Print ISSN: 2321-6379
Online ISSN: 2321-595X
DOI: 10.17354/ijss/2016/522

Original Article

Incidence and Outcome of H1N1 Cases in a Tertiary Care Hospital in South India: A Retrospective Observational Study

Jacob K Jacob[1], Shiji K Jacob[2], Suma Samuel[3], P G Renjith[4], Abin Mathew[5]

[1]Professor, Department of General Medicine, Government Medical College, Kalamassery, Ernakulam, Kerala, India, [2]Professor, Department of Pediatrics, Government Medical College, Kalamassery, Ernakulam, Kerala, India, [3]Assistant Professor, Department of Medicine, Government Medical College, Kalamassery, Ernakulam, Kerala, India, [4]Resident, Department of Medicine, Government Medical College, Kalamassery, Ernakulam, Kerala, India, [5]Intern, Department of Medicine, Government Medical College, Kalamassery, Ernakulam, Kerala, India

Abstract

Introduction: Influenza virus infection is a common, easily contagious, acute febrile illness which ranges from a mild fatigue to acute respiratory distress syndrome (ARDS), respiratory failure or death. H1N1 pandemic had its significantly great impact in India from April 2009 to August 2010. Those with comorbid illnesses get more severe and fatal illness. High mortality among young and healthy age group is a real matter of concern which also needs further studies.

Materials and Methods: The epidemiological data of patients admitted to the Medical College Hospital, Kalamassery, Ernakulam District of Kerala from 2009 April to 2016 July were analyzed from the medical records library and from the epidemiological data section.

Results: During 2009-2010 period, an epidemic of H1N1 fever about 32 cases was admitted to the special ICU of the nodal center. There were 3 deaths among the cases (9.4%). All of them were sick referred cases and in the age group 25-35 years. 2 of them were females. They all had viral bronchopneumonia and ARDS. Over the next 6 years until July 2016, no further cases have been recorded in the area. The monthly trend was plotted in multiple line diagrams and shows that the fever surge every year is almost similar with a clear-cut rise from the month of May with the beginning of the monsoon and lasting till the end of September with the close of the monsoon.

Conclusion: H1N1 influenza caused severe illness requiring admissions. The major cause of death was viral bronchopneumonia and ARDS. A high index of suspicion, prompt treatment with Oseltamivir and mechanical ventilation had a role in reducing the mortality. There was a definite peaking of H1N1 in the monsoon. Vaccination and special focus and studies of the young target population are mandatory.

Key words: Fever mortality, H1N1, Influenza, Oseltamivir

INTRODUCTION

Influenza virus infection is a common illness and very easily contagious. It causes an acute febrile illness which ranges from a mild fatigue to acute respiratory distress syndrome (ARDS), respiratory failure or death. H1N1 Influenza virus is a new virus which came up in late April 2009 in Kerala and probably originated in the pig farms in Mexico.[1-4] Hence, it was called swine flu. Inside the pigs a genetic reassortment occurred to the usual influenza viruses resulting in the new H1N1 virus. The virus was introduced to human beings and thereafter spread from man to man. H1N1 pandemic had its significantly great impact in India from April 2009 to August 2010. Kerala and Maharashtra were the most affected. It came like any other flu-like illness, and people were unprepared to face such a new epidemic especially with its similarity to usual flu-like illness but so different in its fiery complications.[5-8] Morbidity and mortality is more among the elderly, children, and pregnant females. Signs and symptoms are similar

Access this article online

www.ijss-sn.com

Month of Submission : 08-2016
Month of Peer Review : 08-2016
Month of Acceptance : 09-2016
Month of Publishing : 10-2016

Corresponding Author: Dr. Jacob K Jacob, Department of General Medicine, Government Medical College, Kalamassery, Ernakulam - 683 104, Kerala, India. Phone:+91-9446035690. E-mail: jacobkjacob@yahoo.com

