שם: מאיה וינטר יולס

שם העבודה:

Using satellite-based spatiotemporal resolved air temperature exposure to study the association between weather conditions and risk of stroke

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Abstract

Background:

Climate change raises major concerns regarding public health in the 21st century. While the effects of climate change on morbidity and mortality from heat stroke are well known, the relationship between ambient temperature and stroke has been less studied. Moreover, the role of change in temperature, relative humidity and air pollution as well as detailed stroke etiological subtypes has rarely been analyzed. In recent years there has been a decrease in mortality from cerebrovascular disease, thanks to lifestyle changes and advanced and tailored medical treatments, however, stroke is one of the leading causes of mortality and a third leading cause of disability-adjusted life-years (DALYs). The current research proposes a state-of-the-art approach to comprehensively assess the relationship between weather conditions and incident stroke in a diverse climate sub-regin.

Aims:

The overall goal is to investigate the relationship between weather conditions (satellite-based technology data) and the incidence of stroke (ischemic), hemorrhagic and subtypes of ischemic stroke in Israel between 2014-2018. In particular, the relationship between high ambient temperature, heat stress (temperature and relative humidity), heat waves and the risk of stroke will be investigated. Possible interactions will be examined between these factors at different sub-climatic regions and environmental parameters such as air pollution (particulate matter [PM2.5]). The above associations will be analyzed separately for ischemic, hemorrhagic and Transient Ischemic Attack (TIA)), and with sub-classify ischemic stroke in a sub-sample of 4,000 cases. Furthermore, an evidence-based policy will be design for improving preparedness and prevention of climate-related cerebrovascular morbidity.

Methods:

Information on incident stroke over a three-year period will be gathered from the Israeli National Stroke Registry. This registry contains data on patients' characteristics and co-morbidities as well. Ambient temperature will be assessed using novel, high-resolution satellite-based models, based on the patients' residential addresses. A time-stratified case-crossover study design will be used to assess

the link between weather conditions on the day of stroke and during 7 days prior to the event for specific pathological subtypes. All models will be adjusted for satellite-based measures of air pollution (PM2.5) and relative humidity for different seasons, sub-regions, and for various patients' demographic and clinical characteristics. The results will be communicated to experts and focus groups of populations at risk, in order to design evidence-based policy recommendations in collaboration with the stakeholders .

Significance:

This study is particularly important in an era of climate change where stroke morbidity and mortality are expected to rise due to increase in the frequency of extreme temperatures and heat waves. Therefore, the findings will add additional scientific evidence on the impacts of climate change on the public health. Unlike previous studies, this study will use verified stroke data (from the National Stroke Registry), hospital records and novel technology for accurate measurement of weather variables (satellite-based spatial models) that will allow an assessment of the effect of temperature and air pollution at particularly high resolution. This exposure assessment is very significant for Israel, which is characterized by a variety of different climatic zones. Thus, these findings will be significant and relevant for different climatic regions around the world. In addition, the research will provide a scientific basis for policies tailored to a variety of different populations at various climate sub-regions.