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Spatial pattern of hospitalizations due to low impact falls in Portugal: exploratory analysis

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Introduction: Low impact falls result from low energy (falling from a chair or tripping on a mat), Female sex (up to 60/70%) and increase age (mean age of 80.3 years 3 8.7) are identified as risk factors falling. The continual increase of the elderly population worldwide poses as a problem to healthcare systems as theoretical there will be more individuals needing health assistance after suffering a fall. Despite extensive research and preventive efforts, accidental falls continues to be a massive health problem as in the elderly falls are a leading cause of severe injury requiring acute care or causing death. It is important to identify the spatial pattern to understand what is causing the increase and to plan awareness campaigns. We aim to identify the spatial pattern of hospitalizations due to low impact falls, in individuals over 65 years old in Continental Portugal (2000, 2007 and 2013).

Methods: The study area was Continental Portugal. Hospitalizations (2000, 2007, 2013) caused by low impact falls (classified according to International Classification of Diseases, 9th Revision, Clinical Modification) were retrieved

from the National Hospital Discharge Register, mandatory for public hospitals. Population data was retrieved form Statistics Portugal. Counts of hospitalizations were used to calculate age-standardized Empirical Bayesian incidence rates (AEB) by municipality, per 1000 inhabitants (direct-method, 5-years age groups: 65-69; 70-74; 75-79; 80-84; 85+ and Portuguese population from 2011 census as the standard). The AEB rates were calculated (Bailey and Gatrel, 1995) with shared border as the criterion to define neighbors. Rates were calculated for 2000, 2007 and 2013, for both genders and separately for females and males. The spatial pattern was compared, the Moran's I calculated and spatial clusters were determined using Local Moran's I.

Results: For the three years, the mean number of hospitalizations was 17422.7 (SD 3181.8), the percentage of women was, respectively, 68.3%, 70.2%, 68.7% for 2000, 2007 and 2013. The annual crude rates were similar in the three years assessed; both genders: 10 per 1000 inhabitants in the three years, female: 11, 12, and 12 per 1000 inhabitants in 2000, 2007 and 2013 (respectively) and male: 7 in 2000, 7 in 2007 and 8 in 2013 (1000 habitants).

The Moran´s I (respectively for each year) was 0.61, 0.63 and 0.74 for men, 0.57, 0.67 and 0.72 for women and 0.58, 0.68 and 0.76 (p-value<0.001). A similar overall spatial pattern was observed in both genders: clusters of high incidence in the north and low incidence in the south. Over time a marked northeast to southwest pattern was accentuated.

Discussion: Marked spatial patterns in hospitalization due to low energy falls were identified in both genders. The pattern observed is similar to the two main climatic regions of Portugal; north region more humid and cold (high-high clusters) south region more dry and hot (low-low clusters) suggesting that environmental factors may play important role in explaining the spatial pattern.