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TERRITORY, EPIDEMIOLOGY AND GEOPROCESSING: CATALYSTS FOR HEALTH EDUCATION ACTIONS IN THE HISTORICAL CONTEXT OF LEPROSY IN BRAZIL

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ABSTRACT

Geoprocessing techniques are important tools for locating health problems, and enhance actions when sectors are in the same territory. This study identified the concentration of cases of leprosy, schools and health units having the territory as a facilitator of actions in the School Health Program (SHP). It is a cross-sectional, quantitative study, considering new cases of leprosy registered in the Notified Aggravated Information System (SINAN) between the years 2007 and 2016. The geoprocessing technique used the Kernel density estimator to identify case concentration areas, schools and primary health care units in the urban area of Vitória de Santo Antão-PE. The spatial distribution indicated a confluence of cases mainly in two neighboring neighborhoods, with four schools and five Primary Health Care units, social equipment potentially facilitating health education actions on leprosy. The load of attributions of health professionals and teachers may make it more difficult to dedicate more time to SHP activities in school;however tools such as Epidemiology and Geoprocessing may facilitate joint work. It is possible to use the territory common to health and education equipment as a catalyst for health education actions for leprosy.

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INTRODUCTION

Leprosy is a slowly evolving infectious disease caused by a bacterium, Mycobacterium leprae. In the absence of early diagnosis and treatment, physical deformities set in and may evolve into irreversible disabilities (BRAZIL, 2017). In 2018 in the world 208,641 new cases were detected, with 79.6% of these concentrated in India, Brazil and Indonesia. Brazil is the first in number of cases in the Americas, and the second in the world (WHO, 2019). Detection rates in some regions of the country are far from achieving the World Health Organization

goals (BRAZIL, 2019). In 2015, six municipalities in Pernambuco, a state located in the Northeast region, were considered highly endemic, among them Vitória de Santo Antão, with worrying indicators of the disease (PERNAMBUCO, 2015). Primary Care should also develop health surveillance activities for timely detection and take steps to prevent and control communicable diseases and illnesses (BRASIL, 2017a). An epidemiological study in Vitória de Santo Antão, between 2007 and 2016, showed an average detection rate at 25.7 / 100,000 inhabitants over 15 years, and the proportion of the disease cured reached only 20.8% (VITÓRIA DE SANTO ANTÃO, 2017), when the

minimum should be 85%, leaving doubts as to the effectiveness of the teams' actions in this regard. The Ministry of Health defines that values greater than 10.0/100,000 inhabitants in under fifteen years of age are considered hyperendemic and means that there is an active focus of the disease(BRASIL, 2019).Thus, Brazilian health authorities have encouraged action in school spaces to increase the detection of cases in children under 15 years of age, enable early treatment, reduce transmission and the risk of sequelae left by the disease (PERNAMBUCO, 2015) (BRASIL, 2007). The School Health Program (SHP), established by the Ministries of Health and Education in 2007, which is the main health care program for students in public schools, began nationwide.In 2017 a new document reinforced the need for the program's actions to be planned, executed and managed intersectorally, at the municipal level and to develop activities to identify students with signs suggestive of aggravations and diseases in the process of elimination(BRASIL, 2017 b). It is the role of health authorities in any sphere of government to articulate with other sectors, including Education, to enhance health education actions on leprosy(BRASIL, 2016). In this aspect the school is the ideal environment to disseminate information and encourage positive attitudes of habit changes and lifestyles with a view to promoting health (JESUS; SAWITZKI, 2017). On the other hand, it would not be rational to invest resources in leprosy-related actions in a broad and unrestricted manner. In this case, as it is a disease with focal characteristics, it is important that its location be as precise as possible, and the current geoprocessing techniques lend themselves perfectly to precise identification of endemic areas, optimizing investments in education and health promotion interventions. In this transdisciplinary context of knowledge, the objective of this study is to identify and map through geoprocessing techniques municipal schools and basic health units located in areas of concentration of leprosy cases in Vitória de Santo Antão, considering that the territorial proximity of social equipment can favor health education actions directed at leprosy.
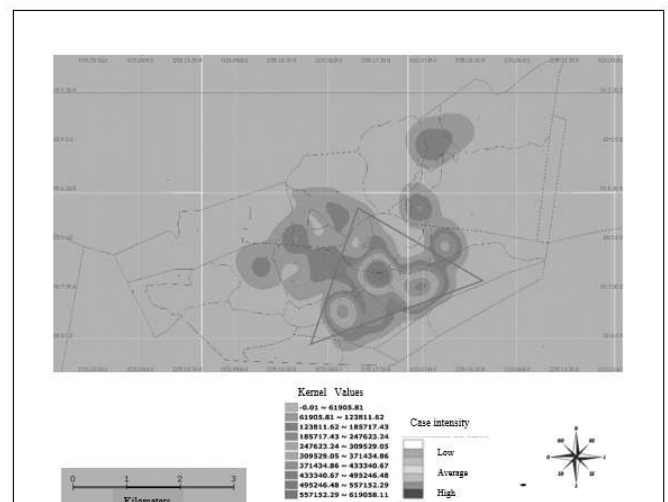
MATERIAL AND METHODS

