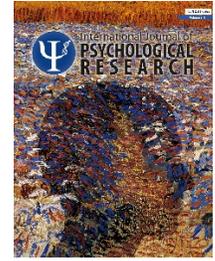




# Meteorological conditions and Psychiatric Emergency Visits in Messina, Italy

## Condiciones Meteorológicas y visitas a Emergencias Psiquiátricas en Messina Italia



Research

Salvatore Settineri <sup>a</sup>, Massimo Mucciardi <sup>b</sup>, Valentina Leonardi <sup>c</sup>, Stefan Schlesinger <sup>e</sup>, Mara Giofrè Florio <sup>e</sup>, Fausto Famà <sup>e</sup>, Maria R. Anna Muscatello <sup>a</sup>, Carmela Mento <sup>a</sup> \* ✉

<sup>a</sup> Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Italy

<sup>b</sup> Department of Economics, University of Messina, Italy.

<sup>c</sup> MD, Specialist in Psychiatry, University of Messina, Italy.

<sup>d</sup> Emergency Department, University Hospital of Messina, Messina, Italy

<sup>e</sup> Department of Human Pathology, University Hospital of Messina, Italy.

### ARTICLE INFO

#### ABSTRACT

**Objective:** The aim of this study is to examine the association between psychiatric disease, climatic and seasonal factors in patients recorded to the Emergency Unit, in Messina Hospital (Italy).

**Method:** A total of 6565 psychiatric patients were recorded to the Emergency Unit in Messina from January 2005 and December 2010. Each psychiatric visit in emergency, was categorized by date of appearance and admitting diagnosis according to diagnostic categories: Anxiety, Mood Disorders and Psychosis. Local weather data were obtained from the Meteorological Instituted "Aeronautica Militare" station in Messina, Sicily, In addition, to gathering data on the state of the sky, temperature, atmospheric pressure with the normalized value at sea level, relative humidity, rainfall, wind direction and speed, the station is connected to a buoy located on the eastern sector of Tyrrhenian Sea.

**Results:** In anxiety disorders we have found relevant results comparison between winter and spring ( $p=.007$ ) and spring and fall ( $p=.001$ ). In affective disorders the differences occur in relation to winter and fall ( $p=.002$ ), spring and fall ( $p=.001$ ), spring and summer ( $p=.002$ ). The psychotic disorder presents significant differences between summer and fall ( $p=.001$ ) and spring and fall ( $p=.002$ ).

**Conclusions:** We can observe a similarity of affective disorders, i.e. anxiety and mood disorders compared to psychosis, which have different influences and probably according to dissimilar etiopathogenetic ways. In our research, the distribution of anxiety disorders is higher than depressive disorders in terms of delivering emergency room visits. The major differences occur comparing spring and fall, the seasons when all pathological classes have significant differences. It follows that the most abrupt climate change, typical of these seasons, as a whole, cause psychopathological emergencies. The study is important for planning a more effective assistance for patients needing psychiatric support.

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\* **Corresponding author:** Carmela Mento, Dipartimento di Neuroscienze, Università degli Studi di Messina, Messina, Italia. Email address: [cmento@unime.it](mailto:cmento@unime.it).



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**RESUMEN**

**Objetivo:** El objetivo de este estudio fue examinar la asociación entre las enfermedades psiquiátricas y los factores climáticos y estacionales, en los pacientes registrados en la Unidad de Emergencia, en el Hospital de Messina (Italia).

**Método:** 6565 pacientes psiquiátricos se registraron a la Unidad de Emergencia en Messina entre enero de 2005 y diciembre de 2010. Cada visita psiquiátrica en urgencias fue clasificada por fecha de aparición y diagnóstico de admisión de acuerdo con las categorías diagnósticas: ansiedad, trastornos del humor y psicosis. Datos meteorológicos locales se obtuvieron de la Institución Meteorológica "Aeronautica Militare" estación en Messina, Sicilia. Además, para la recopilación de datos sobre el estado del cielo, temperatura, presión atmosférica con el valor normalizado a nivel del mar, la humedad relativa, la precipitación, la dirección del viento y la velocidad, la estación está conectada a una boya situada en el sector oriental del mar Tirreno.

