Mapping Cases of Tuberculosis Distribution and Treatment Outcomes using Geographical Information System - The Case of Birim Central Municipality, E/R - Ghana

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Abstract

Analyzing the spatiotemporal distribution of tuberculosis (TB) is a very important way to understand its epidemiology thereby helping to identify geographic regions at higher risk and to enable proper control and resource allocation. This study was undertaken to ascertain the spatiotemporal distribution of TB cases and treatment outcomes in the Birim Central Municipality (BCM) in the Eastern Region (E/R) of Ghana for the period 2012-2016 and to recommend appropriate preventive measures. In this retrospective study, the locations of the total of 268 TB cases identified from 2012-2016 were geocoded on the BCM digital maps. Spatial visualization using choropleth maps, network analysis, and service area analysis of ArcGIS10.2 was used to identify the geographic concentration of cases and the various treatment outcomes as well as proximity of patient community to health facility. A questionnaire was also used to collect primary data from TB patients diagnosed in year 2017. This data was analyzed using SPSS version 21. The study identified five main communities as hot spots of TB in the municipality with variations in other communities. It was also found that other non-spatial factors such as socioeconomic factors and stigmatization highly influence treatment outcome.
Reducing stigmatization, regular sensitization of health staff who are not directly involved in tuberculosis care, and using a formerly cured TB patient as a peer educator were some of the best ways identified to help improve positive treatment outcomes in the municipality.

References


Index Terms

Computer Science

Information Sciences

Keywords
Tuberculosis distribution, treatment outcomes, spatiotemporal distribution, GIS