to other flu viruses but much different in infectivity and virulence. The secondary attack rate in India ranged from 22% to 33%.[9-12] The overall mortality is 0.1-0.3%.[2] H1 indicates the type of hemagglutinin enzyme on the virus surface and N1 indicates the type of neuraminidase enzyme. H1N1 pandemic of 2009 caused maximum mortality among the young population. 2560 cases of swab positive reports occurred of which 80 died in Kerala State in 2009.[1] Of these 22 were associated with pregnancy or postpartum period. During the second attack in 2010 May to July, almost 946 swab-positive cases were reported of which 43 died and 14 were related to pregnancy.[2] H1N1 can cause asymptomatic infection or uncomplicated upper respiratory infection or severe pneumonia with multi-organ failure too. Diagnosis requires clinical, and epidemiological data as any other virus can cause influenza-like illness. It can be confirmed by laboratory data. Hence, the treatment should not be delayed at any cost. Those with comorbid illnesses get more severe and fatal illness. Rapid deterioration can occur in any patient in a few hours time.[2] High-risk groups include infants and young children, pregnant women, chronic respiratory illnesses, cardiac disease, diabetes, chronic kidney or liver failure or central nervous system diseases, immune suppression, hemoglobinopathies, and elderly.

Aims and Objectives

To look at the incidence and outcome of H1N1 patients over a 7-year period in a tertiary care center in South India compared to other specific causes of fever. A retrospective observational study.

MATERIALS AND METHODS

The epidemiological data of patients admitted to the Medical College Hospital, Kalamassery, Ernakulam District of Kerala from 2009 April to 2016 July were analyzed from the medical records library and from the epidemiological data section. The institution was a regional nodal center for admission and treatment of H1N1 cases in 2009 - 10. The total admissions, number of admissions with fever, total mortality and mortality of fever cases, and that of H1N1 were looked at.

Limitations

Under-reporting of many fever cases especially outpatient department (OPD) cases and those attending the casualty during non-OPD hours. Nonavailability of computer based data. This must have caused a certain amount of errors.

RESULTS

A total of about 54000 patients attended the hospital with fever in the medicine and allied departments during 2009 to 2016 July (Figure 1). Unidentified viral fevers, acute diarrheal diseases and simple respiratory infections topped the list. Other specific fevers were charted and found that pneumonias topped the list followed by tuberculosis, dengue fever, exanthematous fevers, hepatitis, typhoid, meningitis, and leptospirosis (Figure 2). During 2009-2010, there was an epidemic of H1N1 fever and along with other states especially Maharashtra, Kerala was one of the worst-hit states. This institution was one of the nodal centers in the middle part of Kerala and the cases admitted here during the time were included in the statistics. It was found that among the many number of cases which reported with suspected H1N1 fever about 32 cases were admitted to the special ICU of the nodal center (Figure 3). The throat swabs were sent and found to be positive. There were 3 deaths among the cases (9.4%). All of them were sick referred cases and in the age group 25-35 years. 2 of them were females. They all had viral bronchopneumonia and ARDS. Over the next 6 years until July 2016, no further cases have been recorded in the area. The monthly trend was plotted in multiple line diagrams (Figure 4) and shows that the fever surge every year is almost similar with a clear-cut rise from the month of May with the beginning of the monsoon and lasting till the end of September with

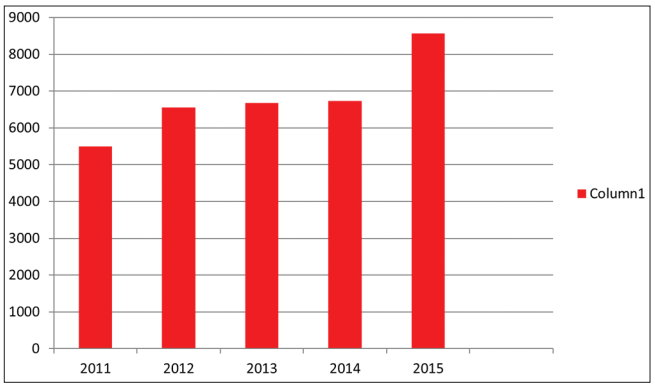

Figure 1: Bar chart showing the trend of total fever cases over last 5 years

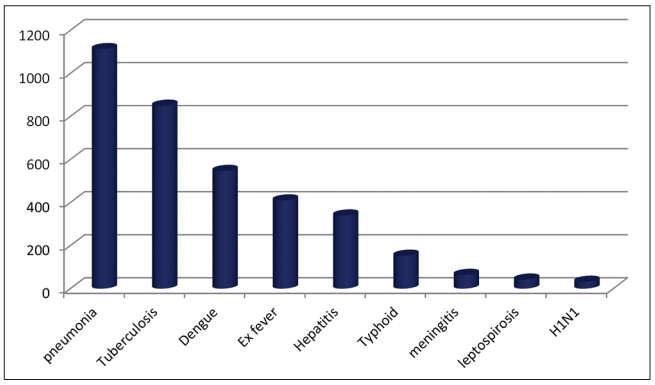

Figure 2: The incidence of different fevers excluding common viral fever, simple respiratory infection, UTI and acute diarrheal diseases