**Resultados:** En los trastornos de ansiedad se encontraron resultados relevantes en comparación con el invierno y la primavera ( $p = 0,007$ ) y primavera y otoño ( $p = 0,001$ ). En los trastornos afectivos se produjeron diferencias en relación con el invierno y el otoño ( $p = 0,002$ ), primavera y otoño ( $p = 001$ ), primavera y verano ( $p = 002$ ). El trastorno psicótico presenta diferencias significativas entre verano y otoño ( $p = 0,001$ ) y en primavera y otoño ( $p = 0,002$ ).

**Conclusiones:** Podemos observar una similitud de los trastornos afectivos; es decir, los trastornos de ansiedad y del estado de ánimo en comparación con la psicosis, los cuales tienen diferentes influencias y probablemente formas etiopatogénicas diferentes. En nuestra investigación, la distribución de los trastornos de ansiedad fue más alta que los trastornos depresivos en términos de la entrada de visitas a la sala de emergencia. Las principales diferencias se produjeron comparando la primavera y el otoño, las estaciones del año cuando todas las clases patológicas tienen diferencias significativas. De ello se deduce que el cambio climático más abrupto, típico de estas estaciones, en su conjunto provoca situaciones de emergencia psicopatológicas. El estudio es importante para la planificación de una asistencia más eficaz para los pacientes que necesitan ayuda psiquiátrica.

**Palabras clave:** clima, psicopatología, visitas a emergencias psiquiátricas.

**1. INTRODUCTION**

Complex psychopathological phenomena are determined an interaction of individual and environmental factors (Mann et al, 1999). Seasonality seems to be associated with increased suicide counts and depressive symptoms, in the general population (Page et al, 2007; Preti 1997; Huibers et al, 2010). Among the latter, meteorological conditions, which have been shown to have an impact on the human beings (Sulman, 1984). The literature suggests a relationship between weather conditions and affective disorders, in example mood disorders (Molin et al, 1999; Lee et al, 2007), anxiety disorders (Bulbena et al, 2005), psychosis and impulsiveness (Volpe et al, 2008; Shory et al, 2003).

Seasonal and climate factors may represent the determinants of health care utilization and psychiatric hospitalization costs. In an attempt to elucidate the chronopsy and metetropism in

psychiatric psychopathology have examined the chronograms of, and the biometeorological relationships to bed occupancy of a psychiatric ward during three consecutive years (1987-1989) (Maes et al, 1993). The number of psychiatric beds occupied during the study period exhibited a significant seasonal variation suggesting that short-term fluctuations in atmospheric activity may dictate some of the periodicities in psychiatric psychopathology. A study showed a relationship between seasonal visits in the summer and fall and the number of of patients with mood disorders, neurotic stress-related and somatoform disorders recorded (Singh et al, 2007). A review about seasonal affective disorder (SAD), described, thoroughly by both retrospective and prospective studies, the actuality of seasonal variation in mood and that, in the general population, depressive symptoms peak in winter, and the most extreme form of this disposition, SAD, appears to be a relatively common disorder (Magnusson, 2000).

Meteorological factors such as temperature, sunshine and rainfall seem good candidates. In fact, it is a common and well-spread belief that people become “depressed” when the weather is bad, and feel happy when the sun is shining (Watson, 2000). Climatic variables have been found to modulate known biological correlates of affect such as plasma tryptophan and serotonin availability (Maes et al, 1995; Sarrias et al, 1989; Radua et al., 2010). Panic anxiety was found to be more frequent during days with the warm western-origin poniente wind and during fall, and less frequent during rainfall (Bulbena et al, 2007). Episodes of panic were more common with the ponente wind (hot wind) twice less often rainfall, and one and a half times more common in fall than in other seasons (Bulbena et al, 2005). Vulnerability to seasonal changes seems to be a separate dimension of bipolar disorder (Volpe et al, 2008; Volpe et al, 2010). Studies of psychiatric and community samples provide robust evidence that the occurrence of psychosis, aggression and suicide (Shiloh et al, 2005; Kaplan et al, 1996; Lee et al, 2006; Deisenhammer et al, 2003).

