



Human thermal bioclimatic conditions associated with acute cardiovascular syndromes in Crete Island, Greece

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The aim of this study is to quantify the association between bioclimatic conditions and daily counts of admissions for non-fatal acute cardiovascular (acute coronary syndrome, arrhythmia, decompensation of heart failure) syndromes (ACS) registered by the two main hospitals in Heraklion, Crete Island, during a five-year period 2008-2012. The bioclimatic conditions analyzed are based on human thermal bioclimatic indices such as the Physiological Equivalent Temperature (PET) and the Universal Thermal Climate Index (UTCI).

Mean daily meteorological parameters, such as air temperature, relative humidity, wind speed and cloudiness, were acquired from the meteorological station of Heraklion (Hellenic National Meteorological Service). These parameters were used as input variables in modeling the aforementioned thermal indices, in order to interpret the grade of the thermo-physiological stress. The PET and UTCI analysis was performed by the use of the radiation and bioclimate model, "RayMan", which is well-suited to calculate radiation fluxes and human biometeorological indices.

Generalized linear models (GLM) were applied to time series of daily numbers of outpatients with ACS against bioclimatic variations, after controlling for possible confounders and adjustment for season and trends.

The interpretation of the results of this analysis suggests a significant association between cold weather and increased coronary heart disease incidence, especially in the elderly and males. Additionally, heat stress plays an important role in the configuration of daily ACS outpatients, even in temperate climate, as that in Crete Island. In this point it is worth mentioning that Crete Island is frequently affected by Saharan outbreaks, which are associated in many cases with miscellaneous phenomena, such as Föhn winds - hot and dry winds - causing extreme bioclimatic conditions (strong heat stress). Taking into consideration the projected increased ambient temperature in the future, ACS exacerbation is very likely to happen during the warm period, against mitigation during the cold period of the year.