

Original article

Clinico-epidemiological profile of H1N1 cases: an experience in a tertiary care centre

Mahalingeshwara Bhat, Sara Chinthu, Arjun R

Department of General Medicine, K.S.Hegde Medical Academy, Deralakatte, Mangalore, Karnataka -575 018

Corresponding author: Chinthu Sara Jacob , Post Graduate student, Department of General Medicine, K.S.Hegde Medical Academy, Deralakatte, Mangalore, Karnataka -575 018

Abstract

Introduction: H1N1 is a flu virus that has generated a great medical discussion due to its pandemic nature. The 2009 swine flu outbreak was observed in Mexico and has since progressed to involve many countries and continents; thus, highlighting the importance in early detection and management of these seemingly subtle but notorious virus.

Aims of the study: To identify and describe clinico- epidemiological profile of H1N1 cases.

Materials and methodology: Retrospective, record based analysis of confirmed cases of H1N1, admitted to K.S. Hegde Hospital, Mangalore, Karnataka from January 2015 to October 2017 was undertaken and results expeditied.

Results and Discussion: Total of 12 cases were reported during the study period. Three cases were diagnosed in 2015 and 8 cases were reported in 2017, with only one being diagnosed in 2016. A female preponderance was observed with 75% cases. The main presenting symptoms were noted to be fever (100%), cough (100%), breathlessness (100%), throat pain (25%) and chest pain (33.3%). All patients were from rural areas and were non-smokers. Main comorbidity identified was diabetes (41.6%). All patients were treated with oseltamivir and required mechanical ventilation. The common causes of death attributable was Acute Respiratory Distress Syndrome and bronchopneumonia.

Conclusion: The incidence of H1N1 has been found to be higher during the 2017 outbreak compared to 2015, highlighting the gravity of the pandemic. It is imperative to note the various common presentations of this virus and most importantly, it's devastating complications. While aggressive treatment is mandatory, early diagnosis is quintessential.

Keywords: Influenza, Oseltamivir, Pandemic, Swine flu.

Introduction

Influenza virus is a common but notorious pathogen that has been attributed to have caused serious respiratory illnesses and death over the past century. It always had the potential to cause widespread pandemics, especially whenever a new type of Influenza strain appeared in the human population, following which it then spread easily from person to person.¹

H1N1 is quite a novel strain of Influenza A virus that quietly evolved by genetic re-assortment, and what's more, continues to do so. Following its emergence in March 2009 in Mexico, H1N1 virus spread rapidly throughout the globe. WHO was forced to declare H1N1 as a pandemic on 11th June, 2009.² However, prior to this, in April 2009, a new strain of Influenza virus A H1N1, commonly referred to as "swine flu," was isolated and it began to spread in several countries around the world.¹ India confirmed its first case on 16th May 2009, when an individual tested positive for the H1N1 Influenza A virus in the city of Hyderabad. Subsequently, the first mortality due to Influenza A H1N1 was reported on 6 July 2009 from Pune.² The second case was reported by the National Institute of Virology (NIV), Pune, in a mother and son duo from Chennai on 1 June 2009.¹

H1 indicates the type of hemagglutinin enzyme on the surface of the virus and N1 indicates the type of neuraminidase enzyme imbedded. A disturbingly high morbidity (27236 cases) and mortality (981 deaths) have been reported from India. After the World Health Organization (WHO) announced the global pandemic in June 2009, it went on to declare the post-pandemic phase as of August 2010. As per the WHO, the pandemic influenza A (H1N1) virus is now considered as a seasonal influenza virus.³

Materials and Methods

Clinico-epidemiological characteristics of influenza A H1N1 cases from January 2015 to October 2017 were retrospectively analysed using data from the medical records department at K.S.Hegde medical college and hospital, Mangalore in the Dakshina Kannada region of Karnataka. Epidemiological characteristics were analysed in terms of demographic characteristics, clinical presentation and outcome. The study population included all patients diagnosed and confirmed as H1N1. All cases were confirmed by real time polymerase chain reaction of respiratory specimens which included throat swab. Detailed history, clinical manifestations and investigations were recorded. All confirmed cases were isolated and were treated with oseltamivir. Admitted patients were admitted in the Infectious disease ward from screening center, outpatient's department and emergency department. Screening, testing and treatment of H1N1 patients were done according to the guidelines of the Ministry of Health and Family Welfare, New Delhi.

