SWINE FLU EXPERIENCE IN LOCAL POPULATION OF LAHORE

KHALID MAHMOOD, TAHIR JAMEEL, MUHAMMAD TAHIR AND HUMA F. ASLAM

Citilab and Research Center, University of Lahore
King Edward Medical University, Fatima Jinnah Medical College, Lahore

Introduction: *The Swine "flu pandemic" of 2009 was a global out break of a new strain of influenza A virus (H1N1), threatening human lives across the sphere and created a great panic in people around the world. In Pakistan, first case of swine flu was reported in August 2009. According to WHO, 12,220 deaths have been reported world wide. The current new reassorted strain has acquired two new capabilities, human to human spread and enhanced virulence. According to the center for disease control & prevention (CDC) recommendations, patients were included in the study who fulfilled the criteria of suspected, probable or confirmed case of swine flu.* ***Materials and Methods:*** *Eighty females and 32 males (total 112) suspected of swine flu cases included in this study. Among these 112 cases 92 patients were between the ages of 21-60 years.* ***Results:*** *All the 100% patients presented with cough, fever and sore throat. Only 15% had vomiting and diarrhoea in addition to common symptoms. Complication developed in 8 patients, out of which 6 cases were confirmed by Real Time - Polymerase Chain Reaction (RT-PCR) suffering from H1N1 influenza with 50% mortality rate. Clinician should include swine flu influenza A in the differential diagnosis of the patients presented with febrile respiratory illness who have been in contact, or visit the community having positive cases of influenza. Patients having flu like symptoms must stay at home for 7-10 days, avoid contact to the others, should cover nose and mouth with tissue while coughing or sneezing.*

INTRODUCTION

The Swine "2009 flu pandemic" is a global out break of a new strain of influenza A virus H1N1 that is highly contagious disease of respiratory tract and has become a public health problem mainly affecting children, young adults and immuno-compromised patients. The disease is threatening human lives across the sphere, spreading from West to East. The disease has also hit South Asian countries and has created a great panic in people around the world.[1-3]

In Pakistan, first case of swine flu was reported in August 2009 at Karachi since then its incidence is increasing and predominantly affecting adults. world wide 12,220 deaths have been claimed by Influenza A (H1N1) and is considered one of the discendents of 1918 flu pandemic strain[4]. Symptoms of swine flu are mild and self limiting in more than 75% cases, moderate in 15-20% and only 5-7% patients develop complications such as bilateral pneumonia, pain/pressure in chest, hypoxia or respiratory failure.[5-8]

Human flu is caused by three types of influenza viruses (A, B, and C). Among these, two viruses also cause influenza in swine. Influenza A is more common while B has not yet been reported in pigs, influenza C virus is rare even then it infects both human and pigs but does not infect birds.[9] Current pandemic swine flu virus contained gene segments from different influenza types including North American swine, North American Avian, North American Human and European swine viruses. The new strain is thought to be the result of reassortment of four strains of influenza A virus subtype (H1N1)[10-13] including one strain endemic in human, 2nd endemic in birds, 3rd and 4th endemic in pigs. Recent studies suggest that it is the result of two strains reassortment, both found in pigs. University of Lovea in 2004 has cited very rare possibility of swine flu[14] transmission from pig to human even in those people who work with the sick pigs. The new reassorted strain has acquired two new capabilities; human to human spread and enhanced virulence. Mortality rate in complicated cases is 1-4% that can be reduced to less than 1% with proper treatment protocol.[15-16]

In the present study, we aim to evaluate the incidence of swine flu in our local population.

MATERIALS AND METHODS

All suspected swine flu cases from local population of Lahore admitted and treated at swine flu isolation department were included in the study. The duration of swine flu illness is typically 4-6 days.

Infectious period for a confirmed case is 1 day prior to the onset, to 7 days after the onset of symptoms. Infected patients can spread virus to other people in the same way as the seasonal influenza spread via coughing and sneezing. It is most contagious during the first five days of illness in adults, children remain infectious longer upto 10 days. Diagnosis of swine flu can be made from sample if collected during first five days after onset of symptoms.[17-18]

• Suspected case of swine influenza A (H1N1) is a person with acute respiratory illness within 7 days of close contact with confirmed case or tra-veled to the community where confirmed cases of swine flu are present or resides in the locality where one or more cases of swine influenza A (H1N1) have been identified.

• Probable case is a person with an acute febrile respiratory illness who is positive for influenza A but negative for H_1N_1 by RT Polymerase Chain Reaction (PCR), positive for influenza A by infl-uenza rapid test or influenza IFA (immuno fluo-rescence assay) and fulfils the criteria for sus-pected case.