Recently, it was revealed that higher illuminance of daytime, greater fluctuation in sleep time, and lower central serotonergic function significantly and independently predicted hyperthymic tendency (Hoaki et al, 2011). Terao & Hoaki (2011) investigated the association between illuminance of daytime and Hamilton depression rating scale (HAM-D) scores and that between illuminance of daytime and Young mania rating scale (YMRS) scores. The findings revealed the significantly negative association between illuminance of daytime and HAM-D scores indicating that light can ameliorate low mood in healthy people. In fact, when handled properly, controlled light exposure can be used to treat some mood and sleep disorders and this is consistent with several researches that have shown a potential antidepressant effect of infrared irradiation (Dumont & Beaulieu 2007; Tsai et al, 2007). Sunshine exposure has been a central focus in mood disorders in response to seasonal changes, and is thought to possibly result in the alteration of monoamine neurotransmitter activity between seasons, both serotonin and dopamine levels observed in patients affected by SAD (Koskela et al, 2008; Hsiang –Yi et al, 2001). To this effect, data have shown consistently over the last 50 years that patients suffering from depression experience a wide range of circadian rhythm disturbances (Kennaway, 2010; Erren et al, 2011). Interestingly, there were numerous reports of decreased melatonin production in depression which may explain the use of melatonin, as well as synthetic melatonin agonist (MT1/MT2 receptor), to improve

sleep disturbances in the context of mood disorders (McIntyre et al, 1989; Nair et al, 1984, Gorwood, 2010). The literature suggests that there is a surprisingly direct relationship between weather conditions and a variety of disordered behaviors (Christensen et al, 2008; Yacherson et al, 2011; North et al, 1998). Moreover, meteorological conditions have been linked psychiatric admission rates (Briere & Downes, 1983; Daniels et al, 2000).

Although there are several researches on the relationship between climate and psychiatric disorders, few studies have focused on the relationship between climatic factors and emergency psychopathology, also in Sicily.

The aim of this study is to examine the association of psychiatric disorders with the weather in the emergency visits. Particularly, we propose to study the seasonal variations in the number of patients' visits with psychiatric diagnosis and to evaluate the factors contributing to increase of observation of psychiatric cases at Emergency, according climatic conditions (i.e. humidity, wind) of our area (Messina),

## 2. METHOD

A 6565 patients were recorded to the Emergency Unit of the Policlinic “G. Martino” in Messina (Italy), in the emergency access of psychiatric disease, during a period from January 2005 to December 2010, for a total 2.157 days. Each emergency visit, was categorized by date of appearance and admitting diagnosis according to DSM –IV TR into main diagnostic categories: Anxiety (including panic disorder, general anxiety, stress-related disorders), Mood Disorders (depressive and bipolar disorders, somatization and conversion disorders, drug/alcohol abuse) and Psychosis (Schizophrenia and other psychotic disorders, psychomotor agitation). Local weather data were obtained from the Meteorological Instituted “Aeronautica Militare” station in Messina, Sicily, at 51 meters at sea level and the geographical coordinates 38° 12’N 15° 33’E. In addition to gathering data on the state of the sky (cloudiness), temperature, atmospheric pressure with the normalized value at sea level, relative humidity, rainfall, wind direction and speed, the station is connected to a buoy located on the eastern sector of Tyrrhenian Sea, through which you can observe the state of the sea, the height of wave, the direction of the wave. In particular, meteorological data for each of the corresponding days consisted of maximum daily temperature (tmax I0), minimum daily temperature (tmin I0), maximum (rhmx I0) and minimum (rhmn I0) relative humidity, precipitation 00-12 hours (pr

1\_10) and precipitation 12-24 hours (pr 2\_10), wind speed (wind 10), direction of wind (dir 10) and sunshine (sun 10). Moreover for each weather variable delays have been considered up to a maximum of seven days (see the symbols 1\_2\_3\_4\_5\_6\_7 in the tables).

