

GIS Based Mapping and Tuberculosis

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Abstract

Tuberculosis (TB) is an infectious disease caused by the bacillus *Mycobacterium tuberculosis* (M.tb.), infects over two billion people worldwide (90% latent infection; 10% active-disease). It typically affects the lungs (pulmonary TB) but can also affect other body organs (extra pulmonary TB). Approximately 10 million new active-TB patients emerge from those latently infected every year, 1.7 million die, making TB the largest infectious disease killer. TB spreads through air droplets when people who are infected with TB expel bacteria into the air by coughing or sneezing.

Keywords: Tuberculosis; *Mycobacterium tuberculosis*; Infection

About the Study

Pakistan with a population of 212 million ranks 5th among 22 high burden countries, accounting 61% of the burden with an incident rate of 265/100,000 population. TB is a multifactorial disease with spatial and temporal distribution. Despite significant advances in TB control, for example, in diagnosis and treatment and innovative research, TB continues to be a major public health problem in most low-and middle-income countries like Pakistan. Therefore it is very important to diagnose the disease at an early stage with new and cost-effective methods. It is also very important to monitor the disease pattern based on spatial and temporal distribution. Geographic Information System (GIS) can be used to develop effective medical control and care for TB and set up control programs for other infectious diseases. Examination of spatial data analysis method can assist in visualizing spatial distribution, identifying spatial outliers, investigating patterns of spatial distribution (clusters or hot spots) via Geographic Information System (GIS).

M.tb transmission often occurs within a household or small community because prolonged duration of contact is typically required for infection to occur, creating the potential for localised clusters to develop. However, geospatial TB clusters are not always due to ongoing person-to-person transmission but may also result from reactivation of latent infection in a group of people with shared risk factors. Spatial analysis and identification of areas with high TB rates (clusters), followed by characterization of the drivers of the dynamics in these clusters, have been promoted for targeted TB control and intensified use of existing TB control tools.

How to Contract Tuberculosis

TB microorganisms are spread through the air starting with one individual then onto the next. The TB microorganisms are placed into the air when an individual with TB infection of the lungs or throat hacks, talks, or sings. Individuals close by may take in these microorganisms and become contaminated.

Where *Mycobacterium tuberculosis* is found

Mycobacterium tuberculosis is a human microorganism that has had an amazing worldwide effect. Its starting points are old. Spinal distortions normal of those subsequent from *M. tuberculosis* infection have been found in human remaining parts as far separated as Peru and Egypt and dating from in any event 5000 BCE.

Conclusion

TB differs from other infectious diseases in several ways that are likely to influence apparent spatial clustering. For example, its long latency and prolonged infectious period allow for significant population mobility between serial cases. Thus, *Mtb* infection acquired in a given location may progress to TB disease in an entirely different region, such that clustering of cases may not necessarily indicate intense transmission but could rather reflect aggregation of population groups at higher risk of disease, such as migrants. Similarly, *Mtb* infection acquired from workplaces and other congregate settings can be wrongly attributed to residential exposure, as only an individual's residence information is typically recorded on TB surveillance documents in many settings.