Association of the Colombian armed conflict and poverty with the incidence and mortality from childhood leukemia in children born during the years 2002-2013

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Abstract

Background: Pediatric acute leukemia is a frequent chronic disease. A violent environment could cause chronic stress during gestation and activate oncogenes. Colombia is a country characterized by very high levels of poverty, and by being struck by a non-international armed conflict for more than 60 years. Aim: To determine the impact of perinatal exposure to collective violence and poverty, on the incidence and mortality rates due to leukemia for Colombian children born during the years 2002 to 2013. Methods: We apply spatial Poisson-Hurdle models to model the incidence and mortality rates for leukemia using as predictors: the Colombian index of armed conflict (IICA), Unmet Basic Needs (UBN), percentage of health coverage, percentage of people living in rural areas, and eigenvectors obtained based on Moran eigenvector spatial filtering. Results: There were 11,149,695 children born in 1122 municipalities of Colombia from 2002 to 2013. There were a total of 4781 cases of childhood leukemia from 2008 to 2016. The risk of suffering from leukemia or dying from this disease is higher for children exposed to armed conflict and is lower for children in extreme poverty. All variables show significant spatial autocorrelation and significant cross-correlation with the LR and LMR. Conclusion: The Colombian armed conflict index and poverty variables were significantly statistically associated with the incidence and mortality rate of Leukemia in children. Keywords: Leukemia, Colombian armed conflict index, Poverty, Spatial correlation, Moran index, Poisson-Hurdle models

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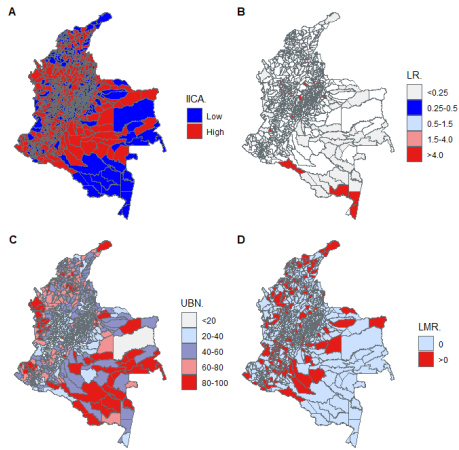
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FIGURE 1 Spatial distribution of main variables considered. Top left panel. Index of armed conflict (IICA). Top right panel. Leukemia mortality rate (LMR). Bottom left panel. Leukemia incidence rate (LR). Bottom right panel, Unmet basic needs (UBN).
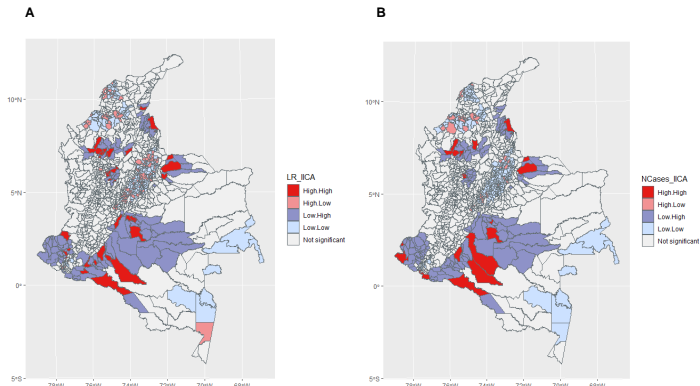

FIGURE 2 Spatial distribution of IICA compare with A. Leukemia rate cases (LR) and B Leukemia mortality cases (LMR NCases)
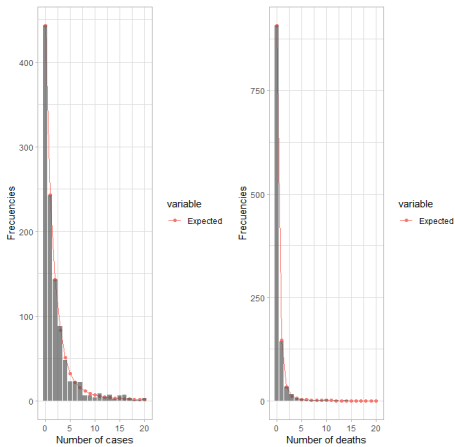
FIGURE 3 Comparison between empirical and fitted frequencies for Leukemia incidence and mortality rate. See fitted models in TABLE 1 and TABLE 2