SEASONAL PATTERN OF MORTALITY IN CARDIOVASCULAR DISEASES IN PANAMA

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Introduction
Seasonal patterns of cardiovascular (CV) mortality have been reported in many parts of the world, mostly in temperate countries. There is evidence that suggests that some of these seasonal mortality changes are related to extreme ambient temperature. In Panama, a country in the tropics without wide variations in ambient temperature, seasonal patterns of CV mortality had not been studied.

Objective
To determine if in Panama there are seasonal patterns of CV mortality.

Materials and methods
We compiled and analyzed data from the National Population Census of 2000 and 2010, from the National Registry of mortality from CV diseases for the years 2001 to 2009, from the reports of temperature and humidity recorded by the Empresa de Transmisión Eléctrica, S.A. (ETESA) for the years 2001 to 2009 and from the influenza reports for the years 2001 to 2009 of the Department of Epidemiology of the Ministry of Health.

A monthly mortality time series for the period 2001 to 2009 was calculated and its components were decomposed into a twelve-month period utilizing a moving averages technique. Elements, like cycle, seasonal occurrence, and stochastic components were separated. A seasonal index of mortality for CV diseases, cerebrovascular disease (CVD), ischemic heart disease (IHD) and diabetes was also calculated. Only deaths of individuals 65 years and older were used for the analysis.

Cycle analysis was performed independently for each disease. A procyclical relationship was first verified using the Engle-Granger cointegration test in twelve-month periods. The relationship of total deaths from CV diseases, CVD, IHD and diabetes to the number of total influenza cases (ICD-10 J10.0 – J11.8) was then analyzed, using influenza cases as the explanatory variable. In a second analysis, thermal sensation values were defined as the explanatory variable.

Results
The series analyzed revealed a seasonal pattern for all CV diseases, especially for IHD. Mortality for IHD was lowest during the first trimester and peaked at the beginning of the third trimester of the year. For the month of July, the IHD mortality season index showed its highest score, and the lowest score was in February. Influenza cases had a very similar seasonal pattern.

The time series analysis revealed that each one of the series presented a first order AR(1) pattern. With the cointegration test, each one of the mortality series was first order cointegrated, showed dependency and an approximate temporal gap of one month when influenza cases and thermal sensation were used as independent variables.

Conclusions
For the period 2001-2009, a seasonal pattern of CV mortality was present in Panama. This pattern is most clearly seen in IHD mortality. The causes of these cyclical changes of mortality have not yet been clearly identified. However, acute respiratory illness and weather may be some of the forces driving the observed cyclical mortality changes.