Impact of Environmental Factors on Abundance of Aedes Mosquitoes in Delhi NCR Region

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Abstract:

Aedes mosquito species is a widely distributed in tropical and subtropical regions. Aedes aegypti and Aedes albopictus are the primary vectors for transmission of Dengue, Chikungunya and Zika Virus to humans. Environmental factors like rapid urbanization, poor water management, and socioeconomic conditions contribute to their abundance. Delhi faced multiple dengue epidemics since 1967. The rapid population growth in Delhi NCR areas like Noida, Ghaziabad (Uttar Pradesh) and Gurugram (Haryana) has heightened their vulnerability to Aedes aegypti mosquitoes. However, mosquito prevalence in these areas remains undocumented.

In this context a monthly entomological survey was carried out at two selected localities each on the basis of dengue cases reported by State Municipal Health Authorities from Noida & Ghaziabad districts and Gurugram district from 2021 to 2022. Month-wise entomological indices i.e. House Index (HI), Container Index (CI) and Breteau Index (BI) were recorded. Entomological surveys conducted revealed significant seasonal variations in Aedes mosquito density. In Chhalera and Barola villages, Noida, HI, CI, and BI ranged from 0.0-18, 0.0-9.4, and 0.0-22, respectively, with higher readings during the monsoon. In Govindpuram and Indira Puram villages, Ghaziabad, the larval indices varied from HI 0.0-34, CI 0.0-32.7, and BI 0.0-40, showing similar seasonal peaks. Ashok Vihar and Basai villages, Gurugram also recorded high indices during July to October, with values reaching HI 0.0-32, CI 0.0-26.2, and BI 0.0-32.

The entomological indices indicates a marked increase in Aedes larval density during July to October coinciding with periods of increased rainfall, hot and higher humidity levels in contrast to the lower indices observed during the pre-monsoon season. This study highlights the necessity of specialized vector management measures, particularly July to October which is the highest transmission season. Therefore, the findings suggests for regular monitoring & vector management in Delhi NCR to reduce the incidence of vector-borne diseases and to prevent future outbreak.

Keywords:

Aedes mosquitoes, seasonal variation, vector control, Delhi NCR, dengue, climate change.