This is a quantitative, descriptive and cross-sectional study developed in the municipality of Vitória de Santo Antão, Pernambuco. The municipality is located 49 km from the capital, Recife and has 136,706 inhabitants, 76.1% of whom live in the urban area(IBGE,2019). The municipal school network is composed of 63 schools, with 39 in rural areas and 29 in the urban perimeter. The municipal health network of Primary Care has 30 units in the urban area and six in the rural area(VITÓRIA DE SANTO ANTÃO, 2017) (VITÓRIA DE SANTO ANTÃO, 2018). In order to delimit the endemic areas, the records of all new cases of leprosy living in the municipality, registered in the local database of the National System of Notification of Grievances (SINAN) of the Municipal Health Secretariat, were cut between 2007 and 2016. Duplicate forms, incomplete addresses, and cases where geographic coordinates could not be identified were excluded (X,Y).Then the standardization and matching of addresses from the database hosted on the website of the Brazilian Institute of Geography and Statistics was done(IBGE, 2019). The population was referred to the 2010 Census, the cartographic bases for the study of the spatialization of the cases and location of health units and schools were acquired on the site of the Brazilian Institute of Geography and Statistics (IBGE) in the public domain (IBGE, 2019). The lists

of schools and basic care units, with their respective addresses, were provided by the municipality's education and health secretariat. The processed data from SINAN were typed in spreadsheets prepared in the Excel 2013 program. After these initial procedures, the geocoding of the cases and the health and education units was performed, according to the road bases through the TerraView software, version 4.2.2, for processing and elaboration of density map, the location and proximity of schools and health units in these areas, which generated a Geographic Information System (GIS) environment.For the elaboration of the Kernel Density Map, the methodological parameters were used: 285 processed events; grid options with 1500 columns; and quártico function algorithm and adaptive density calculation. The study is part of a PhD Thesis entitled Educational Technology on Leprosy for Elementary School Teachers, approved by the Committee on Ethics in Research in Human Beings - UFPE, and approved under the number of the opinion: 2,489,610 and CAAE: 81064017.2,0000,5208.

RESULTS

In the period from 2007 to 2016 there were 304 cases, of which 285 could be georeferenced. The spatial distribution showed greater confluence in the urban area, mainly in two neighboring neighborhoods - LídiaQueiroz, with 9,355 inhabitants and NossaSenhora do Amparo, with a population of 4,184 people, both with a population under 15 of 25.5% (IBGE, 2019). In these same areas four municipal schools and five Primary Health Care units were located, as shown in Figure 1.

Source: The authors, 2020

Figure 1. Kernel density map of the spatial distribution of reported leprosy cases residing in the Vitória de Santo Antão Urban Center, 2007-2016

These municipal schools serve about 2,045 students from kindergarten, elementary school, junior high and high school, youth and adults, from the areas themselves and from the surrounding areas(VITÓRIA DE SANTO ANTÃO, 2018).And each health unit covers between 2,000 and 3,500 people living in its territory, according to the Ministry of Health's ordinance (BRASIL, 2017a).In the urban area of the municipality there are 28 municipal schools and 30 Primary Care units(VITÓRIA DE SANTO ANTÃO, 2017), all have joined the School Health Program.