• Confirmed case is a person with acute febrile respiratory illness with laboratory confirmed influenza A (H1N1) virus infection by Real Time PCR or viral culture.[19-20]

In this study, CBC, ESR coagulation profile, routine chemistry, X-Ray chest and Influenza rapid test for prevalent swine flu strains were performed. Because of lower specificity and sensitivity of rapid test, nasopharyngeal samples from suspected patients were sent to the reference laboratory, National Institute of Health (NIH), Islamabad in a viral transport medium for confirmation of swine influenza A (H1N1) infection.[21]

RESULTS

During two months from Oct. to Dec. 2009, a total of 112 cases including 80 females and 32 males with suspicion of swine flu were included in this study. Male to female ratio was 1 : 2.5.

When patients were classified in different age groups, 92 (74 females and 18 males) were in age range between 21-60 years, among the remaining 20 cases, 15 patients were in age range 61-80 years and 5 were children under the age of 15 years (Table 1).

Table 1: *Age groups n = 112.*

| Age group (years)	Male		Female	
	n	**% age**	**N**	**% age**
Less than 15	1	20	4	80
21-60	18	19.5	74	80.5
61-80	10	66.6	5	33.3

Majority of the patients presented with typical sign and symptoms of swine flu influenza A (H_1N_1). Fever, cough and sore throat were the most common presenting complaints observed in 100% patients whereas headache, running nose and difficulty in breathing in 83% cases, followed by nausea, fatigue and chill in 67% and 35% of patients complained of joint and muscle pain, shortness of the breath along with fever, cough and sore throat. Only 17 patients (15%) had vomiting and diarrhoea in addition to common complaints (Table 2).

Table 2: *Sign and symptoms of Swine flu. n = 112.*

Sign and Symptoms	Total	% age
Fever	112	100
Cough	112	100
Sore Throat	112	100
Headache	93	83
Running Nose	93	83
Difficulty in breathing	93	83
Nausia	75	67
Fatigue	75	67
Chill	75	67
Joint pain	39	35
Muscular Pain	39	35
Shortness of breadth	39	35
Vomitting	17	15
Diarrhoea	17	15

Among 112 cases, 8 patients developed complications like bilateral pneumonia, drowziness, severe hypoxia and unconsciousness within 24-48 hours. Their nasopharyngeal samples were sent for swine flu confirmation.
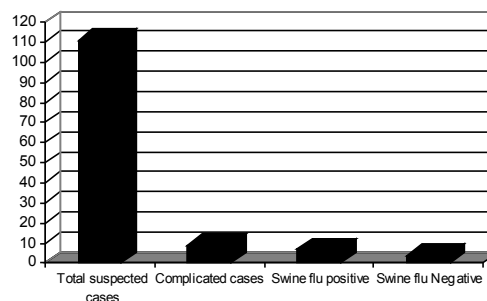
Fig. 1: Suspected n = 112 and complicated cases n = 8.

Among the 8 complicated patients, 6 (75%) were confirmed having swine influenza A (H1N1) virus by real time PCR and 2 (25%) were declared negative having no swine influenza A after fifth day of and on symptoms (Fig 1).

Out of six confirmed cases, 3 (50%) patients expired; first on 18th day, second on 22nd day and third on 30th day after admission. Two patients including one female with five months pregnancy (higher risk group) recovered from illness and was discharged from hospital after 3 weeks. Sixth patient improved clinically and was removed form ventilator.

Multi system failure was seen in only three (50%) of complicated cases at terminal stage involving renal, hepatic and abnormal haematological findings leading to death.

DISCUSSION

In this study, 112 suspected influenza A (swine flu) patients were included for incidence of confirmed swine flu cases. Pattern of sign and symptoms experienced by these patients in our local population during two month period from Oct. to Dec 2009. Early recognition of clinical sign, symptoms and risk factors for swine flu are helpful. This is particularly important for patients having under lying chronic illness because patients may develop complications within 24 hours, if the appropriate treatment is not administered in time.

Close monitoring of young children under five years and adults above 65 years suffering from swine flu and patients with increased susceptibility to nosocomial infection may lessen case fatality. Chronic pulmonary, renal, hepatic, metabolic and immuno-suppression are high risk factors for acquiring swine influenza A.[22]

In this study, 92 cases between 21-60 years age group, 15 patients in 61-80 years and only five under the age of 15 years have been observed.

Among the 112 suspected cases, 92 (82.1%), maximum number of patients were found between the age group 21-60 years in this study, whereas the studies conducted in USA, Canada and Mexico by Greenberg, Dushoff and Kilbourne respectively reported 77.5% prevalence in age group between 22-54 years which is almost similar to the findings of the present study.[23-25]

All of our patients presented with fever, cough and sore throat, 83% complained headache, running nose and difficulty in breathing Nausea, fatigue and chill along with common sign and symptoms were experienced in 67% patients. Thirty five percent patients had complained of joint and muscle pain in addition to fever, cough and sore throat.

