

Correspondence

Seroprevalence of pandemic influenza H1N1 (2009) & seasonal influenza viruses in pigs in Maharashtra & Gujarat States, India, 2011

Sir,

Pandemic influenza H1N1 (2009) virus (H1N1pdm) was reported for the first time in Mexico in March 2009. Pandemic of influenza was declared by the World Health Organization (WHO) on June 2009 as the virus was reported in several countries within a short period of time¹. India also reported cases of pandemic H1N1 from various States². The Centers for Disease Control and Prevention, Atlanta, USA, reported swine originated variant of influenza H3N2 virus in humans which has been linked to pig exposure. This virus showed matrix M gene from 2009 H1N1pdm virus which might make it easily transmissible in humans³. The pigs are an important host in influenza virus ecology since they are susceptible to infection with both avian and human influenza virus strains⁴. Pigs express both sialic acid (SA) linked to galactose (Gal) by α -2,3 linkage (SA α -2,3-Gal) and α -2,6 receptors (SA α -2,6-Gal), preferred by avian and human influenza viruses, respectively⁵.

There are no reports of seroprevalence studies of pandemic influenza H1N1 (2009) virus in pigs from India after emergence of pandemic influenza virus. Therefore, the present study was undertaken to explore transmission of H1N1pdm and other influenza viruses in pigs in Maharashtra and Gujarat States. During this study serum samples were taken from apparently healthy pigs of around 6-7 month of age at an abattoir in Mumbai, Maharashtra. A total of 925 serum samples were collected in 16 visits to an abattoir during May to August 2011. The sample represented 30 per cent of the total slaughtered pig population. The limitation of study was the limited number of samples screened. Hence, the study did not represent the total pig population in Maharashtra and Gujarat. Pigs were randomly received at an abattoir from different locations and piggeries. The samples were from 11 districts of Maharashtra and

five districts of Gujarat State (Table). Antibodies to influenza viruses were detected by haemagglutination inhibition (HI) assay⁶. HI antibody titre of ≥ 20 was considered seropositive. Three influenza viruses namely H1N1pdm (A/Jalna/NIV9436/2009) similar to A/California/04/2009, seasonal H1N1 similar to A/New Caledonia/20/99 and H3N2 similar to A/Perth/16/2009 were used as antigens for detection of antibodies in pig serum samples. Influenza virus strains used in this study were isolated and grown in the allantoic cavity of 10 day-old embryonated chicken eggs⁶ at the National Institute of Virology (NIV), Pune.

Table. District-wise sample collection from an abattoir

Districts of Maharashtra	Number of samples
Jalgaon	219
Dhule	190
Akola	30
Washim	33
Aurangabad	48
Buldhana	15
Nashik	56
Parbhani	30
Nandurbar	48
Ahemadnagar	20
Nagpur	25
Districts of Gujarat	
Surat	72
Navasari	50
Valsad	40
Bharuch	41
Gandhinagar	08
Total	925

The reference hyperimmune serum samples of each subtype, raised in chickens at NIV were used as positive controls. Seroprevalence was estimated and reported as percentages with 95% confidence intervals (CI). As this was exploratory study, the seropositivity was not analyzed district-wise; hence district-wise sample size analysis was not done. Geometric mean titre (GMT) of antibody was estimated for each antigen and CI was calculated using of Nby2 software developed by the Statistics Unit at the NIV, Pune.

A total of 37.8 (C.I. 34.71, 40.96), 29 (C.I. 26.05, 31.81) and 0.3 per cent (C.I. 0, 0.69) serum samples were positive for antibodies against H1N1pdm, H3N2 and seasonal H1N1 viruses, respectively. The GMT of HI antibody indicated high antibody titres against H1N1pdm followed by H3N2 virus (Fig.). A total of 12.5 per cent (C.I. 10.41, 14.67) serum samples were positive for antibodies against both H1N1pdm and H3N2 viruses; 0.1 per cent (C.I. 0, 0.32) serum samples were positive for antibodies against both H1N1pdm and seasonal H1N1 viruses.

Earlier reports from India have shown prevalence of antibodies against influenza viruses in pigs⁷⁻⁹. H1N1pdm virus was isolated from pigs in north India in 2009, after emergence of H1N1pdm virus in India¹⁰. In Maharashtra and Gujarat States, stray pig population is predominant and these animals wander in backyard. The piggery farms are semi-organized and pigs are reared in backyard. It has been estimated that influenza virus infection results in weight loss in pigs¹¹. Therefore, swine influenza might be of substantial economic concern for farmers, and there is a growing concern of the impact of synergistic infections with

influenza and other respiratory viruses¹². The higher antibody positivity against H1N1pdm was followed by influenza H3N2 virus. As influenza vaccination is not practiced in pigs in India, the antibody positivity indicates influenza virus infection in recent past. A very small percentage of samples showed antibodies against seasonal influenza H1N1 virus, indicating predominant circulation of H1N1pdm virus. Also, antibodies to both H1N1pdm and H3N2 viruses indicate co-circulation of these both viruses in pigs.

India reported outbreaks of highly pathogenic avian influenza H5N1 virus in poultry¹³ and prevalence of avian influenza H9N2 has been reported from poultry markets¹⁴. Rearing of pigs in backyard provides an opportunity of intermingling of pigs with backyard poultry which might provide opportunities for reassortant influenza viruses. Therefore, the present study highlights need of influenza surveillance in pig population in India.

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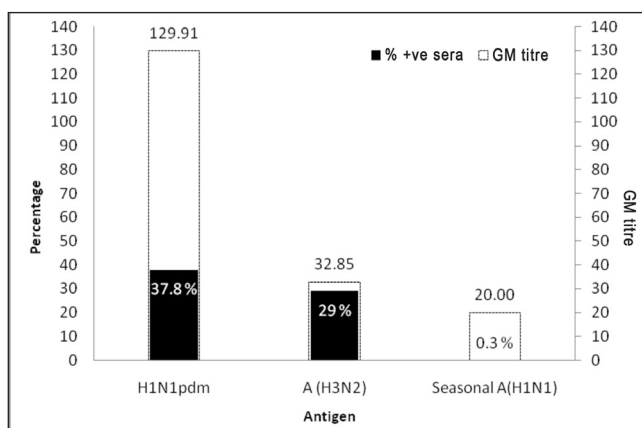


Fig. Percentages of positive serum samples and geometric mean titres of antibodies against pandemic influenza H1N1 (2009), influenza A (H3N2) and seasonal influenza (H1N1) viruses.

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