

Comparative Analysis of the H1N1 and COVID-19 Pandemics: A Statistical Study in the Cities of the State of Goiás

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ABSTRACT

The pathogens Influenza A Subtype H1N1 and SARS-CoV-2 have played a leading role in the pandemics of the current century and have raised questions about an epidemiological approach that corroborate the third goal of sustainable development, foreseen in the UN 2030 Agenda. The analysis of this scenario transcends sanitary boundaries and possesses dynamics that directly affect the socio-economic and environmental sectors of the cities of the state of Goiás - Brazil. In this sense, this study aims to analyze statistical evidence that allows inferring the significant differences between the two pandemic events. This is a cross-sectional observational study. The data used were obtained from the TabNet platform, linked to the DATASUS public records database. The selection of samples was based on the hospital morbidity of the SUS (SIH/SUS) in the interval of the first six months based on the decree of Public Health Emergency of international importance, carried out by the WHO, for H1N1 and COVID-19 events — from April 25, 2009 and January 30, 2020, respectively. The months of April to September and January to July were separated as a way of separating the hospital information pertinent to the two pandemics, in that order. The parameters of hospitalizations (number of hospital admissions authorizations approved in the period), the total value linked to AIH and the mortality rate of each municipality in the state of Goiás were the variables used for filtering. Thus, for H1N1, records were obtained from 176 municipalities, while for COVID-19 the amount was 163. However, mortality rates were not fully reported at the two specified time points — 83 for the first cut and 48 for the second. For the prediction of these values, the K-NN (K-Nearest Neighbors) machine learning technique has been used. The normality analysis was done by means of the Shapiro-Wilk Test in which it allowed one to choose a non-parametric method for hypothesis testing, since for the two pandemics, in all the variables, a Gaussian behavior was not observed. Therefore, assuming a p-value of 5% to reject the null hypothesis, The Mann-Whitney U test was applied to confirm that there is statistical evidence of a significant difference in the two pandemics, with the following p-values for hospitalizations, total value and mortality rate, respectively: 0.00237, 0.04728 and 0.00237. Therefore, from a statistical point of view, the two pandemics demonstrated divergent behaviors for the parameters involved.

Keywords: Influenza A Virus; SARS-CoV-2; Pandemics; Sustainable Development.

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