Only 15% patients had vomiting and diarrhoea with usual sign and symptoms of the flu. The pattern of sign and symptoms observed in this study is identical with the sign, symptoms and pattern of the disease in studies conducted in Philippines, UK, Mexico and in current swine flu pandemic 2009 by Godlee, Jain, Desmon, and Cohen Jon respectively.[26-29] Complications developed in eight (7.1%) patients out of 112 cases already having underlying illness like diabetes, asthma or physiological stress like pregnancy in the present study. Different studies reported 5-7% cases developed complications suffering from preexisting disease or immuno compromised.[30-32] Isolation of H1N1 virus by Real Time PCR have been observed in 6 (5.3%) out of 112 suspected influenza A cases in this study. Higher isolation rate of H1N1 (33%) have been reported in Spanish flu. The higher isolation in Spain is probably due to the pig handling factor.[33-34]

Out of six confirmed case, 3 (50%) patients expired in this study which is much higher as compared to the mortality reported 1-4% in swine flu in different studies conducted in USA, UK, Mexico and Spain. Philippine reported 10% mortality due to swine flu in 2007.[35-37]

Lower mortality rate in European countries is because of the fact that they have past experience of Spanish flu, Asian flu, Hong Kong flu from 1918 to 1970 and recent 2009 flu pandemic. People are mostly vaccinated for previous and current strain.[38] In our setup, lack of awareness of public, health officials and limited resources are the main obstacles for prevention of swine flu. Being first experience of the disease, mortality rate is higher than other countries.

It is **concluded** that clinician should include swine flu influenza A in the differential diagnosis of patients with acute febrile respiratory illness who have been in contact, or visit the community having positive cases of influenza. Treatment must be started without wasting much time in suspected patients to achieve maximum recovery. Patients having flu like symptoms must stay at home for 7-10 day, avoid contact to the others, cover nose and mouth with tissue while coughing or sneezing, dispose tissue properly after use and wash hands frequently with soap.

ACKNOWLEDGEMENTS

REFERENCES

1. Donruethai S., Roongtham K, Sophon T et al. Pathogenesis of swine influenza virus (Thai isolates) in weanling pigs: an experimental trial. Virology Journal 2009; 6: 34.

2. Alexander DJ. Report on avian influenza in the Eastern Hemisphere during 1997-2002. Avian Dis 2003; 47 (3 Suppl): 792-7.

3. Novel H1N1 flu situation update. Centers for Disease Control and Prevention. 2009 July 18. 4.

4. Taubenberger JK, Morens DM. "1918 Influenza: the mother of all pandemics". *Emerg Infect Dis* 2006; 12 (1): 15–22.

5. Khan A. Swine flu lands in Pakistan tomorrow. The Nation. Vol. 59, No. 10, October 2009 660.

6. Centers for Disease Control and Prevention. Interim guidance on case definitions to be used for investigations of novel influenza A (H1N1) cases. 18 Jul 2009.

7. Current WHO phase of pandemic alert. 2009 July 18.

8. Ellis C, McEwen R. Who should receive Tamiflu for swine flu? Editorials. BMJ 2009; 339: b2698.

9. Van Reeth K, Gregory V, Hay A. et al. Protection against a European H1N2 swine influenza virus in pigs previously infected with H1N1 and/or H3N2 subtypes. *Vaccine*. 2003; 21: 1375–1381.

10. Chutinimitkul S, Thippamom N, Damrongwatanapokin S, et al. Genetic characterization of H1N1, H_1N_2 and H3N2 swine influenza virus in Thailand. *Arch Virol*. 2008; 153: 1049–1056.

11. Kitikoon P, Strait EL, Thacker EL. The antibody responses to swine influenza virus (SIV) recombinant matrix 1 (rM_1), matrix 2 (M_2), and hemagglutinin (HA) proteins in pigs with different SIV exposure. *Vet Microbiol*. 2008; 126: 51–62.

12. Galwankar S, Clem A. Swine influenza A (H1N1) strikes a potential for global disaster. J Emerg Trauma Shock 2009; 2: 99-105.

13. Sng J, Koh D, Koh G. Influenza A (H1N1) infections among healthcare workers: a cause for cautious optimism. Occup Environ Med 2009.

14. Gray GC, McCarthy T, Capuano AW et al. "Swine workers and swine influenza virus infections". *Emerging Infectious Diseases* 2007:13 (12): 1871–8.

15. Conde C. Swine flu: rehearsal for disaster? Tex Med 2009; 105: 16-21.

16. Shahid MA, Abubakar M, Hameed S, Hassan S. Avian influenza virus (H5N1); effects of physico-chemical factors on its survival. Virol J 2009; 6: 38.

