

Short term effects of meteorological parameters to respiratory infections with fever

Ioannis F. Karagiannis, R.N., MSc, Sotirios Tsiodras, MD, PhD, Demosthenes B. Panagiotakos, PhD, Angeliki L. Lambrou, R.N., MPH, Kassiani Gkolfinopoulou, R.N., PhD, Urania G. Dafni, ScD

Hellenic Centre for Diseases Control and Prevention, Athens, Greece

OBJECTIVE

This study explores the possible impact of meteorological conditions on the incidence of clinical syndromes with an interest for public health in the basin of Athens, Greece.

BACKGROUND

It has been noted since the era of Hippocrates that weather conditions at a specific location can influence the incidence of various infectious and non-infectious diseases [1, 2]. It has also been implied that variations in weather conditions influence the number of cases of infectious respiratory conditions [3]. Syndromic surveillance was introduced in Athens, Greece, for the first time in July 2002 in the framework of increased preparedness for the Olympic Games of 2004 [4]. Our experience showed that the incidence of some syndromes parallels that of diseases surveyed by the mandatory notification system of the Hellenic Center for Diseases Control and Prevention that are known to have a strong seasonal pattern in their incidence e.g. influenza. Influenza incidence peaks at the same time with the “respiratory infection with fever” syndrome during spring. This study aimed at investigating possible relationships between the incidence of the “respiratory infection with fever” syndrome and meteorological parameters.

METHODS

Epidemiological data were derived from the syndromic surveillance system that was implemented in Athens, Greece, for the Olympic Games. Meteorological data from the Thisseio station of the National Observatory of Athens in downtown Athens, Greece, were used. The analysis included data for the period Aug 1 st, 2002 – Jul 31st, 2003. Adjustment was done for day of the week, long term trends and bank holidays. Statistical methods initially used in econometrics and currently used in epidemiological studies to study correlations between atmospheric pollution and mortality in human populations when the type of correlation is unknown were incorporated. These included time series analysis methods and Generalized additive models (GAMs). Statistical analysis was conducted with the use of SAS v9.1.3.

RESULTS

15,704 patients (48.2% male) presenting with the syndrome “respiratory infection with fever” were identified. The median age of the entire group was 36.0 years. The correlation between the daily incidence of respiratory infection with fever and most meteorological variables was found to be non linear. 5-day periods with low moving averages of daily average temperature were followed by high numbers of the syndrome. The maximum incidence was found to occur after 5-day periods with an average temperature of +9 °C. Low day-to-day variations of daily temperature maxima were minimizing the incidence of respiratory infections with fever.

CONCLUSIONS

The daily incidence of respiratory infections with fever in adults appears to be associated with meteorological parameters in the current study. Examination of data from longer intervals after controlling for known community influenza epidemics will further enhance understanding of the mechanisms underlying these observations.

REFERENCES

- [1] Panagiotakos DB, Chrysohoou, Pitsavos C, Nastos P, Anadiotis A, Tentolouris P, Stefanidis C, Toutouzias P, Paliatou. Climatological variations in daily hospital admissions for acute coronary syndromes. *Int J Card* 2004, 94: 229-233
- [2] Colwell RR, Epstein PR, Gubler D, Maynard N, McMichael AJ, Patz JA, Sack RB, Shope R. Climate change and human health. *Science* 1998, 13;279(5353):989-989
- [3] Danielides V, Nousia CS, Patrikakos G, Bartzokas A, Lolis C, Milionis HJ, Skevas A. Effect of meteorological parameters on acute laryngitis on adults, *Acta Otolaryngol* 2002, 122: 655-660
- [4] Dafni UG, Tsiodras S, Panagiotakos DB, Gkolfinopoulou K, Kouvatseas G, Tsourti Z, Saroglou G. An algorithm for a statistical detection of peaks: The Syndromic Surveillance System for the Athens 2004 Olympics. *MMWR* 2004/53 (Suppl); 89-94

Further Information:

Ioannis Karagiannis, ikarag@med.uoa.gr