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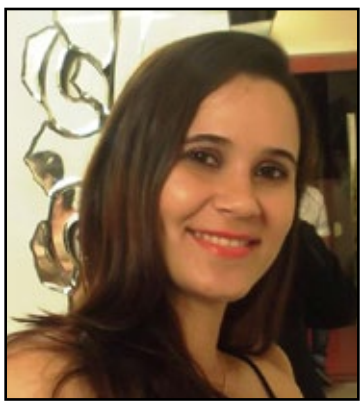

Spatio-temporal patterns of suicide: an ecological study

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ABSTRACT

Aim: to analyze the spatial and temporal distribution of mortality by suicide in residents of the state of Pernambuco from 1996 to 2015, using spatial analysis and statistical techniques. **Methods:** it is an ecological study that will have the municipalities as units of analysis. The data source will consist of the suicides recorded in the Mortality Information System, from 1996 to 2015. The temporal trend will be analyzed by the simple linear regression technique. From the gross coefficients of suicide mortality, the Local Empirical Bayesian method will be applied to correct random fluctuations of the indicator. The Moran Global and Local Indices will be adopted to indicate the existence of correlation and spatial clusters in the territory. **Expected results:** to identify temporal changes in suicide mortality in the period studied and to locate possible spatial clusters that may represent priority areas for the planning of interventions and health actions.

Descriptors: External Causes; Mortality; Vital Statistics; Suicide; Spatial Analysis; Tendencies.

INTRODUCTION

Suicide is an important public health problem, carrying with it a strong social commotion. Worldwide, about one million people commit suicide each year. By 2015, the suicide mortality rate in the world was 10.7 per 100,000 populations. In the same year Brazil recorded a coefficient of 6.3 per 100,000 inhabitants. However, underreporting, lack of data in some countries, and non-regularity in reporting suicide records to the World Health Organization limit the precise knowledge of this event[1].

Some factors are fundamental for the understanding of suicide, such as the clear definition of the geographical distribution, the identification of vulnerable subgroups, as well as the monitoring of mortality coefficients over time[2]. Thus, the use of spatial analysis and temporal tendency are useful tools in researches related to self-killing.

Considered as a set of tools that make possible the manipulation of data contained in the space, spatial analysis techniques play an important role in epidemiological research, making possible the mapping of diseases and the identification of risk groups[3]. When applied to the study of suicide, these techniques provide the visualization of different death patterns, as well as to identify spatial clusters of risks and to establish relations between susceptible groups and sociodemographic factors[2].

In Brazil, the number of studies published using techniques of spatial and temporal analysis applied to suicide is still scarce. Describing the distribution of suicide in time and space will contribute to the identification of priority areas, which may help in directing health interventions, especially in suicide prevention actions.

GUIDING QUESTIONS

What is the occurrence and spatio-temporal distribution of suicide mortality in residents of the state of Pernambuco from 1996 to 2015?

AIM

Analyze the spatial and temporal distribution of mortality by suicide in residents of the state of Pernambuco from 1996 to 2015, using spatial analysis and statistical techniques.

METHOD

This is an ecological study of temporal analysis of suicide mortality coefficients in residents of the state of Pernambuco, with people aged ten years and over, occurring in the period from 1996 to 2015. The analysis unit will be composed of the 185 municipalities that make up the state. Data on suicides will be obtained from the Mortality Information System, composed of the intentional self-inflicted harm (X60-X84) described in the 10th International Classification of Diseases.

For the temporal trend analysis, the simple linear regression technique will be employed. The annual coefficients of suicide mortality will be considered as the dependent variable and the calendar year will be the independent variable. The population estimates will be extracted from the Brazilian Institute of Geography and Statistics. Software R version 3.4.1 will be used to construct the time trends and obtain the adjustment statistics of the models. For this analysis the 5% level of significance will be adopted.

Through the spatial analysis, the thematic map of the gross coefficients of mortality will

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be constructed. Correction of the statistical instability of these coefficients will be performed using the Bayesian Local Empiric method. The Moran Global Index will be used to verify the presence of spatial autocorrelation of suicide deaths. Weighted by the geographic proximity measured by the neighborhood matrix, this index assesses the extent to which the level of a variable for an area is similar or not to neighboring areas. Their values range from -1 to 1. Positive values indicate positive spatial autocorrelation and negative values suggest negative spatial autocorrelation. For the analysis of a more detailed pattern the Local Spatial Association Indicator, which produces a specific value for each region studied, will be used, allowing the identification of groupings of areas with values of similar attributes or anomalous areas.

The research was approved by the Research Ethics Committee of the Health Sciences Center of the Federal University of Pernambuco on May 4, 2017, under the opinion of number 2,045,304.

EXPECTED RESULTS

It is hoped to identify possible changes in the epidemiological profile and spatial distribution of suicide over two decades. These results can support the planning of intervention actions of the health sector and related areas, capable of minimizing their occurrence.

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