

# Clinical-Epidemiological Profile of Influenza A H1N1 Cases at a Tertiary Care Institute of India

Vijaydeep Siddharth, Vineet Goyal<sup>1</sup>, Vipin Kumar Koushal<sup>2</sup>

Department of Hospital Administration, AIIMS, New Delhi, <sup>1</sup>Deputy Medical Superintendent, State Institute of Mental Health, PGIMS, Rohtak, Haryana, <sup>2</sup>Department of Hospital Administration & Medical Superintendent, GMCH, Chandigarh, India

## ABSTRACT

**Introduction:** Influenza virus is a common human pathogen that has caused serious respiratory illness and death over the past century. In April 2009, a new strain of Influenza virus A H1N1, commonly referred to as “swine flu,” began to spread in several countries around the world, and India confirmed its first case on 16 May 16 2009. **Aim:** To study the clinical and epidemiological profile of Influenza A H1N1 cases at the Government Medical College and Hospital, Chandigarh. **Materials and Methods:** Clinical epidemiological characteristics of Influenza A H1N1 cases from May 2009 to April 2010 were retrospectively, descriptively analyzed using data from the Influenza A H1N1 screening center and isolation ward at the Government Medical College and Hospital, Chandigarh. Data were Analyzed using MS Excel software. **Results:** At GMCH, till April 2010, a total of 4379 patients were screened for Influenza A H1N1, of which 365 patients were tested. The most common symptoms were fever (87.6%), cough (49.77%), sore throat (27%) and breathlessness (23.9%). The most common presentation (42.30%) of Influenza A H1N1 cases was fever and cold-like features, not cough. 29.58% (108) of the tested patients were found to be positive for the disease. Maximum cases were detected in the month of December, and the patients less than 40 years of age accounted for 81.4% (44 cases) of the cases. Influenza A H1N1 resulted in death of 54.9% (28) of the admitted cases, of which 46% (12) deaths occurred within 48 h of admission. **Conclusion:** On the basis of these findings, it can be safely hypothesized that prevalence of Influenza A H1N1 is high in the younger population, and fever, cough and sore throat are the most common symptoms with which the patients usually present.

**Keywords:** Epidemiology, influenza A H1N1, swine flu

## Introduction

Influenza virus is a common human pathogen that has caused serious respiratory illness and death over the past century. It always had potential to cause widespread pandemics whenever a new type of Influenza strain appeared in the human population and then spread easily from person to person.<sup>(1)</sup> In April 2009, a new strain of Influenza virus A H1N1, commonly referred to as “swine flu,” began to spread

in several countries around the world. The recent H1N1 virus strain has been found to be closely related to the swine flu virus, but with a genetic composition that is quite different from the earlier known isolates. This novel virus presented genetic characteristics that had not been previously identified in Influenza A in humans, swine or poultry.<sup>(2,3)</sup>

India confirmed its first case on 16 May 16 2009, when a man travelling from New York via Dubai and Delhi tested positive for the H1N1 Influenza virus in Hyderabad.<sup>(4)</sup> 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.<sup>(1)</sup> As there are very limited studies relating to Influenza A H1N1 and its epidemiology in the Indian situation, this study aimed to study the clinic epidemiologic profile of patients found positive for Influenza A H1N1

Access this article online	
Quick Response Code:	Website: www.ijcm.org.in
	DOI: 10.4103/0970-0218.103471

## Address for correspondence:

Dr. Vijaydeep Siddharth, Room. No. 12, Control Room, Near MS Office, Old Private Ward Block Ground Floor, Department of Hospital Administration, AIIMS, Ansari Nagar, New Delhi, India. E-mail: dr.siddharthmamc@gmail.com

**Received:** 02-09-11, **Accepted:** 02-12-11

at the Government Medical College and Hospital, Chandigarh.

## Materials and Methods

In order to study the epidemiology and establish the magnitude and severity of Influenza A H1N1, a retrospective, descriptive study was carried out at the Government Medical College and Hospital, Chandigarh. Data of swine flu cases from May 2009 to April 2010 were taken from the Influenza A H1N1 screening center and isolation ward. Epidemiological characteristics were analyzed in terms of demographic characteristics, clinical presentation and outcome. The study population included all the suspected patients tested for Influenza A H1N1.

Data were collected from a questionnaire that was used to record patient information and presentation, which was administered by the doctor on duty. Records of the Influenza A H1N1 screening center and isolation ward were also studied. Data were analyzed using Microsoft Excel Software and basic statistical measures like mean, median, percentage, etc. were calculated.

