**ORIGINAL ARTICLE**

# Study of Epidemiological and Clinical Profile of Influenza A H1N1 Cases

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**ABSTRACT**

**BACKGROUND:** Influenza virus is a common respiratory pathogen .In April 2009, a new strain of Influenza virus A H1N1 was evolved and spread in several countries around the world and caused pandemic. After that the resurgence of H1N1 epidemic occurs almost every year and it has caused significant morbidity and mortality. The objective of this study is to analyze the epidemiological profile, clinical characteristics and outcome of hospitalized H1N1 cases during 2015 epidemic. **METHODS:** The retrospective study of the category C H1N1 positive influenza cases admitted during 15 February 2015 to 25 March 2015 was done to analyze the epidemiological and clinical data. The statistical analysis was done by using Microsoft excel and chi square test **RESULTS:** Total 50 cases were studied. Female to male ratio was 1.5:1 with female preponderance and median age was 46 years. The most common presenting symptoms were cough, breathlessness, sore throat and fever. The case fatality rate was 14%. **CONCLUSION:** Our study shows higher age group shift of H1N1 cases compared to previous years. Total WBC counts were in lower range of normal limit. Co-morbid conditions were significantly associated with increase requirement for ventilatory support and need for ventilatory care was associated with significantly increased mortality.

**Key words:** Clinical characteristics, epidemiological, H1N1 influenza epidemic

## INTRODUCTION

Influenza is highly contagious and constitutes a significant public health problem due to its rapid transmission and the high associated morbidity and mortality.[1] The latest influenza pandemic due to Influenza A (H1N1) 09 (pdm H1N1) began in May 2009, spread to all over the world and became global by July 11 2009. On 10th August 2010, the pandemic was declared to be an end with more than 18,449 deaths reported worldwide by end of the month.[2,3]

The resurgence of H1N1 epidemic in 2015 since December 2014 however appears to be worse than the previous one, leading to over 33,000 cases and 2000 deaths countrywide.[4] While on comparison with previous years, there were 5044 cases and 405 deaths in 2012[5], 5250 cases and 692 deaths in 2013.[6] and 937 cases and

218 deaths from swine flu in 2014.[4] By mid-February 2015, the reported cases and deaths in 2015 had surpassed the previous numbers.[4] The resurgent waves lead to more number of hospitalizations and deaths due to pdmH1N1 as compared to the rest part of the year and appear at an interval of 1.5-2 years.[7]

Influenza pandemic is commonly believed to sustain for a year or two. But in last 6 years from 2009 pandemic, H1N1 epidemic comes in several waves over multiple years causing high morbidity and mortality every time,[8,9] meaning thereby, resurgence due to pandemic influenza virus is not exception, but common even after the pandemic is over.

There are few studies done in India to describe the epidemiological profile ,clinical characteristics and outcome of H1N1 cases. We carried out retrospective, descriptive study to describe the epidemiological profile and clinical characteristics and outcome of hospitalized H1N1 cases during 2015 epidemic in Sabarkantha district ,Gujarat.

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## MATERIAL AND METHOD

This is a hospital-based retrospective study of the Category C H1N1 positive influenza cases admitted during 15 february 2015 to 25 March 2015. The file records of H1N1 cases where used to obtain & analyze the Demographic data like age, sex; history like associated diseases e.g. diabetes mellitus, cardiac disorder, chronic pulmonary disease ; clinical findings like presenting symptoms ,laboratory findings, requirement of ventilatory support and outcome like cure or death.

The nasal and throat swabs from category C -suspected swine flu patients were collected in viral transport medium by microbiology department and sent to B.J. Medical College, Civil Hospital, Ahmedabad for H1N1 testing by Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR)

Statistical analysis: All the relevant data collected and analyzed using Microsoft Excel and chi square test. P value less than 0.05 was considered as statistically significant at 95% confidence level.

## RESULT

Our study include total 50 cases. Male - 20(40%) & female - 30(60%), among this 1 was pregnant ,ratio from female to male was 1.5:1 with female preponderance.

