

Relationships of Plasma Lipids, Lipoproteins and Cardiovascular Outcomes with Climatic Variations: A Large 8-Year Period Brazilian Study

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Abstract : Objectives: The outcome of cardiovascular disease is affected by environment and climate. This study evaluated the possible relationships between climatic and environmental changes and the occurrence of biological rhythms in serum lipids and lipoproteins in a large population sample in the city of Campinas, State of Sao Paulo, Brazil. In addition, it determined the temporal variations of death due to atherosclerotic events in Campinas during the time window examined. Methods: A large 8-year retrospective study was carried out to evaluate the lipid profiles of individuals attended at the University of Campinas (Unicamp). The study population comprised 27.543 individuals of both sexes and of all ages. Normolipidemic and dyslipidemic individuals classified according to Brazilian guidelines on dyslipidemias, participated in the study. For the same period, the temperature, relative humidity and daily brightness records were obtained from the Centro de Pesquisas Meteorologicas e Climaticas Aplicadas a Agricultura/Unicamp and frequencies of death due to atherosclerotic events in Campinas were acquired from the Brazilian official database DATASUS, according to the International Classification of Diseases. Statistical analyses were performed using both Cosinor and ARIMA temporal analysis methods. For cross-correlation analysis between climatic and lipid parameters, cross-correlation functions were used. Results: Preliminary results indicated that rhythmicity was significant for LDL-C and HDL-C in the cases of both normolipidemic and dyslipidemic subjects (n =respectively 11.892 and 15.651 both measures increasing in the winter and decreasing in the summer). On the other hand, for dyslipidemic subjects triglycerides increased in summer and decreased in winter, in contrast to normolipidemic ones, in which triglycerides did not show rhythmicity. The number of deaths due to atherosclerotic events showed significant rhythmicity, with maximum and minimum frequencies in winter and summer, respectively. Cross-correlation analyzes showed that low humidity and temperature, higher thermal amplitude and dark cycles are associated with increased levels of LDL-C and HDL-C during winter. In contrast, TG showed moderate cross-correlations with temperature and minimum humidity in an inverse way: maximum temperature and humidity increased TG during the summer. Conclusions: This study showed a coincident rhythmicity between low temperatures and high concentrations of LDL-C and HDL-C and the number of deaths due to atherosclerotic cardiovascular events in individuals from the city of Campinas. The opposite behavior of cholesterol and TG suggest different physiological mechanisms in their metabolic modulation by climate parameters change. Thus, new analyses are underway to better elucidate these mechanisms, as well as variations in lipid concentrations in relation to climatic variations and their associations with atherosclerotic disease and death outcomes in Campinas.

Keywords : atherosclerosis, climatic variations, lipids and lipoproteins, associations

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