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Epidemiological and Climatic Determinants of Scrub Typhus in Manipur, India: A Retrospective Surveillance-Based Study

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Abstract

Scrub typhus, caused by *Orientia tsutsugamushi*, is a re-emerging vector-borne zoonotic disease and a major cause of acute undifferentiated febrile illness in India. Accurate laboratory testing and climate-sensitive surveillance are essential for early detection and prevention of outbreaks. A retrospective descriptive study was conducted using secondary surveillance data from the Integrated Health Information Platform (IHIP) under the Integrated Disease Surveillance Programme (IDSP) for the period 2023–2025. District-wise laboratory testing data were analysed for testing trends and positivity rates using descriptive biostatistics. Age- and sex-wise distributions were assessed. Climatic interpretation was performed using India Meteorological Department (IMD) reports on temperature, rainfall, and humidity to assess ecological suitability for chigger proliferation.

During the study period, 13,814 individuals were tested, of which 2,715 (19.7%) were laboratory-confirmed scrub typhus cases. Testing increased substantially over time, with peak positivity observed in 2024 followed by a decline in 2025, reflecting improved diagnostic coverage. A higher laboratory-confirmed burden was consistently reported from hill districts including Senapati, Churachandpur, and Ukhrul, indicating persistent transmission foci with outbreak potential. Most cases occurred in the 31–45 and 46–60 year age groups, with male predominance suggesting occupational exposure, while notable female involvement indicated peri-domestic transmission. IMD data showed rising temperatures, intense monsoonal rainfall, and sustained high humidity during the study period, creating favourable conditions for chigger survival and seasonal transmission.

Enhanced laboratory-based surveillance combined with climate-informed interpretation highlights the potential for localized outbreaks of scrub typhus in Manipur and underscores the importance of integrating climatic indicators into routine public health surveillance.

Keywords: Scrub typhus, *Orientia tsutsugamushi*, Epidemiological surveillance, Climatic determinants, Manipur

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