the close of the monsoon. The percentage of fever which needs IP care remained almost the same (13.5-15.5%) over the last 3 years (Figure 5). All H1N1 cases which came to the nodal center were given special ICU care.

The mortality pattern of different fevers was looked into and it was observed that complicated leptospirosis topped the list mostly due to delayed presentation (Figure 6).

DISCUSSION

During June 2009-2010 August H1N1 pandemic, Kerala was affected badly along with other states especially Maharashtra. Among the many number of cases which reported with suspected H1N1 fever about 32 cases were admitted to the special ICU of the nodal center. The throat swabs were sent and found to be positive. There were 3 deaths among the cases (9.4%). All of them were sick referred cases and in the age group 25-35 years. 2 of them were females. One of them was a pregnant lady and all were without any other underlying health problems. They all presented late and had viral bronchopneumonia and ARDS. This is consistent with the state and national clinical profile.[1] The mortality was 9.4%. Bhatt *et al.* have described an in hospital mortality of 58.53%,[2] whereas Rama *et al.* have observed a mortality of 17.19% in a study in 2015.[3] The overall mortality is only 0.3-0.5%.[1] The observed relatively high mortality percent compared to the state, and national mortality is probably because the statistics is from a nodal apex center. H1N1 has a high mortality rate even in the best institution. All patients were, however, treated with the existing oseltamivir regimen and supportive treatment including ventilation. All the exposed was also given oseltamivir and none of the contacts or caring staff who were on oseltamivir developed the disease despite closely working with the patients. This showed the efficacy of oseltamivir regimen during the pandemic both in prophylaxis as well as in treatment. Bhat *et al.* have identified poor prognostic factors as the development of ARDS, comorbid medical conditions and delay in starting antiviral therapy.[2] The epidemiologic hallmark of pandemic influenza is its early mortalities among young healthy individuals.[8] Early identification, treatment, and isolation of ILI is important in spread of the disease as well as prevention of morbidity and mortality.[3]

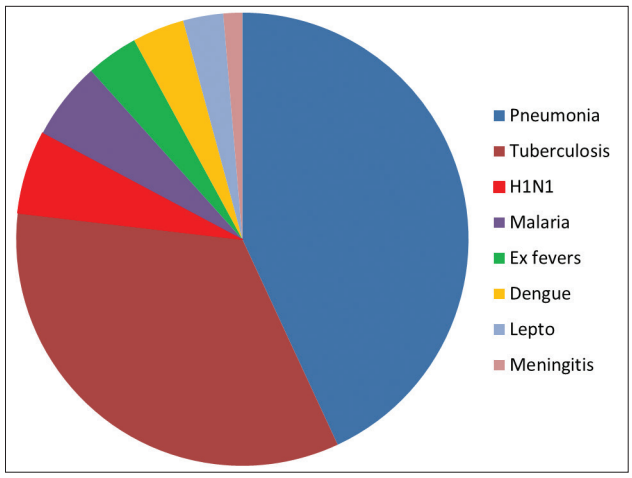

Figure 3: Pie chart showing the differential incidence of specific fevers during 2009 - 2010

Over the next 6 years until July 2016, no further cases have been recorded in the area. This shows that H1N1 has ceased spreading in the locality due to excellent and combined preventive measures taken by the honourable

