Influenza Vaccination in India: Position Paper of Indian Academy of Pediatrics, 2013

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Burden of Influenza is significantly higher in developing countries as compared to developed countries, but the data on the disease burden is less well defined in most of the developing countries including India, and consequently, constraints evolving strategies for prioritization of measures to prevent and control it. The ‘swine flu’ or ‘A(H1N1)’ pandemic is on the wane but the virus continues to circulate causing sporadic outbreaks even in 2013. The A(H1N1)pdm09 has replaced the previous circulating seasonal A (H1N1) virus and acquired the status of a seasonal virus. Limited influenza activity is usually seen throughout the year in India with a clear peaking during the rainy season. The rainy season in the country lasts from June to August in all the regions except Tamil Nadu where it occurs from October to December. IAP recommends the ideal time for offering influenza vaccines is just before the onset of rainy season. The efficacy/ effectiveness data of trivalent inactivated influenza vaccines are also presented in different age groups and different categories of individuals. The IAP maintains its earlier recommendations of using the current trivalent inactivated influenza vaccine in all children with risk factors but not as a universal measure. IAP has now prioritized different target groups for influenza vaccination based on contribution of the group to the overall influenza burden, disease severity, and vaccine effectiveness in different age groups and categories. The current trivalent inactivated influenza vaccines incorporate the 2009 pandemic strain also, hence avert the need of a separate ‘A (H1N1)’ vaccine. IAP stresses the need of more refined surveillance; large scale studies on effectiveness of seasonal influenza vaccines in Indian children, and more effective, properly matched, higher-valent influenza vaccines.

Keywords: Influenza vaccines, Swine flu, Indian Academy of Pediatrics, Recommendations.

There are three types of Influenza viruses A, B and C. The subtypes of type A Influenza virus is determined by haemagglutinin and neuraminidase. Both A and B viruses are responsible for seasonal influenza epidemics, and out-of season sporadic cases and outbreaks [1]. The Influenza type A causes moderate to severe illness in all age groups in humans and other animals whereas type B primarily affects children and causes usually a milder illness. The illness by type C Influenza virus is rarely reported in humans [2].

Burden of Disease

Seasonal Influenza

Global: Influenza occurs globally with an annual attack rate estimated at 5%–10% in adults and 20%–30% in children [1]. Children aged <5 years, and particularly those <2 years of age, have a high burden of influenza. According to a recent estimate, in 2008 there were 90 million (95%, CI 49-162 million) new cases of seasonal influenza, 20 million (95%, CI 13-32 million) cases of influenza-associated acute lower respiratory infections (ALRI), and 1-2 million cases of influenza associated severe ALRI, including 28 000-111 500 deaths [3].

Developing countries: The incidence of influenza episodes and associated ALRI is significantly higher in developing countries as compared to developed countries [3]. A systematic review of seasonal influenza epidemiology in sub-Saharan Africa showed that on average, influenza accounted for about 10% (range 1%-25%) of all outpatient visits and for about 6.5% (range 0.6%-15.6%) of hospital admissions for acute respiratory infections in children [4]. Recent studies from many developing countries of Asia have shown the importance of burden of influenza-related illness in the region [5-13].

India: Adequate data on the prevalence and burden of influenza in India is lacking. According to published data in India, it contributes to around 5-10% of all acute respiratory infections (ARI). The reported incidence of influenza URI was found to be 10/ 100 child years and that of ALRI to be only 0.4/100 child years [2]. According to an Indian review, influenza virus was responsible for about 1.5% to 14.5% of all ARIs
episodes [14]. A community-based study from north India estimated incidence of influenza episodes among children with ARI around 180 and 178 per 1000 children per year, amongst children below 1 and 2 years, respectively. Similarly, the incidence of influenza-associated ALRI was calculated as 33 and 44 per 1000 children per year [3,15].

