

# How to Prevent the Resurgence of H1N1 Influenza in India

Although the epidemic of an influenza is supposed to prevail for a year or two,<sup>[1]</sup> the prevalence and recurrence history of H1N1 influenza for last many years causing extensive morbidity and high mortality every time, has changed the concept of influenza pandemic. The resurgence of H1N1 influenza every year in India has become a regular phenomenon than exception, even after the pandemic is over. Since early part of this year, H1N1 influenza has caused severe health hazards in India, which has created panic across the country and has become a major concern for the health professionals and researchers. The first case of H1N1 was reported in May 2009, and by the end of 2010, 20,604 cases were reported that included 1763 deaths.<sup>[2]</sup> Then, the country experienced epidemic of H1N1 influenza every year at regular intervals causing high morbidity and mortality. Therefore, there is an urgent need to focus on understanding the plausible reasons of resurgence of pandemic H1N1 in India and the methods to prevent it.

## UNDERSTANDING THE PATHOPHYSIOLOGY OF RESURGENCE

Rapid change in environment, decrease in host immunity, and quick mutations of viruses are proposed to be the major contributors to such resurgences of influenza.

Among the environmental factors, low temperature appears to play a major role.<sup>[3]</sup> Repeated occurrence of H1N1 influenza in India during the winter season indicates the definitive role of lower ambient temperature in the pathogenesis of this disease. Decrease in ambient temperature has frequently been associated with the influenza seasonality. This could be due to the ability of the viral particle for prolonged survival in lower temperature.<sup>[4]</sup> Further, overcrowding during winter due to various festivals such as Pongal in South and Makar Sankranti in North and for other social and religious activities that are more frequently celebrated in winter compared to other seasons acts as a contributing factor in facilitating the spread of the virus. It is also suggested that cold climate increases the physiological stress due to stress in thermal regulation, which might decrease the immune system and increase the susceptibility of the host to viral infections.<sup>[4]</sup>

Level of host immunity is the major contributing factor in acquiring influenza. Influenza pandemic occurs with the emergence of a new virus that can severely affect the naïve population and can spread rapidly. Normally, immunity to a new virus is obtained either by exposure to the infection or by vaccination against the infection. Decreased host immunity is attributed to be the major cause of resurgence of influenza epidemic.<sup>[5]</sup> In India, as such the immunity level is low in the general population due to the high prevalence of diabetes, poor nutrition, overcrowding, and low environmental conditions.

Especially, occurrence of diabetes that has become common in all age groups, in both genders and in both urban and rural population, has increased the cause of this viral infection.

Viral evolution and rapid mutations of viruses have become the major concerns. Influenza A virus is known for its high rate of mutation. The rate of mutation has been estimated as  $6.7 \times 10^{-3}$  nucleotide substitution per site per year. These mutations prevent the activity of existing antibody against the virus, resulting in rapid turnover of mutant viral strains.<sup>[6]</sup> Therefore, studies should be conducted on genetic characterization of the pandemic H1N1 strain responsible for the current resurgence, which may reveal the process to develop appropriate vaccines for its prevention.

## PREVENTIVE STEPS

Vaccination, efforts from the government and public sectors, public awareness, and cooperation, and yoga are three limbs of H1N1 influenza prevention.

Vaccination is crucial in the prevention of H1N1 influenza. Herd immunity plays an important role in preventing the spread of influenza. Mass vaccination for the pandemic H1N1 in both genders and across the age groups has been reported to the lower spread of infection during the season and subsequent pandemic waves.<sup>[7,8]</sup> However, no definitive data is available till date regarding the critical level of herd immunity required for population protection. Nevertheless, action should be taken at all levels to ensure adequate vaccination of the population at risks. During the current resurgence, the Ministry of Health and Family Welfare, Government of India, restarted the process of public awareness, education through various modes of mass media, and mass vaccination of the risk populations to prevent the transmission of H1N1 infection. Although initially vaccination was recommended only for health-care workers and staff who come in contact with influenza patients, laboratory personnel involved in influenza testing, and members of rapid response teams, now the steps have been taken to vaccinate the general population at risk.

Public education and awareness are of paramount importance. People should know the do's and don'ts of this disease. Especially, those who are infected or suspected to be infected must take precautionary measures not to spread the disease. The use of masks or kerchiefs by these patients while sneezing, not to spit or nose-spit in public, and to isolate them once diagnosed to have the disease are a must.

Yoga is very useful in the prevention of H1N1 influenza. H1N1 influenza mainly affects the respiratory tract and primarily causes respiratory problems. Therefore, those who have adequate and developed respiratory functions and better

immunity of the respiratory tract, suffer less from this infection, and have less impact of this influenza. Pranayama (yogic breathing exercises) tunes and improves the respiratory functions. Regular practice of pranayama is very helpful in the prevention of H1N1 influenza.

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