## 2.1 Statistics

We have adopted three approaches to measure the effects of weather variables on Psychiatric Emergency Visits (PEV) for each season. The Mann-Whitney U-test were used to test whether daily means for PEV classified for mental disease (Anxiety, Mood and Psychosis), differ across the seasons. The non-parametric Spearman's correlation coefficient was applied to identify possible correlations between PEV (classified for mental disease) and meteorological variables. Finally, in order to further examine this relationship, a multiple logistic regression were applied to model days with/without PEV for each class of mental disease controlling for season. The climate variables were selected using the stepwise forward conditional regression model with  $p = 0.05$  for inclusion and  $p = 0.10$  for exclusion.

The corresponding odds ratio (OR), with 95% confidence intervals (CI), were obtained for every selected variable. Significance is reached when the 95% confidence intervals do not include 1. All analyses were performed using SPSS (13.0) and Excel 2003.

## 3. RESULTS

In our study, between pathological disease and seasons different averages are observed (table 1 and 2). Table 1 summarizes the data on emergency department visits for the three pathological disease (anxiety disorders, mood disorders and psychosis) from 2005 to 2010 for a total of 2157 days. For anxiety disorders we have found relevant results in comparison between winter and spring ( $p = .007$ ) and between spring and fall ( $p = .001$ ). In affective disorders, the differences occur in the relationship between winter and fall ( $p = .002$ ), spring and fall ( $p = .001$ ) and between spring and summer ( $p = .002$ ). The psychotic disorder presents significant differences when comparing the summer and fall ( $p = .001$ ) and between spring and fall ( $p = .002$ ). In the fall, for Anxiety, has been observed a correlation between weather and the presentation to the emergency room, particularly the role of maximum and minimum temperature and wind. The minimum temperature has significant relationships both on the day of the visit ( $r = 0.1947$ , Sig. 0.001) than in the 3

days before to the visit ( $r = 0.1826$ , Sig.0, 001,  $r = 0.1769$ , Sig. 0.001;  $r = 0.1689$ , Sig. 0.001). A similar pattern occurs for the maximum temperature on the day of the visit ( $r = 0.1511$ , Sig. 0.001) and 3 earlier days ( $r = 0.1621$ , Sig. 0.001,  $r = 0.1611$ , Sig. 0.001; 0.1462, Sig. 0.001). Other significant correlations occur in the days prior to the visit, but less high. Wind direction plays a special role in the two days before the visit ( $r = 0.1150$ , Sig. 0.001,  $r = 0.1243$ , Sig. 0.001). The humidity has a reverse direction to anxiety. The maximum relative humidity decrease from 7th up to 5th day before the visit would increase the presence of the phenomenon of anxiety ( $r = -0.2179$ , Sig. 0.001,  $r = -0.1911$ , Sig. 0.001,  $r = -0.1118$ , Sig. 0.001). In spring there are no clear directions between climatic parameters and the phenomenon of anxiety. In summer a forward correlation between the maximum and minimum temperature as it has for the fall (Sig. 0.001). A similar phenomenon occurs for the minimum relative humidity in the opposite direction the second day before the visit to emergency room ( $r = -0.1170$  Sig.0, 001). Also the precipitation that correlates inversely with anxiety the fourth day before the visit ( $r = -0.1331$ , Sig.0, 001). In winter we observe all the phenomena occur in a reverse direction (Sig. 0.001) compared to the phenomenon of anxiety. In particular, the minimum temperature at the third and fourth days before the visit ( $r = -0.1180$  Sig. 0.001,  $r = -0.1590$  Sig. 0.001) and the maximum temperature the previous day ( $r = -0.1189$  Sig. 0.001) until the fourth day before the visit ( $r = -0.1122$ ,  $r = -0.1180$ ,  $r = -0.1608$ , Sig. 0.001). Even the maximum and minimum relative humidity have significant negative correlations with the winter.

In the fall affective disorders are related to the minimum and maximum and temperature on the same day of observation (respectively  $r = 0.1379$ , Sig. 0.001 and  $r = 0.1369$ , Sig. 0.001), and the minimum temperature during the five earlier days. As anxiety disorders, there is an inverse correlation with maximum relative humidity that's important the seventh day before the visit ( $r = -0.1166$  Sig. 0.006). In the spring we find no correlation.