The case definitions followed were as follows: (i) Suspected case was defined as a case with signs and symptoms as per category B and C7; and (ii) Confirmed case was defined as a probable case that was tested positive for pandemic influenza A (H1N1) 2009 by real-time reverse transcription polymerase chain reaction (RT-PCR). Throat or nasal swab samples of suspected cases with influenza-like illness (ILI) were collected in Viral Transport Medium and sent to laboratories after maintaining adequate cold-chain.³

Results

From January 2015 to October 2017, 12 cases were diagnosed as confirmed H1N1 positive. Three cases were identified in the year 2015, one case in 2016 and eight cases in the outbreak of 2017. (Figure 1)

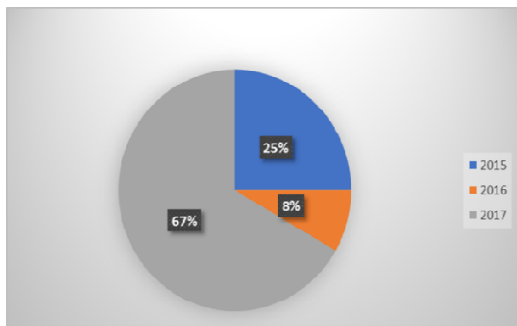


Figure 1: Distribution of confirmed H1N1 cases over the last three years

Of the total cases, three were males (25%) and nine were females (75%). All patients were from rural areas. Patients belonged to the age group of 20-60 years (mean age being 39.1). Five patients were less than age 40 years (41.6%). Main comorbidity noted was diabetes (41.6%). Maximum cases were detected in the month of June (25%). All cases were treated with Tamiflu and relatives of patients were administered prophylaxis for H1N1.

All cases required admission in isolation ward for treatment and intensive care. Average length of stay in the Influenza A H1N1 isolation ward was 8 to 10 days. The average length of stay was shorter in patients who succumbed, i.e. 3 days.

Total number of deaths accounted for five (41.6%) and all were females. The most common causes of death were viral bronchopneumonia (25%) and ARDS (16%). A total of 5 deaths occurred, patients who died required ventilator support and intensive care, 16.6% occurred within the first 48 hours of admission and all cases were females. Major symptoms were fever (100%), cough (100%), breathlessness (100%). Other common symptoms were expectoration (58.3%), throat pain (25%) and chest pain (33.3%).

Discussion

The H1N1 virus is an interesting entity. Recent studies at MIT have suggested that the Indian swine flu strain (A/India/6427/2014) contain various amino acid changes T200A and D225N as compared to influenza A(H1N1)pdm09, prominent among them being that it has an increased ability to bind to human glycan receptors, fusion and transmission that results in high virulence. Also, there is a probability of increased disease severity and decreased susceptibility to neuraminidase inhibitors leading to increased hospitalizations and deaths.⁴

Extensive literature review have revealed that there are very limited studies related to Influenza A H1N1, and its clinical and epidemiology profile in the Indian situation. The present study was an attempt to bridge the deficit; to study epidemiology of Influenza A H1N1 cases and to study clinical presentation of Influenza A H1N1 cases among a sub-population.²

In the present study, the most common symptom associated with Influenza A H1N1 was found to be fever, followed by cough, sore throat and breathlessness.² All cases from January 2015 to October 2017 were included in this study. Highest cases were noted in the year 2017, with maximum cases being observed in the months of June, probably due to the rainy season. Vijaydeep et al conducted a study in April 2009-2010, the study revealed maximum cases were noted in the month of December.¹ The disparity can be attributed to the different climatic phases in the country, the inference being that rainy seasons are the time when most outbreaks occur.

Secondly, female preponderance was seen in our study. Puvalingappa et al conducted a similar analysis and noted that there was no significant difference between males and females.⁵ The age of patients at our centre varied between 20-60 years and mortality was more in cases of age more than 40 years, which clearly reflects its high prevalence, morbidity and mortality among the younger and middle age population. According to another study, the prevalence of Influenza A H1N1 in 2009 was greatest among children and young adults, although older patients and those with co-morbidities are more likely to experience worse clinical outcome.¹ According to a study done in Queensland, a large number of cases were reported in the 10-19 years age group (28%), followed by the 20-29 years age group (26%).⁶ Similarly, a study done in New Zealand concluded that, in 2009, Influenza A H1N1 predominantly affected young women with relative sparing of the elderly population.⁷

The major conglomerate of symptoms noted were fever (100%), cough (100%), breathlessness (100%). Other common symptoms were expectoration (58.3%), throat pain (25%), chest pain (33.3%). In a study done in China, fever (81%), cough (40%) and sore throat (35%) were found to be most common symptoms in Influenza A H1N1.⁸ Fever (56%) was also reported to be the most common symptom, followed by cough (54%), sore throat

(32%), rhinitis (17%) and difficulty in breathing (7%) in a study of the first 100 cases of Influenza A H1N1 in Saudi Arabia.⁹

The main risk factor noted among patient's in our study was diabetes. Cardiac and respiratory diseases along with anaemia, obesity and cancer were the most common co-morbidities reported in other Indian studies.⁵The most common cause of death noted was respiratory failure; other causes of death being pneumonia, high fever leading to neurological problems, dehydration, and electrolyte imbalances. Fatalities too were observed to be more likely in younger children and the elderly, in studies and analyses conducted elsewhere.⁹

