

Monsoon Maladies

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The advent of monsoon in India provides a welcome relief from the dry hot summer and brings waves of life to parched landscapes across the country, but the cooling showers also bring along a lot of diseases. Infectious diseases like Dengue fever, Chikungunya, Hantaviruses, Nipah virus, Chandipura virus, Malaria and the novel H₁N₁ influenza virus had emerged or re-emerged as major public health problems through the last decade in India. Bacterial disease like Plague, Leptospirosis, Anthrax, Brucellosis, Enterohemorrhagic *E. Coli*, Salmonella, Shigella and Staphylococci also remain a threat during this season [1,2].

Mortality due to infectious diseases has fallen drastically over the years as a result of sanitation development, vaccines, antibiotics and other advances in social environment and medical sciences. However, population growth, urbanization, environmental pollution, climate change and movement of populations have been associated with a shift in geographical distribution and accelerated diffusion of old and new pathogens resulting in an increased number of outbreaks. Overcrowding, poor sanitation and water supply, poverty, breakdown of public health measures, changing ecosystems, human demographics and behavior, microbial adaptation and change, and international travel and trade also amplify transmission of infectious diseases [3-6].

Incidence of dengue has increased many folds in the last decade. Urbanization is strongly associated with its re-emergence. As the *Aedes* mosquitoes prefer artificial water containers as its larval habitat, human habitations became its choice. The four strains of dengue virus are circulating with an epidemic potential and becoming endemic and hyper-endemic in many regions [5]. Build-up of a susceptible, non-immune population in India due to the absence of circulation of the virus for decades led to the resurgence of Chikungunya infection from Southern and Central parts of the country since 2006. Although deaths are not common, the morbidity and

disability caused due to Chikungunya is enormous [5]. The novel H₁N₁ virus, reported first in the country in 2009 from Hyderabad, subsequently spread rapidly throughout India, and is still in circulation, even causing deaths [3,7]. Crimean-Congo haemorrhagic fever (CCHF) outbreak was reported in Gujarat in 2011. These outbreaks were zoonotic, and caused a person-to-person spread in hospital setting. High index of clinical suspicion, early laboratory diagnosis and institution of containment measures curtailed further spread of the disease [6]. Acute encephalitis syndrome (AES) takes a heavy toll in a few States of India, in children below the age of 10 years. During the past five decades, the incidence of AES in the country has been on the rise [8,9]. With mosquitoes (*Culex* species) as the principal vectors along with a bird-mosquito natural cycle, the role of ardeid birds in the maintenance of Japanese encephalitis virus and West Nile virus has been described in India [5]. The Nipah virus was responsible for outbreaks in Siliguri, West Bengal in 2010 with a case fatality rate of 74%. Due to the abundant presence of natural reservoir Pteropus bats (fruit bats) in the North-Eastern parts of India, there is still an outbreak potential [5]. Chandipura virus, transmitted by bite of the female sandfly, was reported from Andhra Pradesh in 2003 and Gujarat in 2004, and is considered a potentially dangerous emerging virus [5]. Recent data also suggest the presence of Hantavirus infections in India. Kyasanur Forest Disease virus is maintained as enzootic in small mammals and monkeys in the forests in Southern India [5]. Recent reports suggest continuing presence of Rickettsial diseases in India as well [10]. The reported numbers are underestimates as there are no community-based studies, and there is a lack of availability of confirmatory laboratory tests.

Emerging infectious diseases affect the credibility of health services, and threaten economic development. A strategic vision and an effective plan of action are needed to combat these threats. We need a strong public health structure, effective risk communication, an efficient surveillance system, strong laboratory networks,

epidemic preparedness and rapid response. Current surveillance systems are not sufficient to adequately address the problem of emerging diseases.

Research efforts to develop more effective and advanced tools to combat the resurgence of the diseases are important. Diagnostic tools, and treatment and prevention facilities need to be developed; laboratories for testing need to be upgraded and maintained. A close interaction and bonding between the research community and the public health, agriculture and animal husbandry are crucial to combat the menace of these diseases.

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