In winter there is an inverse correlation between climatic parameters and affective disorder, with particular reference to relative humidity maximum, minimum and maximum temperature from the third to seventh day prior to observation in the emergency room.

In summer the maximum humidity has a significant correlation with regard to the same day and the day before the visit (respectively  $r = 0.1264$ , Sig. = 0.003 and  $r = 0.1620$ , Sig. 0.001).

**Table 1.** Daily mean for PEV (total) and PEV classified for mental disease (Anxiety, Mood and Psychosis) by season.

	Season	PEV (total)	PEV for Anxiety	PEV for Mood	PEV for Psychosis
Winter	Daily mean	2.97	2.00	.69	.28
	N	538	538	538	538
	Std. Deviation	2.184	1.670	.911	.533
Spring	Daily mean	3.39	2.25	.78	.36
	N	551	551	551	551
	Std. Deviation	2.107	1.678	.864	.601
Summer	Daily mean	3.12	2.11	.63	.38
	N	522	522	522	522
	Std. Deviation	2.140	1.652	.837	.646
Fall	Daily mean	2.69	1.89	.53	.26
	N	546	546	546	546
	Std. Deviation	2.133	1.699	.783	.552
Total	Daily mean	3.04	2.06	.66	.32
	N	2157	2157	2157	2157
	Std. Deviation	2.155	1.679	.854	.586

**Table 2.** Results for Mann–Whitney U-test

Seasonal difference	PEV		
	Anxiety	Mood	Psychosis
Winter vs Spring			
Mann-Whitney U	134563	136509	139727.5
Z	-2.683	-2.464	-2.113
Asymp. Sig. (2-tailed)	0.007	0.014	0.035
Winter vs Summer			
Mann-Whitney U	134998	137417	130770
Z	-1.11	-0.668	-2.486
Asymp. Sig. (2-tailed)	0.267	0.504	0.013
Winter vs Fall			
Mann-Whitney U	140306.5	132692.5	143106
Z	-1.3	-3.1	-1
Asymp. Sig. (2-tailed)	0.194	0.002	0.317
Spring vs Summer			
Mann-Whitney U	135984.5	129278	142154.5
Z	-1.573	-3.135	-0.407
Asymp. Sig. (2-tailed)	0.116	0.002	0.684
Spring vs Fall			
Mann-Whitney U	130360	124120	138163.5
Z	-3.894	-5.551	-3.072
Asymp. Sig. (2-tailed)	0.001	0.001	0.002
Summer vs Fall			
Mann-Whitney U	130562.5	131697	129283.5
Z	-2.416	-2.43	-3.431
Asymp. Sig. (2-tailed)	0.016	0.015	0.001

**Table 3** Multiple logistic regression results for Anxiety

Variables	B	S.E.	Wald	df	Sig.	OR	95% C.I.for OR	
							Lower	Upper
Season			22.583	3	.000			
Winter vs. Fall	.607	.163	13.916	1	.000	1.834	1.334	2.523
Spring vs. Fall	.713	.167	18.222	1	.000	2.041	1.471	2.831
Summer vs. Fall	.069	.193	.127	1	.721	1.071	.734	1.563
t_min_l7	-.038	.018	4.238	1	.040	.963	.929	.998
t_max_l0	.082	.015	30.984	1	.000	1.086	1.055	1.117
rhmn_l7	-.011	.004	9.070	1	.003	.989	.983	.996
wind_l3	.020	.007	7.656	1	.006	1.020	1.006	1.035

**Note:** Dependent variable: 1 = days with anxiety episodes 0 = days without anxiety episodes -2 Log likelihood = 2026.369 Hosmer-Lemeshow test : chi-square = 5.970; df = 8; p= 0.651 Model base = Fall