## Results

The GMCH, located in sector 32, Chandigarh, is a 674-bedded multispecialty tertiary care teaching institution. Screening, testing and treatment of patients were done according to the guidelines of the Ministry of Health and Family Welfare, New Delhi.

A screening center and isolation ward with critical care facility for Influenza A H1N1 patients was created to provide necessary medical care. Patients were admitted in the isolation ward from the screening center, outpatient department and emergency department (medicine and pediatrics).

From May 2009 to April 2010, 4379 patients were screened and 365 patients were tested, of which 29.58% (108) were found to be positive and 153 patients (case and suspect) admitted in the Influenza A H1N1 isolation ward of the GMCH. The first case in GMCH was confirmed on 27 July 2009. A total of 54 confirmed cases were admitted in the Influenza A H1N1 isolation ward, of which 54.9% (28 cases) succumbed to the disease [Table 1]. The case fatality ratio was found to be 25.9%. GMCH received patients mainly from Chandigarh, Punjab, Haryana and Himachal Pradesh, etc. details of which are given below.

From Figure 1, it can be seen that the number of Influenza A H1N1 cases gradually escalated from the month of July, reaching a peak in the winter months. The GMCH had reported maximum cases and mortality in the

month of December, i.e., 46% and 67.8% (total cases and mortality reported during the entire study period), respectively [Figure 1].

## Characteristics of influenza A H1N1 cases

Of the 4379 patients screened at the Influenza A H1N1 screening clinic at GMCH, 8.3% (365 cases) of the suspected patients were tested and 29.58% (108 cases) patients were found to be positive. Patient's age varied from 4 months to 80 years, with an average age of 27 years (median age of 24 years).

From Table 2, it can be seen that of the total cases, 56.48% (61 cases) were male and 43.51% (47 cases) were female. Influenza A H1N1 primarily affected the younger population, with patients less than 40 years accounting for 81.4% (44 cases) of the cases [Table 2]. The age group of 0-18 years accounted for 39.8% (43 cases) and 18-40 years age group comprised 40.7% (44 cases) of the total cases [Table 2]. 39.3% and 42.5% of the total positive patients in males and females were of the age group 18-40 years, respectively. The age group of 0-5 years comprised only 10.18% (11 cases) of the total cases, of which five cases occurred in children less than 1 year of age. Population at the extremes of age (0-5 and >60 years) formed 17.5% (10.1% and 7.4%, respectively) of the total positive patients [Table 2]. From Table 2, it can be hypothesised that Influenza A H1N1 has caused huge morbidity among the younger population, i.e., less than 40 years of age, and the older population got relatively spared. Influenza health care providers constituted 12.96% (14) of the total positive cases, of which the majority were doctors, i.e., 85.7% (12), and a single case was seen in nursing personnel and hospital attendant.

## Clinical presentation and outcome of influenza A H1N1 Cases

Commonly prevalent symptoms associated with Influenza A H1N1 were found to be fever (87.6%), cough (49.77%), sore throat (27%) and breathlessness (23.9%). From Figure 2, it can be concluded that the most common presentations among Influenza A H1N1 cases were fever and cold-like features, but not cough (42.30%); fever with shortness of breath with or without cold-like features (15.30%); fever, sore throat and cough with or without cold-like features (11.50%); and fever, cough and cold-like features (10.57%).

**Table 1: Geographical distribution of Influenza A H1N1 cases in GMCH, Chandigarh**

	Positive	Admitted	Deaths
Chandigarh	52	19	06
Haryana	22	16	08
Punjab	29	17	12
HP	05	03	02
Total	108	54	28