DISCUSSION

The analysis of the data with the geoprocessing techniques showed that leprosy is unevenly distributed, following the poorest areas of the municipality, mainly two districts of the urban area. This finding corroborates similar studies that found high leprosy detection rates in very poor populations, including areas where the local population presented a risk five times higher than non-residents(NERY et al, 2019) (FERNANDES, 2019). In these areas, as shown in Figure 1, where leprosy cases are intensifying, there are municipal schools and Primary Care units very close together territorially. Among the factors capable of enhancing health education actions, in this case on leprosy, is the proximity between these institutional facilities. However, the educational activities carried out by the teams are restricted to some actions, for example, anthropometric evaluation, updating of the vaccination scheme and treatment of Geo-helmintiases. The Ministry of Health advocates that health actions focusing on endemic diseases in schools offer the ideal conditions to promote integration between health and education professionals (BRASIL, 2016), in turn, Ordinance 2.436/2017 understands that the territory of action of the Primary Care team is dynamic, where factors of several natures interfere in the health-disease process, and thus the planning of actions for interventions that can revert or reduce health problems must consider the elements that exercise this determination (BRASIL, 2017 a).

The study showed that actions implemented by schools and health units located in different territories, with diverse social and epidemiological characteristics, did not consider for the purpose of diagnosis, planning and execution of those actions the principles of Epidemiology, which would probably identify different risks requiring interventions according to each reality, giving them greater effectiveness (SOUZA et al, 2019). In fact, it is on the school floor that knowledge is disseminated, an ideal place to implement policies for disease prevention and health promotion (ASSIS; JORGE, 2018). It is clear that monitoring and control of anthropometric indicators, vaccination status and treatment of parasitosis are important for the health of children and adolescents, however if geoepidemiological parameters guided the planning of these interventions, problems in that region would be more readily identified and articulated actions between health and education would probably have more effective impacts. It is plausible to conjecture that the difficulties for the success of joint actions between educators and health professionals are related to external factors and/or prior to these actions. For example, the lack of training of these professionals in the aspect of interdisciplinary work, detailed ignorance of the SHP, and also the overload of work of one of the categories, compromises their involvement (BRASIL, 2017c).

Studies have indicated that the Nurse's workload in the health unit has made it more difficult to dedicate herself to the activities in the school (FERREIRA et al, 2016) (VIEIRA et al, 2018) (SILVA-SOBRINHO, 2017), in the same way teachers are also overworked, often determined by the double journey, sometimes in different educational institutions, as shown in the Brazilian Yearbook of Basic Education (2019) that 17% of teachers taught in more than one school. Even with the difficulties previously reported, it can be observed in the statements of participants in studies on this topic that the facilitating aspects of health education actions in the SHP have

their strong point in the territorial approach (SOUZA *et al*, 2017),(BRASIL, 2017c). In this direction Ibiapina and Bernardes (2019), recognize that in an expanded conception of health, "*the territory appears as a means through which a population's ways of living pass*".In this way, it is possible to use the territory common to health and education teams as a transforming element, by identifying through geoprocessing techniques problematic areas from the health point of view and in a synergic and dialogic action, seek the solution contextualized in reality.

Conclusion

The findings of this survey showed a high concentration of leprosy cases in poorer urban areas of the municipality, inserted and close to this same territory are Primary Health Care units and Schools. This finding opens possibilities for the territory element to be a strong ally and facilitator of health education actions developed by PSE, in order to contribute to the early identification and thus have an impact on the reduction of cases, stigma and prejudice still present in society in relation to people with leprosy. The limitations of this study are related to the use of secondary data, which do not allow controlling possible misunderstandings in typing and/or sub-notifications. Even so, since it is an information system whose completion is mandatory nationally in all health spheres, it is considered that its results did not imply any harm to this study.

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