**Table 4.** Multiple logistic regression results for Mood

Variables	B	S.E.	Wald	df	Sig.	OR	95% C.I.for OR	
							Lower	Upper
Season			37.065	3	.000			
Winter vs. Fall	.373	.117	10.115	1	.001	1.453	1.154	1.829
Spring vs. Fall	.684	.113	36.653	1	.000	1.982	1.588	2.473
Summer vs. Fall	.262	.110	5.642	1	.018	1.299	1.047	1.612
pr2_l5	.022	.009	5.894	1	.015	1.023	1.004	1.041
rhmn_l6	-.008	.001	38.364	1	.000	.992	.989	.994

**Note:** Dependent variable: 1 = days with mood episodes 0 = days without mood episodes -2 Log likelihood = 2929.192 Hosmer-Lemeshow test : chi-square = 7.418; df = 8; p= 0.492 Model base = Fall

**Table 5.** Multiple logistic regression results for Psychosis

Variables	B	S.E.	Wald	df	Sig	OR	95% CI for OR	
							Lower	Upper
Season			29.501	3	.000			
Winter vs Fall	-.159	.142	1.260	1	.262	.853	.646	1.126
Spring vs Fall	.290	.139	4.327	1	.038	1.337	1.017	1.757
Summer vs Fall	.709	.158	20.201	1	.000	2.032	1.492	2.768
T min _17	-.046	.008	31.310	1	.000	.955	.940	.970
Wind _16	-.021	.006	11.752	1	.001	.979	.976	.991

**Note:** Dependent variable: 1 = days with psychosis episodes 0 = days without psychosis episodes -2 Log likelihood = 2426.325 Hosmer-Lemeshow test : chi-square = 14.319; df = 8; p= 0.074 Model base = Fall

In fall the Psychosis there are no significant correlation. Spring has just reverse correlations for the parameter of the wind on the sixth day before the presentation to the emergency room ( $r = -0.1495$ , Sig. 0.001). The summer has a direct relationship between the maximum relative humidity and psychotic episodes ( $r = 0.1243$ , Sig. 0.004) and inverse with the minimum temperature on the fourth and fifth day before the visit ( $r = -0.1490$ , Sig. 0.001 and  $r = -0.1163$ , Sig. 0.007). The winter correlates inversely with maximum relative humidity ( $r = -0.1343$ , Sig. 0.001). The logistic regression model (Table 3,4,5) for the three pathological classes (anxiety, mood and psychosis) takes the fall as a baseline and allows to highlight predictive aspects of emergency visits as a function of changes in weather and seasonal factors. With reference to anxiety, a higher incidence of emergency room visits is evident in the spring (OR=2.041) followed by winter (OR=1.834).

The maximum temperature and wind three days before play an important role. Conversely, the minimum relative humidity seven days before decreases the probability having anxiety symptoms. About the mood, spring (OR=1.982) is the most representative season followed by winter (OR=1.453) and summer (OR=1.299). The precipitation (12-24 hours) five days before increases (slightly) the

probability that mood disorders occur. In contrast, the minimum relative humidity decreases (fairly) the probability of occurrence of affective disorders in the next six days. For psychosis, in the summer there is more probability of occurrence of acute episodes (OR=2.032) and, only secondarily, in the spring (OR=1.337). The difference between the several conditions and seasons allows us to observe unique behavior in the comparison between winter and spring, not unique in the comparison between winter and summer and differences in individual diseases between winter and fall, spring and summer for the mood disorders, between summer and fall for psychosis, and between spring and fall for all psychopathological spectrum. So, the major differences occur comparing spring and fall, the seasons when all pathological classes have significant differences. It follows that the most abrupt climate change, typical of these seasons, as a whole, cause psychopathological emergencies.

In reference to the values weather we do not observe variables that increase the probability of so clear onset of the disease. Especially temperature on the seventh day before and wind on the sixth day before decreases the probability of having the presentation to the emergency room.

#### 4. DISCUSSIONS

In our research, clinical data are related to meteorological those in a population that comes from a urban district Messina. The distribution of anxiety disorders is higher than depressive disorders in terms of delivering emergency room visits. In relation to season, the spring is most representative in which there is the absolute increase of all admissions, either because of individual diseases. This one in agreement with most studies in the literature (De Graaf et al, 2005; Howart & Hoffman 1984; Bulbena et al, 2005).