17. Gupta V, Singla N. Avian influenza: current scenario. J Commun Dis 2008; 40: 233-41.

18. Yassine HM, Al-Natour MQ, Lee CW. et al. "Interspecies and intraspecies transmission of triple reassortant H3N2 influenza A viruses". *Virol J* 2007; 28 (4): 129.

19. Wang S, Taaffe J, Parker C, Solorzano A. et al. Hemagglutinin (HA) Proteins from H1 and H3 Serotypes of Influenza A Viruses Require Different Antigen Designs for the Induction of Optimal Protective Antibody Responses as Studied by Codon-Optimized HA DNA Vaccines. *J Virol*. 2006; 80: 11628–11637.

20. Payungporn S, Phakdeewirot P, Chutinimitkul S et al. Single-step multiplex reverse transcription-polymerase chain reaction (RT-PCR) for influenza A virus subtype H5N1 detection. *Viral Immunol*. 2004; 17: 588–593.

21. Hancock K, Veguilla V, Lu X, *et al.* "Cross-reactive antibody responses to the 2009 pandemic H1N1 influenza virus". *N. Engl. J. Med*. 2009; 361 (20): 1945–52.

22. Balcan, Duygu; Hu, Hao; Goncalves, Bruno et al. "Seasonal transmission potential and activity peaks of the new influenza A (H_1N_1): a Monte Carlo likelihood analysis based on human mobility". *BMC Medicine* 2009; 7 (45): 29.

23. Greenberg, Michael E.; Michael H. Lai et al. "Response after One Dose of a Monovalent Influenza A (H1N1) 2009 Vaccine. *N Engl J Med* 2009; 361: NEJMoa0907413.

24. Dushoff, J.; Plotkin, J. B.; Viboud, C.; et al.) "Mortality due to Influenza in the United States -- An Annualized Regression Approach Using Multiple-Cause Mortality Data". *American Journal of Epidemiology* 2006; 163: 181–7.

25. Kilbourne, ED; Zhang, Yan B.; Lin, Mei-Chen (January 2006). "Influenza pandemics of the 20th century.". *Emerging Infectious Diseases* (Centers for Disease Control and Prevention) 12 (1): 299.

26. Godlee, Fiona (2009-12-10). "We want raw data, now". *BMJ* 2009; 339: b5405.

27. Jain S, Kamimoto L, Bramley AM, *et al.* "Hospitalized patients with 2009 H1N1 influenza in the United States, April-June 2009". *N. Engl. J. Med*. 2009; 361 (20): 1935–44.

28. Desmon, Stephanie (2009-08-21). "Pork industry rues swine flu". *The Baltimore Sun* 172 (233): pp. 1, 16. Archived from the original on 2009-09-08. Retrieved 2009-09-01.

29. Cohen Jon, Enserink Martin (2009-05-01). "As Swine Flu Circles Globe, Scientists Grapple With Basic Questions" (fee required). *Science* 324 (5927): 572–3.

30. Cannell, JJ; Zasloff, M; Garland, CF; et al. Giovannucci, E (2008-02-25). "On the epidemiology of influenza". *Virology Journal* 5 (29): 29.

31. Smith, GJ; Vijaykrishna, D; Bahl, J. *et al.* (2009-06-25). "Origins and evolutionary genomics of the 2009 swine-origin H1N1 influenza A epidemic". *Nature* 459 (459): 1122–1125.

32. Soundararajan, V; Tharakaraman, K; Raman, R; et al. "Extrapolating from sequence — the 2009 H1N1 'swine' influenza virus". *Nature Biotechnology* 2009; 27 (6): 510–513.

33. David M. Morens, Jeffery K. et al. "Predominant Role of Bacterial Pneumonia as a Cause of Death in Pandemic Influenza: Implications for Pandemic Influenza Preparedness". *The Journal of Infectious Diseases* 2008; 198 (7): 962–970.

34. Hsieh, Yu-Chia; *et al.* "Influenza pandemics: past present and future" (PDF). *Journal of the Formosan*

Medical Association 2006; 105 (1): 1–6. Retrieved 2009-09-26.

35. Taubenberger, JK; Morens, DM (January 2006). "1918 influenza: the mother of all pandemics". *Emerging Infectious Diseases* (Centers for Disease Control and Prevention) 12 (1).

36. Patterson, KD; Pyle GF "The geography and mortality of the 1918 influenza pandemic". *Bull Hist Med*. 1991; 65 (1): 4–21. PMID 2021692.

37. Kilbourne, Edwin D. (January 2006). "Influenza Pandemics of the 20th Century". *Emerging Infectious Diseases* (CDC) 12 (1): 9–14. PMID 16494710.

38. Beigel JH, Farrar J, Han AM, et al. Writing Committee of the World Health Organization (WHO) Consultation on Human Influenza A/H5 "Avian influenza A (H5N1) infection in humans". *The New England Journal of Medicine* 2005; 353 (13): 1374–85.