### Table 1: Age profile of H1N1 cases

| Age(years) * | Male | Female | Total | |
|---|---|---|---|---|
| 15-29 | 3 | 4 | 13 | 25(50%) |
| 30-44 | 5 | 9 | 12 | |
| 45-59 | 5 | 13 | 17 | 25(50%) |
| ≥60 | 7 | 4 | 8 | |
| Total | 20 | 30 | 50 | |

*In Our study, we have not included pediatric cases having age below 15 years. Mean Age was 45.12 years & median age was 46 years.

The cough was present in 50 (100%) cases, breathlessness in 48(96%),Sore throat in 47(94%), Mild fever in 47(94%), Running Nose in 30(60%), Headache and Bodyache in 14(28%), High Grade Fever in 9(18%),chest pain in 9(18%), Diarrhoea in 8(16%), Vomiting in 7(14%), Sputum with blood in 2(4%) and Abdominal Pain in 2(4%) cases.

The mean & median Pulse(/min) both were 107.The mean & median Systolic Blood Pressure was 126.8 and 130 respectively. The mean & median Diastolic Blood Pressure was 80.9 & 80 respectively. The mean & median Respiratory Rate (/min) was 17.9 & 18 respectively. The mean & median SPO2 was 88.8 & 92 respectively. The tachycardia & tachypneoa were present in 31(62%) and 5(10%) cases, respectively.

### Table 2: Chest X-ray findings according to lobe involvement

| Lobe involvement † | Zone involved | No. of cases | | No. of Case Expired |
|---|---|---|---|---|
| Bilateral | Extensive | 2 | 27(54%) | ------- |
| | Middle & Lower Zone | 12 | | 5 |
| | Lower Zone | 13 | | 1 |
| Left | Middle & Lower Zone | 2 | 14(28%) | ----- |
| | Middle Zone | 1 | | ----- |
| | Lower Zone | 11 | | ---- |
| Right | Middle Zone | 1 | 7(14%) | ---- |
| | Upper & Middle Zone | 1 | | ----- |
| | Lower Zone | 4 | | 1 |
| | Middle % Lower Zone | 1 | | ---- |

†In two cases, there was no abnormality detected.

### Table 3: Chest X-ray findings according to zone involvement

| Zone | Involvement | No. | Total No. & Percentage |
|---|---|---|---|
| Middle Zone | Left | 1 | 1 (2%) |
| | Right | 1 | |
| Lower Zone | Bilateral | 13 | 32 (64%) |
| | Left | 11 | |
| | Right | 4 | |
| Middle & Lower Zone | Bilateral | 12 | 13 (26%) |
| | Left | 2 | |
| | Right | 1 | |
| Upper & Middle Zone | Right | 1 | 1 (2%) |
| Extensive | Bilateral | 2 | 3 (6%) |

The mean and median Total Leucocytes Count was 6746.8 & 5100 respectively. The mean and median Europhile Percentage was 62.6 & 58.5 respectively. The mean and median Lymphocyte Percentage was 23.4 & 27 respectively. The mean and median Monocyte Percentage 11.1 & 10.5 respectively. The mean and median Platelet Count was 2,33,040 & 2,24,000 respectively. The mean and median ESR was 29.2 & 28 respectively. Urea was elevated in 8 cases(16%) and billirubin was normal in all cases.

**Table 4:Requirement of Ventilatory Support**

| Ventilatory Support | Absconed | Cured | DAMA | Expired | Grand Total |
|---|---|---|---|---|---|
| CPAP | 1 | 10 | 1 | 5 | 17 |
| CPAP + Invasive | ----- | ------ | ----- | 1 | 1 |
| Invasive | ----- | ----- | ----- | 1 | 1 |
| Grand Total | 1 | 10 | 1 | 7 | 19 |

**Table 5 : Profile of High Risk Factors**

| High Risk Condition | Cured | Expired | Absconed | Total |
|---|---|---|---|---|
| COPD | 1 | .... | 1 | 2 |
| CRF,DM | 1 | .... | .... | 1 |
| DM | 5 | .... | .... | 4 |
| DM,IHD | 1 | .... | .... | 1 |
| DM,IHD | .... | 1 | .... | 1 |
| IHD | ..... | 1 | .... | 1 |
| Total | 8 | 2 | 1 | 11 |

COPD-Chronic Pulmonary Disease, CRF-Chronic Renal failure, DM-Diabetes Mellitus, IHD-Ischemic Heart Disease, HTN,-Hypertension, Total seven cases were died. The cause of death in six cases was Acute Respiratory Distress and in one was Myocarditis. The case fatality rate was 14%.