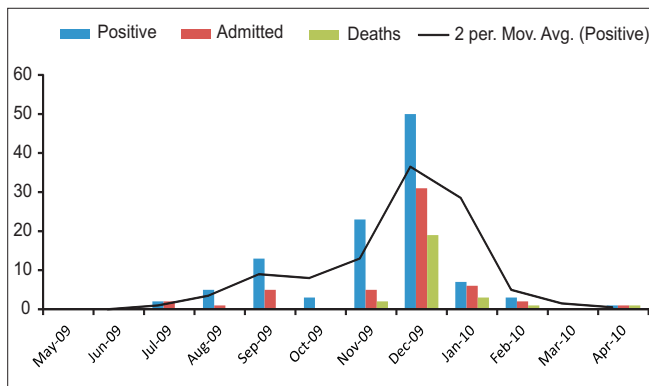


Figure 1: Trend of Influenza A H1N1 cases in GMCH

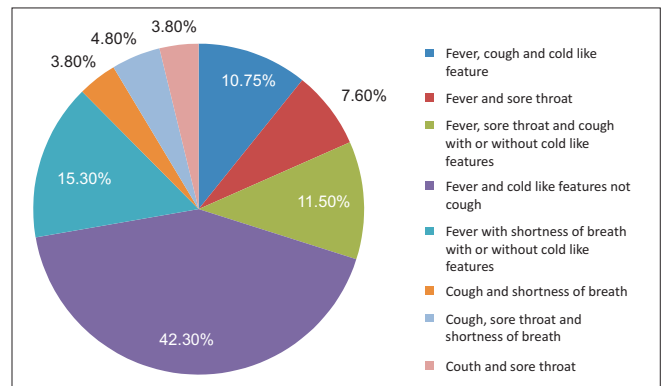


Figure 2: Various presentations among laboratory confirmed cases of Influenza A H1N1 at GMCH

Table 2: Morbidity and mortality due to Influenza A H1N1 at GMCH, Chandigarh

Age group (years)	Male								Female							
	Positive		Admitted		Deaths		Case fatality ratio	Positive		Admitted		Deaths		Case fatality ratio		
	No.	%	No.	%	No.	%		No.	%	No.	%	No.	%			
0-1	04	6.5	02	6.0	00	00	00	01	2.1	01	4.7	00	00	00		
>1-5	05	8.1	02	6.0	01	5.8	20.0	01	2.1	01	4.7	00	00	00		
>5-12	07	11.4	02	6.0	01	5.8	14.2	07	14.8	00	00	00	00	00		
>12-18	09	14.7	05	15.1	02	11.6	22.2	09	19.1	04	19.0	00	00	00		
>18-40	24	39.3	13	39.3	06	35.2	25.0	20	42.5	08	38.0	06	54.5	30		
>40-60	09	14.7	07	21.2	06	35.2	66.6	04	8.5	03	14.2	03	27.2	75		
>60	03	4.9	02	6.0	01	5.8	33.3	05	10.6	04	19.0	02	18.1	40		
Total	61	100	33	100	17	100	27.8	47	100	21	100	11	100	23.4		

Initially, the patients were quarantined in the Influenza A H1N1 isolation ward to contain spread of pandemic, which may not have required admission otherwise. They were admitted till they completed their complete Tamiflu therapy and were discharged as soon as they were through with it. During the later period of the pandemic, only sick patients were admitted and stable cases were quarantined at home. Relatives of cases were administered prophylaxis for Influenza A H1N1.

Fifty percent (54) of the total cases required admission in the Influenza A H1N1 isolation ward, either for isolation or because their clinical conditioned warranted the same [Table 1]. Average length of stay in the Influenza A H1N1 isolation ward was 4.9 days, which included hospitalization for isolation, treatment and intensive care. The average length of stay was shorter in patients who succumbed, i.e., 3.6 days.

A total of 36 deaths occurred in the Influenza A H1N1 isolation ward, of which 28 (77.7%) deaths were observed in the Influenza A H1N1 cases. Majority of the patient who died required intensive care and ventilator support. Of the total 28 deaths, 46% (12) occurred within 48 h of admission, of which seven were within 24 h of admission. A single death was reported in a 20-year-old antenatal case with 27 weeks of gestation. 60.7% (17) deaths occurred in males and the rest occurred in females. It

can be seen from Table 2 that 75% deaths occurred in the age group 18-60 years, with 42.8% (12) deaths in the age group of 18-40 years and 32.1% (9) deaths in the age group >40 to 60 years. Maximum morbidity and mortality was observed in the age group 18-40 years.

## Discussion

All the cases from May 2009 to April 2010 reporting to the Influenza A H1N1 screening center, outpatient department and emergency department were included in this study. GMCH had cases from Chandigarh, Punjab, Haryana, Himachal Pradesh, etc., which may reflect the trend, morbidity and mortality of Influenza A H1N1 in this part of India.

As of April 2010, in India, 134,116 persons had been tested for Influenza A H1N1 and 30,581 (22.80%) of them had been found to be positive, with a case fatality ratio of 4.9% (1501).<sup>(5)</sup> While the positivity rate in this study is 29.05%, with a case fatality ratio of 25.49%. High prevalence and mortality may be attributed to the study population restricted to a small geographical area when compared against the entire country and sick patients referred from adjacent states having delay in essential medical care required, with loss of crucial time.

