**An imminent threat to public health**

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Influenza infection is highly contagious and often, mild to severe respiratory illness of birds, animals and humans is caused by it. According to recent estimates of the World Health Organisation (WHO), influenza viruses, particularly IAVs, cause recurrent regional epidemics which cause about 3 to 5 million cases of severe illness and about 290,000 to 650,000 respiratory deaths worldwide.

In recent years, influenza A subtypes H1N1, H3N2 and influenza B viruses are the prevailing seasonal viruses amongst human beings. Therefore, type A and B influenza viruses are the only included in seasonal influenza vaccines. Pandemic influenza occurs when a new influenza virus appears in a human population which has no pre-existing immunity to it. 2009’s Pandemic (H1N1) was the first of the 21st century. It was caused by a virus that has swine origins and was documented as swine flu by the media. This virus affected 214 countries all over the world. Although, WHO’s report revealed that 18,631 laboratory-confirmed deaths occurred during the pandemic, the statistical modelling showed 10 times the mortality rate—calculated using H1N1’s mortality data retrieved from different countries. Moreover, this virus (H1N1pdm 09) continued its circulation as a seasonal influenza virus along with subtype H3N2 and type B influenza virus.

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Wild aquatic birds such as Waterfowl are the principal reservoirs for influenza A viruses. While it is not lethal for these aquatic birds since the viruses have adapted in their natural habitat. However, they can transmit the influenza virus to a variety of animals including pigs, horses, sea mammals, birds as well as human beings. Avian influenza viruses, which are highly pathogenic, are H5 and H7 while low pathogenic subtypes are H9 and H10. By the end of 2005, the highly pathogenic H5NI virus was reported from East, South East, Central Asia and Europe. In February 2006, the virus’ infection was seen in Pakistan, India and Nigeria –causing a threat to poultry as well as to the global community by triggering the chances of the next pandemic.

Although, animal to human transmission of avian influenza viruses is rare, 20 human cases of influenza A (H5N1) were reported in the province of Khyber Pakhtunkhwa (KP) in 2007.These cases indicate that human to human transmission is possible and that is a matter of great public health concern. Influenza A may cause high morbidity with a drastic increase in hospital expenditures and duties exemptions, thereby decreasing the production capacity of a country. Moreover, excessive deaths due to this disease are the major contributing factors for causing a burden on a country.

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Influenza is believed to be a major cause of mortality and morbidity worldwide but a limited number of epidemiologic studies have been conducted in less developed countries like Pakistan. In this regard, we conducted a population-based cross-sectional survey and hospital-based sentinel surveillance from 2015 to 2016.The rationale was to get precise estimates of the burden of the disease in the human population of Lahore and to get a better understanding of disease epidemiology in the community. We also gathered information on genetic characterisation and phylogenetic analysis of circulating virus strains which were collected through hospital based active surveillance.

Our research concluded that pandemic (H1N1pdm09) and seasonal (H3N2) influenza viruses are circulating in the local community. A distinct seasonal peak of laboratory confirmed influenza A was recorded in December 2015 while cases of respiratory illnesses (other than influenza but influenza-like) were also recorded during the study period—amounting to a maximum in February 2016. Moreover, we detected influenza A subtypes, H1N1pdm 09 (28%) and H3N2 (30%) among a total of 50 out of 311 influenza A cases.

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Our study confirmed that out of a 100 reporting patients to outdoor clinics, 16 are confirmed new cases of influenza A and approximately 10 out of 100 are existing cases—already present among the population of Lahore. Genetic characterisation of viruses indicates that both subtypes, H1N1 and H3N2, were found resistant to nearly all anti-viral drugs however, they are sensitive to influenza vaccines recommended by WHO for the Northern Hemisphere. So these estimates will enable concerned health authorities to initiate public health interventions at appropriate times to prevent and control the next influenza epidemic in a country and include influenza vaccination in the national vaccination schedule in order to get effective control over this disease