## DISCUSSION

Influenza A (H1N1) is similar to seasonal influenza but has been characterized by higher activity during the northern summer season, higher fatality rates among healthy young adults and higher incidence of viral pneumonia, While death resulting from seasonal influenza occurs mainly in the elderly and in individuals with pre-existing chronic diseases.[10]

In our study, mean age was 45.12 & median age was 46.The age group between 45-59 years bears highest cases. Our study does not contain pediatric cases in study. The study of cases of H1N1 epidemic from january to march 2015 done by Barot N et al in 2015[11], also shows second highest cases distribution in 50-59 age group after highest in pediatric age group. But study done by Prakash Patel et al.[12] of H1N1 cases of the same epidemic period in Surat city, shows highest cases between 30-40 years age group. Majority of studies involving H1N1 cases of 2009 to 2013 epidemic shows ,younger population from children to young adult, having <45 years of age predominantly affected.[13-15] Thus our study having H1N1 cases of 2015 epidemic shows higher age group shift compared to H1N1 cases from 2009 to 2013.It may suggest gradual change in demographic profile of H1N1 epidemic.

The females were predominantly affected with female to male ratio was 1.5:1.The sex distribution is different in different studies involving cases of 2009 to 2015 H1N1 epidemic.[12,13,15]

Common presenting symptoms include cough, breathlessness, sore throat, mild fever, running nose present in 100%,96%,94%,94%,60% cases respectively. Other less common features are Headache and Bodyache, High Grade Fever, Chest pain, Diarrhoea, Vomiting, Sputum with blood, Abdominal Pain present in 28%,18%,18%,16%,14%,4% cases respectively. In most of the studies fever, cough, breathlessness and sore throat are most common presenting symptoms and diarrhoea, vomiting, chest pain is less common symptom.[14,15] But study done by Rao BVN et al.[16] noticed vomiting present in 70% cases.

Mean total WBC count was 6747 & Median was 5100.Thus, Total WBC count were in lower range of normal limit. Platelets were under normal limit in most of the cases. The hematological findings correlates with hematological study done by Nianyue Wang et al.[17] and Patel KK et al.[15] The influenza A H1N1-infected patients, shows lymphocyte count in normal range which is different from the clinical signs of the common respiratory virus infection, such as rhinovirus and respiratory syncytial virus (RSV) (the ratio of the lymphocytes increased). [17] Liver & renal function tests were normal in majority.

Out of 11 patients with co-morbidities, 7(63.64%) required ventilatory support, while out of 39 patient without comorbidities 12(30.8%) required ventilatory support. Thus, co-morbid conditions were significantly associated with increase requirement for ventilatory support(p=0.0474) Out of 50 cases, 19 (38%) cases require ventilatory support. 7 patients(36.9%) out of 19 who required ventilatory support died, while all patients who didn't required ventilatory support survived .Thus, need for ventilatory care

was associated with significantly increased mortality ($P =0.0003$).

Co-morbidities were seen in 11 (22%) patients, out of these 2 (18%) patients were expired. While Out of 39 patients without co-morbidities,5 (13%) were expired. Thus, mortality rate seems to be high in patients with co-morbidities. But at p value 0.05,there is no statistical significance was found.(p==0.6509) Diabetes was most prevalent comorbid condition ,present in total 8 cases.

Total 7 cases were expired out of total 50 H1N1 cases in study. Thus mortality rate was 14% ,which is lower than other studies done by Mahendra Singh et al.[18], Dr Kshitij Domadia[19] and Patel KK[15] (mortality rate 19.1%,22.4% , 22.2% respectively.)

## CONCLUSION

Our study shows higher age group shift of H1N1 cases compared to previous years. The H1N1 epidemic had the same clinical features as seasonal influenza except vomiting and WBCs count was in lower range of normal limit. When compared to seasonal influenza it has higher fatality rate. Co-morbid conditions were significantly associated with increase requirement for ventilatory support and need for ventilatory care was associated with significantly increased mortality .

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