress induced disorders, during the 2010 the majority of patients were admitted during the winter 29%, fall 28%, spring 23% and 20% during summer. During the 2011 the majority of patients were admitted during the winter 32%, 26% during fall, spring 24% and summer 18%. Data for both years coincide.

Conflicting results have proven other authors who have investigated the correlation of environmental and climatic factors in relation to the admission rates of patients with psychiatric disorders in a period of two years: most patients was with bipolar disorders, while neurotic disorders and stress induced disorders are with lowest incidence. However, our results are similar with respect to a larger number of patients with stress induced disorders in winter (10). A group of authors has found that the highest rate of admissions is in the spring and summer (11). Our results showed a similarity to results of group of authors who investigated the prevalence of PTSD and climatic factors and found that it is also the highest in the winter months, but in early spring (12).

The authors investigated whether the seasons are linked to suicide in patients with psychiatric disorders. The study included a period of five years in Sweden, so that is observed increased suicidality in certain seasons. Proven is

significantly increase of the suicide rate in patients with neurotic and stress related disorders, as well as somatoform disorders (F40-48) in spring and early summer. In male subjects (n=9902) was most prevalent depression and in female subjects (n=4128) had history of neurotic, somatoform and stress related disorders. The increase was also found in some other psychiatric disorders (13). Similar results were reported in Denmark where the authors found that the association of suicidality is in relation to the seasons in patients with stress induced disorders, but also in subjects without any psychiatric disorder (14).

Opposite results found the authors, who found no association with neurotic and stress-related disorders in relation to the seasons and climate factors (15).

Statistically significant variation in relation to seasons was found for neurotic disorders, as well as several other disorders with the highest frequency in the spring (16).

In second place were diagnoses F20-F29 (Schizophrenia, schizophrenia like disorders and mad states). In third place were diagnoses from group F30-F39-mood disorders, which include episodes of mania, bipolar disorders, depression, recurrent depressive disorder, persistent mood disorders and other mood disorders. These results are similar to our research (2).

6. CONCLUSIONS

Based on the data presented above can be drawn the following conclusions:

- Somatoform and stress related disorders are at the first place by the incidence both during the 2010 and 2011.
- Data analysis showed that there is an increased of admissions of patients with these disorders during the winter.
- Statistical analysis Spearman rank correlation coefficient indicates that the climate and climatic factors have a statistically significant effect on the admission rate of patients from diagnostic group of stress induced disorders.
- Due to the lack of research in this field so far the results of these studies and those in the scientific literature induce the need for such studies in future.

REFERENCES

1. Rapley C.:The health impacts of climate change. BMJ. 2012 Mar 19; 344: e1026. doi: 10.1136/bmj.e1026.
2. Denissen JA. et al. The effects of Weather on Daily Mood. A Multilevel Approach. Humboldt University Berlin, 2008: 662-667.
3. Kaiser M. Kako vrijeme utiče na zdravlje (Meteoropatija). USA, 2007: 19-50.
4. Rocchi MB, Sisti D, Cascia MT, Preti A. Seasonality and suicide in Italy: Amplitude is positively related to suicide rates. J Affective disorders. 2007: 36-129.
5. Marion SA, Agbayewa MO, Wiggins S. The effect of season and weather on Suicide rates in the elderly in British Columbia. Can.J Public Health. 1999: 22-418.
6. Kellner R. The seasonal prevalence of neurosis. Br J Psychiatry. 1966 Jan; 112(482): 69-70.
7. Eastwood MR, Stiasny S. Psychiatric disorder, hospital admission, and season. Arch Gen Psychiatry. 1978 Jun; 35(6): 769-771.
8. Shiloh R, Shapira A, Potchter O, Hermesh H, Popper M, Weizman A. Effects of climate on admission rates of schizophrenia patients to psychiatric hospitals. Eur Psychiatry. 2005 Jan; 20(1): 61-64.
9. Kerry Emanuel. Wether and Earth's Atmosphere. National Oceanic and Atmospheric Administrations Climate Prediction Center, Massachusetts, 2009.
10. Modai I, Kikinzon L, Valevski A. Modai I, Chronobiol Int. 1994 Jun; 11(3): 196-199.
11. Solt V, Chen CJ, Roy A. Seasonal pattern of posttraumatic stress disorder admissions. Compr Psychiatry. 1996 Jul-Aug; 37(4): 305.
12. Newman E, Kaloupek DG. Seasonal pattern of posttraumatic stress disorder admissions. Compr Psychiatry. 1996.
13. Reutfors J, Osby U, Ekbom A, Nordström P, Jokinen J, Papadopoulos FC. Seasonality of suicide in Sweden: relationship with psychiatric disorder. J Affect Disord. 2009 Dec; 119(1-3): 59-65.
14. Yip PS, Yang KC, Qin P.Seasonality of suicides with and without psychiatric illness in Denmark. J Affect Disord. 2006 Nov; 96(1-2): 117-121.
15. Gordon T, Keel J, Hardin TA, Rosenthal NE. Seasonal mood change and neuroticism: the same construct? Compr Psychiatry. 1999 Nov-Dec; 40(6): 415-417.
16. Eastwood MR, Stiasny S. Psychiatric disorder, hospital admission, and season. Arch Gen Psychiatry. 1978 Jun; 35(6): 769-771.