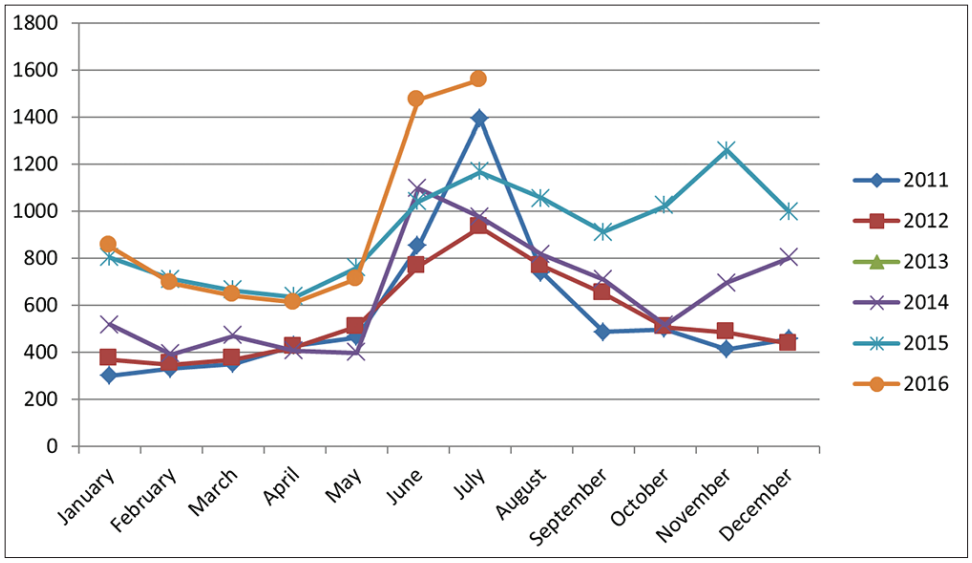

Figure 4: The monthly trend of fever cases over a 6 year period

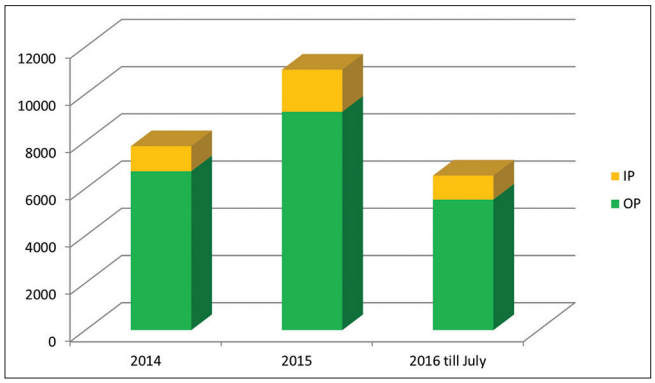

Figure 5: Bar diagram showing the OP-IP ratio of fever cases over the last 3 years

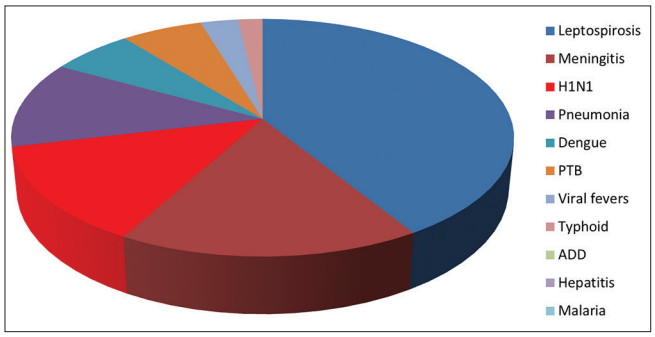

Figure 6: Pie chart showing the mortality pattern in the study

government agencies and the NGOs. Herd immunity attained during this period may be another important reason besides other epidemiological factors, why fresh cases have not occurred despite the epidemic running in other H1N1 naive areas of our country. The monthly trend of all fevers put together showed a definite peaking in the monsoon with the onset in May and return in September. This correlates with the mosquito breeding period especially because of the pooling of water in small or big collections. However, with the prompt use of effective medical as well as environmental measures, the epidemic in the area could be controlled and no further cases have been reported 5 years down the line. Unlike the average flu, H1N1 tended to kill younger people; 80 % were <60 years and almost the third were healthy with no underlying health problems.[5] Kadam *et al.* have noted that young to middle-aged patients were commonly affected and common comorbidities were pregnancy, diabetes, hypertension, and obesity.[6] In delayed presentations, there can be a 30 % mortality.[5] There was no case reported in the region after August 2010. This may be due to screening of all immigrants, efficient surveillance, early detection and optimal treatment of cases and contacts, setting up of adequate laboratory facilities, provision of antiviral drugs in adequate quantities, isolation of cases and prophylactic measures including oseltamivir, anti mosquito measures, environmental sanitation and N 95 masks through the best efforts of government and NGOs which brought the pandemic to a halt in India too. However, a revisit in other states of India after 6 years points to the possibility of further mutations or the naive nature of the susceptible populations.[5,12-14]

