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TITLE

SPATIAL AND SPATIOTEMPORAL ANALYSIS OF POSITIVITY AND PREVALENCE RATES FOR SCHISTOSOMIASIS MANSONI IN THE STATE OF ALAGOAS: AN ECOLOGICAL STUDY BETWEEN THE YEARS 2012 AND 2021

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ABSTRACT

Introduction: Schistosomiasis is a Neglected Tropical Disease (NTD) associated with social, economic, cultural, and political aspects. It is caused by the trematode *Schistosoma mansoni*, with the intermediate host being snails of the genus *Biomphalaria*, and humans as the definitive host. Objective: To evaluate the spatial distribution of schistosomiasis mansoni in the state of Alagoas, Brazil, from 2012 to 2021 using data from the Schistosomiasis Control Program Information System (SISPCE) and the Notifiable Diseases Information System (SINAN). Methods: This ecological study utilized data obtained from SISPCE and SINAN between 2012 and 2021. Positivity rates for the disease were considered for SISPCE data, while prevalence rates were considered for SINAN data. Empirical Bayesian kriging was used for spatial smoothing, and Global Moran's I and Local Moran's I (LISA) statistics were calculated to detect spatial autocorrelation and clusters. Space-time retrospective analysis using the scan statistic was performed to identify high-risk clusters. Maps were constructed using QGIS 3.10.14, and results were considered significant at $p < 0.05$. Results: The municipalities of Santana do Mundaú, São José da Laje, Capela, Atalaia, and Campestre exhibited moderate (5-15) raw positivity rates. After smoothing, the highest positivity rate (>15.0) was found in Branquinha. Regarding raw prevalence, the highest rate (60.0-93.0/100,000 inhabitants) was observed only in Campo Grande, with Olho D'Água Grande showing the highest smoothed prevalence ($>40.0/100,000$ inhabitants). Spatial autocorrelation was identified, with Global Moran's I for positivity and prevalence of 0.526071 ($p = 0.001$) and 0.184817 ($p = 0.024$), respectively. Space-time analysis for SISPCE identified two clusters, with the primary cluster comprised of 56 municipalities, exhibiting an annual positivity rate of 4238.6/100,000 inhabitants and a relative risk (RR) of 12.6 ($p < 0.001$). For SINAN, four clusters were identified, with the first cluster consisting of two municipalities showing an annual prevalence of 128.5/100,000 inhabitants and RR of 77.59 ($p < 0.001$). Conclusion: Our data reveal notable differences in disease positivity and prevalence between areas in the state, with municipalities showing high rates in SISPCE diverging from those with high rates in SINAN. These findings suggest potential shortcomings in disease control program coverage, leading to sporadic notifications in SINAN and compromising effective case management. It is crucial to enhance surveillance and program coverage to ensure more effective detection and appropriate case management.

KEYWORDS

Schistosoma mansoni; Spatial Distribution; Epidemiological Indicators

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