In the present retrospective analyses, all patients were observed to be from rural areas. Biswas et al conducted a study in Kolkata in 2010 and reported more cases from urban areas.¹⁰ Malhotra et al conducted a study in Rajasthan showed that positivity was higher among the urban populace (91.23%), compared to the rural population (8.77%).³ Influenza A H1N1 cases were reported to be more from the urban area than rural area, which may be due to the dense population in urban area favouring easy spread of the virus infection. Attack rates are also high in population groups where stagnated living conditions are a norm.¹¹

Outcome- The confirmed cases in the present study were admitted till they completed their complete Tamiflu therapy and were discharged soon after. Relatives of cases were administered prophylaxis for Influenza A H1N1.

Limitation- The major limitation of the study is that it was restricted to only one single center; sample size being limited to draw major conclusions.

CONCLUSION

On the basis of the findings of this study, it can be hypothesized that the prevalence of Influenza A H1N1 is higher in the younger and middle aged population. Fever, cough and sore throat are the most common symptoms with which the patients usually present. This means that the symptoms of H1N1 may be misleading and it is quintessential for clinicians to be aware of its myriad presentations, especially during seasons of outbreak. This study provides hospital-based epidemiological information, but community-based wider studies are required to arrive at a more precise and accurate understanding of Influenza A H1N1. Regular surveillance, early diagnosis and timely initiation of oseltamivir therapy in suspected cases would be helpful to reduce mortality and morbidity under such emergency situations. As the data from this analysis shows, patient load is also increasing, with every change of season, and this only further validates the author's view that further studies are essential.

Conflict of Interest: None

Source of Support: None

References-

1. Siddharth V, Goyal V, Koushal VK. Clinical-Epidemiological Profile of Influenza A H1N1 Cases at a Tertiary Care Institute of India. *Indian J Community Med Off Publ Indian Assoc Prev Soc Med.* 2012;37(4):232-5.
2. Gaikwad LL, Haralkar S. Clinico-epidemiological profile of Influenza A H1N1 cases admitted at a tertiary care institute of western India. -. *Int J Med Sci Public Health.* 2014;3(10):1258-61.
3. Malhotra B, Singh R, Sharma P, Meena D, Gupta J, Atreya A, et al. Epidemiological & clinical profile of influenza A (H1N1) 2009 virus infections during 2015 epidemic in Rajasthan. *Indian J Med Res.* 2016 Dec;144(6):918-23.

4. Sharma P, Gupta S, Singh D, Verma S, Kanga A. Influenza A(H1N1)pdm09 cases in sub-Himalayan region, 2014-2015 India. *Indian J Pathol Microbiol.* 2016 Jan 1;59(1):63.
5. Puvanalingam A, Rajendiran C, Sivasubramanian K, Ragunathanan S, Suresh S, Gopalakrishnan S. Case Series Study of the Clinical Profile of H1N1 Swine Flu Influenza. *J Assoc Physicians India.* 2011 Jan 1;59:14–6, 18.
6. Appuhamy RD, Beard FH, Phung HN, Selvey CE, Birrell FA, Culleton TH. The changing phases of pandemic (H1N1) 2009 in Queensland: an overview of public health actions and epidemiology. *Med J Aust.* 2010 Jan 18;192(2):94–7.
7. Garcia-Garcia L, Valdespino-Gomez JL, Lazcano-Ponce E, Jimenez-Corona A, Higuera-Iglesias A, Cruz-Hervert P, et al. Partial protection of seasonal trivalent inactivated vaccine against novel pandemic influenza A/H1N1 2009: case-control study in Mexico City. *BMJ.* 2009 Oct 6;339(oct06 2):b3928–b3928.
8. Kong W, Ye J, Guan S, Liu J, Pu J. Epidemic Status of Swine Influenza Virus in China. *Indian J Microbiol.* 2014 Mar;54(1):3–11.
9. AlMazroa MA, Memish ZA, AlWadey AM. Pandemic influenza A (H1N1) in Saudi Arabia: description of the first one hundred cases. *Ann Saudi Med.* 2010;30(1):11–4.
10. Biswas DK, Kaur P, Murhekar M, Bhunia R. An outbreak of pandemic influenza A (H1N1) in Kolkata, West Bengal, India, 2010. *Indian J Med Res.* 2012 Apr 1;135(4):529.
11. Chaudhari AI, Zaveri JR, Thakor N. Profile of confirmed H1N1 virus infected patients admitted in the swine flu isolation ward of tertiary care hospitals of Baroda district, Gujarat, India. *Int J Res Med Sci.* 2017 Jan 12;3(9):2174–80.