Age of patient varied from 4 months to 80 years, with an average age of 27.3 years (median age-24 years). Of the

total 81.4% cases, 57% of total mortality was observed in patients under 40 years of age, which clearly reflects its high prevalence, morbidity and mortality among the younger population. According to a 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.<sup>(6)</sup> 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.<sup>(7)</sup> 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%).<sup>(8)</sup>

The most common symptoms with which patients presented were fever (87.27%), cough (49.77%), sore throat (27%) and difficulty in breathing (23.9%). In a study done in mainland China, fever (81%), cough (40%) and sore throat (35%) were found to be most common symptoms in Influenza A H1N1.<sup>(9)</sup> 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.<sup>(10)</sup> In a study conducted at Chile, fever was the most common presentation (83%), followed by cough (72%), odynophagia (54%), myalgia (48%) and dehydration (4%).<sup>(11)</sup> A study done in Japan described fever (87%) as the most common symptom, followed by cough (86.3%) and sore throat (65%).<sup>(12)</sup>

Although patients in this study comprised a sizeable proportion of cases from Chandigarh and the adjoining states, the findings of this study need to be carefully extrapolated and cannot be generalized to a large population. This is one of the limitations of our study. Secondly, we restricted our study to only hospital; therefore, many cases of Influenza A H1N1 may have been missed. Not being a community-based study, we may not be able to calculate the exact measures of epidemiology. Thirdly, regional geographical conditions have not been accounted for, which may have a significant impact on prevalence and morbidity. There may be a small number of cases that may have been missed out, although every attempt was taken to include all the cases, but this figure would not have been significant.

## Conclusion

On the basis of the findings of this study, it can be hypothesized that the prevalence of Influenza A H1N1

is high in the younger population, and fever, cough and sore throat are the most common symptoms with which the patients usually present. This study provides hospital-based epidemiological information, but a community-based wider studies are required to arrive at a more precise and accurate understanding of Influenza A H1N1.

## References

1. Khanna M, Kumar P, Choudhary K, Kumar B. Emerging influenza virus: A serious global threat. *J Biosci* 2008;33:475-82.
2. Centers for Disease Control and Prevention (CDC). Swine influenza A (H1N1) infection in two children-Southern California, March-April 2009. *MMWR Morb Mortal Wkly Rep* 2009;58:400-2.
3. Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team, Dawood FS, Jain S, Finelli L, Shaw MW, Lindstrom S, Garten RJ, Gubareva LV, Xu X, Bridges CB, Uyeki TM. Emergence of a Novel Swine-Origin Influenza A (H1N1) Virus in Humans. *N Engl J Med* 2009;360:2605-15.
4. Available from: <http://timesofindia.indiatimes.com/india/First-confirmed-case-of-swine-flu-in-India/articleshow/4538930.cms>. [Last accessed on 3<sup>rd</sup> June 2009 at 19:05].
5. Available from: <http://mohfw-h1n1.nic.in/documents/PDF/SituationalUpdatesArchives/may2010/Situational%20Updates%20on%2002.05.2010.pdf>. [Last accessed on 2010 3<sup>rd</sup> of June, at 19:45].
6. Delaney JW, Fowler RA. 2009 Influenza A (H1N1): A Clinical review; *Hosp Pract (Minneapolis)* 2010;38:74-81.
7. Dee S, Jayathissa S. Clinical and epidemiological characteristics of the hospitalized Patients due to Pandemic H1N1 2009 Viral infection: Experience at Hutt Hospital, New Zealand. *N Z Med J* 2010;123:45-53.
8. Appuchamy RD, Beard FH, Phung HN, Selvey CE, Birell FA, Culleton TH. The changing phases of pandemic (H1N1) 2009 in Queensland: An overview of Public Health Action and Epidemiology; *Med J Aust* 2010;192:94-7.
9. Li YQ, Qian Q, Fung LQ, Yang H, Wei MT, Gao Y, et al. Epidemiological characteristics of 420 influenza A (H1N1) cases confirmed in the early stage of the epidemic in Mainland China. *Zhonghua Liu Xing Bing Xue Za Zhi* 2009;30:1102-5.
10. AlMazroa MA, Memish ZA, AlWadey AM. Pandemic influenza A (H1N1) in Saudi Arabia: Description of the first one hundred cases. *Ann Saudi Med* 2010;30:11-14.
11. Torres JP, Ryan M, Herve B, Espionza R, Acuna G, Manalich J, et al. Impact of the novel influenza A (H1N1) during the 2009 autumn winter season in a large hospital setting in Santiago, Chile. *Clin Infect Dis* 2010;50:860-8.
12. Chibana N. Clinical Review of 1017 influenza A cases between 30 and 35 weeks in 2009. *Kansenshogaku Zasshi* 2010; 84:153-8.

**How cite this article:** 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* 2012;37:232-5.  
**Source of Support:** Nil, **Conflict of Interest:** None declared.