Understanding dengue transmission dynamics through mathematical models

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In recent years, the incidence of dengue has grown dramatically, mainly in tropical and sub-tropical climatic regions. The World Health Organization (WHO) confirmed around 284–528 million cases per annum worldwide. In view of the severity of this disease, enormous effort is being made to understand the transmission mechanism and device methods for its prevention. Mathematical treatment has always been of great importance in this context. In this talk, some mathematical models will be discussed which aim to provide a better insight into the disease progression and its control. First, the memory effect of both human and mosquito will be highlighted to observe the interplay between the well-known threshold quantity (R_0) and persistence of the disease using fractional order differential equation model. Next, the impact of active case finding on dengue disease transmission will be presented using a compartmental ODE model. Finally, a general multi-patch dengue model will be discussed focusing on the effectiveness of different adult mosquito control strategies in reducing the dengue prevalence.