Swine flu or A(H1N1)

H1N1 pandemic in 2009-10: The pandemic of H1N1 in 2009 had several characteristics that differentiated it from seasonal flu. Globally, the illness rates were highest in children and young adults (20-40% of the population), the hospitalization rates were highest in children below one year of age, and the ‘case fatality rates’ (CFR) varied tremendously and were estimated to be between 0.0004-1.5%. The risk factors for severe disease and death were pregnancy, morbid obesity, asthma, children below 2; however, 25%-30% of those who died had no underlying risk factor [2, 16, 17]. During the 2009 pandemic, pregnant women were documented as an important risk group for severe disease across the globe [16,17].

According to the data from Government of India, 22.8% of the samples out of the total samples from 202,790 persons who had been tested have been found positive for A(H1N1) [18]. In the majority, the illness was self-limited with recovery within a week. Among those tested, 94% cases recovered and 2,728 deaths were reported till December 2010 [18]. Maximum cases were reported during the months of August and September. Though the attack rate was highest in the age groups of 20-39 years and 10-19 years, the highest case-fatality was seen in the age group 20-39 years, followed by young children less than 5 years old [18]. According to a recent study (2007-2010) conducted in and around Delhi, the percent positivity of Influenza A(H1N1)pdm09 influenza virus was highest in >5–18 years age groups [19].

‘Seasonal’ versus ‘pandemic flu’: ‘Seasonal flu’ usually has severe disease in children below 2 years, individuals above 65 years, and in persons with chronic medical conditions whereas ‘pandemic flu’ more severely affected children and caused deaths in young adults having no risk factors [16, 17]. Sparing of elderly and very rapid transmissibility and high attack rates were other differentiating features. Overall, the severity and mortality of ‘pandemic flu’ was higher than seasonal flu (CFR of 0.89% vs 0.13%) [2, 16].

A (H1N1) influenza outbreaks during 2013 in India: The pandemic virus continues to circulate and cause waves of infections leading to hospitalization and complications in different parts of India despite the fact that the pandemic stage of the H1N1 virus had ended in August 2010. Once a pandemic has occurred, it is expected to have sporadic outbreaks of smaller magnitude in subsequent few years. Northern India had an unusual heightened activity of A (H1N1) influenza in first quarter of 2013 that led to 261 deaths till February 28, 2013 [20].

Dynamics of Seasonal Influenza Virus Circulation in India

Seasonality: In temperate regions, outbreaks consistently occur during the late autumn and winter months; in November–March in the Northern Hemisphere; and in May–September in the Southern Hemisphere [21]. In India, limited influenza activity is usually seen throughout the year with a clear peaking during the rainy season all over the country. However, northern India has a secondary albeit a smaller peak in cooler winter months with pattern similar to temperate regions [13,19]. The rainy season in the country lasts from June to August in all the regions except Tamil Nadu where it occurs from October to December.

Genetic surveillance of Influenza virus circulation, 2009-13: In India, there is change in the genetic makeup of circulating influenza viruses since 2009. According to Global Influenza Surveillance and Response System (GISRS) 2009-13 [22], from second half of 2009, A(H1N1)pdm09 was the most predominant influenza virus till first quarter of 2011. Second half of 2011 showed lower activity of this strain while A (H3N2) and B group viruses predominated in this half. However, from the beginning of 2012, the pandemic strain, A(H1N1)pdm09 reappeared and co-circulated with group B and A(H3N2) viruses. A recent study clearly revealed that clade VII has been identified as recent circulating clade in India as well as globally [23].

Group B influenza virus, mainly the undetermined lineage along with both Victoria and Yamagata lineages (to some extent) had circulated almost in equal quantity. There were two clear-cut peaks available, one during rainy season (June to September) and another during winter months. The national laboratories from Kasauli, Mumbai, and Pune regularly collaborate with GISRS. So, in 2012 and in first few months of 2013, A (H1N1) pdm09 and type B (mainly undetermined) were the main flu virus strains responsible for influenza outbreaks. However, it is difficult to predict the future circulation of different types/subtypes of influenza viruses in the country. Furthermore, the yearly type/subtype distribution varied significantly from region to region, and from site to site.