Analysis of a biometeorological indice and their relationship with hospital admissions in city of Santa Maria, RS, Brazil

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1. Introduction

Several studies have shown that environmental variables play an extremely important role when it comes to increasing growth and severity of respiratory diseases, especially in children. A clear evidence of the effects of meteorological variables on hospital admission may be observed when using the thermal comfort indices (CTI), by fact that these biometeorological indices represent at the same time the reactions of the human body in the environment.

2. Objective

This study aims to analyze through the application of two biometeorological indices the association between different types of weather and respiratory morbidity (hospital admission) for respiratory diseases in children under five years of age in city of Santa Maria, Brazil, during the year 2010.

3. Methodology

The meteorological dates used were obtained by the National Institute of Meteorology (INMET) and data on hospital admissions for respiratory diseases (HA) were obtained by Brazil´s Ministry of Health. Were calculed the indices Effective Temperature (ET), which considers the meteorological parameters as air temperature and relative humidity in your calculation, and Effective Temperature as a function of wind (ETw), which considers beyond to these variables, also the wind action. In order to simulate extreme daily situations were combined values of the maximum daily temperature and minimum daily relative humidity, representative of periods of stress by warm (ET_1). Values of minimum daily temperature, maximum daily relative humidity and mean velocity of the wind for represent the periods where stress by cold is higher (ETw_3). Based on thermal comfort zones were characterized the types of weather that occurred more and so associate these frequencies of occurrence with hospital admission of the children.

4. Results

The results showed observing ET_1 and ETw_3 indices, that Santa Maria peoples experiences a high thermal stress by cold nearly all year round (especially in the morning). They also showed there is a strong association between weather types related with cold and HA, which are responsible for most hospital admissions of children (HA). The period of the year with the highest thermal stress in relation to low temperatures (cold and very cold days) was between the months May and November, but the highest frequencies occurred in May, July and August (especially on cold days, humid ETw_3). Regarding the daily distribution of HA in the weather types, according to ETw_3 indice, was observed that cold and very cold days were responsible by approximately 90% of the admission. The highest percentage of HA occurred on days classified feeling as cold (4.48 admissions per day).

5. Conclusions

This study aimed to analyze the association between meteorological variables and respiratory morbidity of children in the city of Santa Maria, RS. Different daily situations of weather were simuled (ETw_1, Etw_2, ETw_3, ETw_4) and noticed there was a strong association between hospital admissions and types of weather related to the cold. The majority of

admission was on very cold and cold days. The months May, July and August were the most stressful due to low temperatures and also the largest mean of hospital admissions occurred on cold days.

6. Bibliography

COELHO, M.S.S.Z. Uma análise estatística com vistas à previsibilidade de doenças respiratórias em função das condições meteorotrópicas na cidade de São Paulo. 2007. Tese de doutorado, IAG-USP, 2007.

GONÇALVES F.L.T; CARVALHO L.M.V.; CONDE F.C., LATORRE, M.R.D.O; SALDIVA, P.H.N.; BRAGA A.L.F. The effects of air pollution and meteorological parameters on respiratori morbidy during the summer in Sao Paulo city. Environmental International. Vol 31, pp 331-349, 2005.

LECHA, L.B. Biometeorological classification of daily weather types for the humid tropics. International Journal of biometeorology, Vol 42, pp 77-83, 1998.

RUSTICUCCI, M; HARRIS, M; ACOSTA E. Relación entre las causas de internación en un hospital general y las condiciones meteorológicas durante el año 1995. Actas VII Congreso Argentina de Meteorologia. Centro Argentino de Meteórologos. pp 459-460, 2001.

BRAGA, A. L. F. Quantificação dos efeitos da poluição do ar sobre a saúde da população pediátrica da cidade de São Paulo e proposta de monitorização. Tese de doutorado, FMUSP, 1998.

GIOULEKAS D.; PAPAKOSTA D.;DAMIALIS A.; SPIEKSMA F.; GIOULEKA P.; PATAKAS D. Allergenic pollen records (15 years) and sensitizations in pacients with respiratory allergy in Thessaloniki, Greece. Allergy. Vol 59, pp 174-184, 2004.

KASSOMENOS P. A.; GRYPARIS A.; KATSOUUYANNI K. On the asociation between daily mortality and air mass types in Athens, Greece during winter and summer. International journal of biometeorology. Vol 51, pp 315-322, 2007.

KEYWORDS: respiratory disease, thermal comfort indice, hospital admissions

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