According climatic factors, there are significant variables and less significant others. The maximum and minimum temperature influence the emergency department presentations on different days by the climatic variation leads us to presume that the influence of climate element can not be immediate but may have latency periods, as in the case of anxiety disorder . The episodes of anxiety present, therefore, a perceptual sensitivity to changes in weather. Since the individual climatic factors do not have a uniform pattern (eg, temperature and humidity), it is possible that the same factors act independently of one another. There are not many studies in the literature on the relationship between meteorological factors and anxiety, but the recent findings on the relationship between anxiety and mood could justify our reflections, rather well documented for affective disorders, eg. seasonal affective disorder (Oyane et al, 2008). More generally, the anxiety is associated with depression when the seasonality takes over.

In our study, many epidemiological studies confirm this result, but other ones have also highlighted generalized anxiety associated with markers of seasonal variation; also known as the season has an influence even in the autonomic nervous system, as demonstrated by recent studies on sleep, hypertension and metabolic syndrome (Ohtani et al, 2006; Magnusson, 1996; Oyane et al, 2010). Anxiety and depression are associated with a biological substrate in which represent different aspect of the same problem (Damasio, 1994). In general behavioural changes were noted in the personality and more specifically about the presence of syndromes associated with a spectrum of seasonality (Madden Pamela et al, 1996).

For mood disorders, climate variables have significant correlations that are comparable to those in the anxious condition except for the summer, in which the two conditions correlate differently, in particular anxiety in direct proportion with the maximum and minimum temperature and depression with maximum relative humidity. In fact, in summer the heat is

perceived subjectively higher than the actual value of the temperature due to humidity. Also in depressive disorders implicated emotions are sadness and irritability that a humid weather usually favors (Winkler et al, 2006). Volpe et al investigated the existence of a seasonal distribution of three dimensions of mania, psychosis, aggression and suicidality, during psychiatric hospitalizations, in a Brazilian sample (Volpe et al, 2008). Psychosis was positively correlated with hours of sunshine of index month and with increasing hours of sunshine; but negatively correlated with relative humidity of index month and with difference from previous to index month.

#### 5. CONCLUSION

In our study, the climatic phenomena that affect psychosis does not have a univocal reading. The number of observations is lower than the whole sample and the diagnosis of psychosis includes a range of psychopathological symptoms that is not homogeneous and this makes more difficult a plausible interpretation of the data. Results from multiple logistic regression model are displayed for each class of mental disease. As we said, our goal is to understand if the psychiatric emergencies are associated with meteorological variables controlling for the seasons.

For anxiety the seasonality (the difference between spring and fall, winter and fall) and climatic factors, above all the maximum temperature and wind direction three days before are predictive of recurrence of the disorder. A similar prediction can be made for mood disorders, for which the season (particularly the difference between spring and fall) and the precipitation (12-24h) five days before can predict the emergence of this pathology. For psychosis comparison between summer and fall has predictive value, while the minimum temperature and wind direction are climatic factors that decrease the probability of acute episodes of psychosis present to the emergency room.

Moreover, climatic factors variety exist both in relation to the their own value that the disease in question; critically, we can observe a certain similarity between anxiety disorders and mood disorders compared to psychosis, which have rather different influences and probably according to dissimilar etiopathogenetic ways. In spite of the studies that find no correlation (Huibers et al, 2010), we believe that these are possible only if the phenomenon is observed in a period not only concurrent with the psychiatric disorder onset, but also in the days preceding; it is possible that all the biological and neurotransmitter

changes need different times than the disease, eg. psychosis involving different sectors of the mind.

A limit of this study is that the diagnostic categories are heterogeneous and this is inherent in the problem of emergencies that do not always allow the identification of the nosographic diagnosis with a consequent remarkable dispersion. In contrast, we would underline the importance of having created a method of organizing data upgradeable (databank of 2157 days) which allowed us to merge weather data with medical data daily, through a large sample.

This implementation will allow Hospital of Messina to have a system for forecasting of emergency psychopathology as a function of weather data. The study should this information can be helpful to physicians in planning a more assistance for patients needing psychiatric support.

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