

Study tracks risk of VL exposure in Brazil's urban areas

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Visceral Leishmaniasis (VL) is a severe chronic systemic disease caused by the protozoa (*Leishmania infantum*) in South America, the Mediterranean, southwest and central Asia. These parasites lodge in defense cells and compromise the spleen, liver and bone marrow, becoming fatal if left untreated. The parasites are transmitted to human and animal hosts by the bite of phlebotomine sand flies with dogs as the main urban reservoirs.

The official global burden totaled more than 58,000 human VL cases per year and more than 90% these occur in just six countries: India, Bangladesh, Sudan, South Sudan, Brazil and Ethiopia. In Brazil, during 2001 to 2011, were confirmed 39,780 VL cases.

The increasing occurrence of VL cases in Brazilian urban centers is a challenge for control programs. In this context, Belo Horizonte, with nearly 2.5 million inhabitants, is one of the largest Brazilian cities with active transmission of VL: 1,604 cases were recorded from 1994 to 2013. In spite of the availability of diagnosis (clinical and laboratory) and drugs for treatment, the city has one of the highest VL fatality rates in nation, with 21% of those who have the disease succumbing in 1994 and 24% in 2009.

The factors involved in VL transmission are poorly understood, especially in urban and densely populated counties. Assuming that the identification of risk factors for the disease can help VL control and contribute to the reduction of cases and deaths, the research group in

Epidemiology, headed by Dr. Mariangela Carneiro (Federal University of Minas Gerais, Brazil), conducts studies on urbanization and expansion of VL in Belo Horizonte, capital of Minas Gerais State. One of the studies carried out by the group, publishing in *PLOS Neglected Tropical Diseases* aimed to identify the risk areas for VL and the risk factors involved in transmission in Belo Horizonte.

In the same geographical space human VL cases (n=412), canine infection, socioeconomic and environmental features were analyzed. A concentration of high-risk focal points of human VL cases was identified in the northern part of the city, marked by lower levels of education and income, and higher numbers of infected dogs per inhabitant. It is worth mentioning that the Brazilian Ministry of Health prohibits the treatment of dogs with drugs available for use in cases of human VL and instead recommends euthanasia of infected dogs. This measure has been questioned by the population, especially by animal protection groups.

The spatial analysis adopted for this study is useful for the identification of focal points with a greater risk of VL and displays operational applicability in the control program for an urban environment with an unequal spatial distribution of the disease. Thus, the frequent monitoring of risk of human VL according to focal points is important to direct and prioritize the actions of the control program in urban environment, especially in big cities.

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