CONCLUSION

During the evaluation period, H1N1 influenza caused severe illness requiring admissions. The major cause of death was viral bronchopneumonia and ARDS. A high index of suspicion, prompt treatment with oseltamivir, and mechanical ventilation had a role in reducing the mortality. There was a definite peaking of H1N1 in the monsoon. What worries an epidemiologist as well as the clinician most is the ability of the influenza virus to undergo frequent and unpredictable mutations which can result in the emergence of an even more virulent virus in future and epidemiological and clinical vigilance is warranted. Vaccination and special focus and studies of the young target population are mandatory.

ACKNOWLEDGMENTS

Our sincere thanks to Mrs. Dhanya, data analyst of epidemiological section; Staff of records library, Dr. Praveen Dept. of Community Medicine, Dr. Savio Bonnie George, Lecturer in Medicine for their sincere help and co-operation at various stages of this study.

REFERENCES

1. Kumar A. H1N1 influenza-a: The pandemic resurgence and emerging strategies in management. KMJ 2010;10:147-51.
2. Bhatt KN, Jethw SC, Bhadiyadar D, Patel D, Joshi K. Study of clinical profile in patients with H1N1 influenza in Surat district, June 2009 – March 2010. J Assoc Physicians India 2012;60:15-9.
3. Sharma R, Agarwal S, Mehta S, Nawal CL, Bhandari S, Rathore M, *et al*. Profiling the mortality due to influenza A (H1N1) pdm09 at a tertiary care hospital in Jaipur during the current season--January & February 2015. J Assoc Physicians India 2015;63:36-9.
4. Nadkar MY, Subramanian S, Ingole N. H1N1 influenza: An update. JAPI 2009;57:454-8.
5. Itolikar S, Nadkar MY. H1N1 revisited after six years: Then and now. J Assoc Physicians India 2015;63:41-3.
6. Borse RT, Kadam DB, Sangle SA, Basavraj A, Prasad HB, Umarji PB, *et al*. Clinicoradiologic correlation in adult patients diagnosed with novel influenza A (H1N1). J Assoc Physicians India 2013;61:600-7.
7. Koujalgi R. H1N1 encephalopathy. JAPI 2013;61:80-1.
8. Cunha BA. Swine influenza (H1N1) pneumonia: Clinical considerations. Infect Dis Clin North Am 2010;24:203-28.
9. Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team, Dawood FS, Jain S, Finelli L, Shaw MW, Lindstrom S, *et al*. Emergence of a novel swine-origin influenza A (H1N1) virus in humans. N Engl J Med 2009;360:2605-15.
10. World Health Organization. Pandemic (H1N1) Update 67. Geneva: World Health Organization; 2009.
11. Ministry of Health and Family Welfare-Government of India. Pandemic

Influenza A (H1N1)-Guidelines on Categorization of Influenza A H1N1 Cases During Screening for Home Isolation, Testing Treatment, and Hospitalization. Available from: http://www.mohfw-h1n1.nic in. [Last revised on 2009 Oct 05].

12. WHO Programme and Projects Global Alert and Response Disease Outbreak News WHO, Pandemic H1N1, 2009 - Update 78, 18 December; 2009.
13. World Health Organization. Clinical Management of Human Infection with New Influenza A [H1N1] Virus; Initial Guidelines. United States: World Health Organization; 2009.
14. Archer B, Cohen C, Naidoo D, Thomas J, Makunga C, Blumberg L, *et al*. Interim report on pandemic H1N1 influenza virus infections in South Africa, April to October 2009: Epidemiology and factors associated with fatal cases. Euro Surveill 2009;14. pii:19369.

How to cite this article: Jacob JK, Jacob SK, Samuel S, Renjith PG, Mathew A. Incidence and Outcome of H1N1 Cases in a Tertiary Care Hospital in South India: A Retrospective Observational Study. Int J Sci Stud 2016;4(7):39-43.

Source of Support: Nil, **Conflict of Interest:** None declared.