Investigating the Effects of Climate Change on the Prevalence of Dengue Fever

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ABSTRACT

Introduction: Climate change is any change in weather parameters such as temperature and rainfall for a long time and may be caused by natural factors or human activities. Today, climate change has unwanted consequences for health worldwide, and dengue fever is among these diseases. Dengue (bone-breaking fever) is the most common disease transmitted by the Aedes mosquito infected with dengue virus worldwide, affecting more than 200 million people every year. This disease is characterized by fever, malaise, headache, and rash. The present study aimed to investigate the effects of climate change on the prevalence of dengue fever.

Search Strategy: The search for keywords such as “dengue fever”, “climate change”, and “Aedes” was performed in the PubMed database and Google Scholar search engine and their Persian equivalents in the internal databases such as SID and CIVILICA from 2010 to 2024. In the initial search, 259 articles were extracted and included in the study, followed by reviewing 26 articles.

Results: Weather influenced dengue in three aspects: the virus, vector, and transmission environment. The virus underwent part of its development within the vector mosquito, and its life cycle was dependent on temperature, rainfall, and humidity. Two mosquitoes, *Aedes aegypti* and *Aedes albopictus*, adapted to human habitations by laying eggs in both natural (tree holes) and artificial (water tanks, pots, bottles, and containers) environments. Heavy rainfall washed away these eggs and larvae from these reservoirs; however, stagnant water can create ideal breeding conditions. An increase in temperature accelerates the reproduction and growth rates of mosquitoes while also shortening the virus's incubation period. Conversely, if temperatures exceed 44 °C, the risk of dengue transmission diminishes due to the desiccation of mosquito breeding sites. During the cold period, adult mosquitoes died, but their eggs survived. High relative humidity also increased the metabolic process in adult mosquitoes. Therefore, in the wet season, the incidence of dengue was the highest, and the disease was less common in the dry season. Also, climate change weakened human immunity against the disease.

Conclusion and Discussion: Climate change influences the transmission of the disease by changing the geographic range of the vector, increasing reproduction, biting, and shortening the incubation period. Solutions such as the development of renewable energy sources and the enhancement of public awareness should be implemented to address climate change.

Keywords: Climate change, Dengue, Aedes

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