

# Profile of Influenza A (H1N1) Positive Patients of Surat District

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## ABSTRACT

**Introduction:** Previous epidemic of Influenza A (H1N1) in 2009 caused significant morbidity and mortality. In 2015, the rapid transmission of disease led to a surge in the cases since January 2015 all over India. It was a challenge for the health authorities to equip the health centres in order to deal with the epidemic. The objectives of the present study were to study demographic and clinical profile of H1N1 positive patients and to study the effect of delayed hospitalisation (>48hours) on mortality.

**Material and Methods:** Secondary data analysis of H1N1 positive patients of Surat district, hospitalised between January to February 2015 was done. Data entry and analysis was done using Microsoft Excel 2013 and SPSS v 19 and Open Epi version 3 softwares.

**Results:** Total 641 H1N1 positive patients were admitted. Majority of H1N1 cases were from urban areas [590 (92.1%)], females [330 (51.5%)] and less than 40 years of age [375 (58.5%)]. Mean age of patients was found to be  $35.6 \pm 19.7$  SD years. It was a propagated type of epidemic. Majority of cases had complaint of cough [574 (89.5%)] followed by fever [556 (86.7%)]. Higher number [21 (6.8%)] of deaths were observed among delayed hospitalised patients (>48 hours).

**Conclusion:** In the present study majority of cases were from urban areas, females and less than 40 years of age. Cough and fever were the common presenting symptoms. Mortality was seen higher among delayed hospitalised patients.

**Keywords:** Influenza A (H1N1), Profile, Delayed Hospitalization.

## INTRODUCTION

Influenza is an acute respiratory tract infection caused by Influenza virus. There are three types of Influenza virus namely A, B and C. Usually Influenza A causes pandemics. Influenza A undergoes frequent antigenic variation namely shifts and drifts as compared to other two types of Influenza virus. Antigenic shifts results in sudden major change and this causes new epidemics or pandemics. Influenza spreads rapidly from person to person via droplet infection and risk of transmission is increased in overcrowded settings, thereby propagating the infection in times of epidemic. Influenza affects all age groups and both sexes. But, children, individuals aged above 65 years and immunocompromised individuals are at high risk for acquiring Influenza.<sup>1</sup>

On April 17, 2009, United States Centres for Disease Control and Prevention reported the first 2 cases in the United States of human infection with a novel influenza A (H1N1) virus.<sup>2</sup> The disease spread rapidly to many countries all around the globe. On June 2009, the World Health Organization (WHO) declared first influenza pandemic of the century in response to the spread of new influenza A (H1N1) virus.<sup>3</sup> In India the first confirmed case was documented in May, 2009 and from Gujarat state in June 2009.<sup>4,5</sup> Again a new wave of epidemic was seen since January 2015 all over India due to rapid transmission of disease. The objectives of the present study were to study the

demographic profile of H1N1 positive patients and to study the effect of delayed hospitalisation (>48 hours) on mortality.

## MATERIAL AND METHODS

Study was done in Department of Community Medicine, Government Medical College, Surat (Gujarat), India. Data from both Surat Rural and Urban was required in order to study the profile of H1N1 positive patients. Data of all the H1N1 positive patients admitted in private and government hospitals in Surat Rural was obtained from Jilla Panchayat, Surat and data of H1N1 positive patients admitted in private and government hospitals in Surat city was obtained from Surat Municipal Corporation. We obtained the data of Category C H1N1 patients (categorized by the treating physicians as per Government of India, Ministry of Health and Family Welfare guidelines: Category (A, B and C) hospitalized in the months of January and February 2015 in various hospitals in Surat district. Secondary data of all the 641 Category C H1N1 positive patients who were hospitalized in Surat district were obtained from the above mentioned authorities and analyzed.

## STATISTICAL ANALYSIS

Data entry and analysis was done using Microsoft Excel 2013, SPSS (Statistical Package for Social Sciences software version 19) and Open Epi version 3 softwares. Descriptive statistics like mean and percentages were used to interpret the results. To see the effect of delayed hospitalization on mortality, Chi square test was applied.

## RESULTS

Total 641 H1N1 positive patients were admitted in different hospitals of Surat city with Category C signs and symptoms. Out of total 641, 590 (92.1%) belonged to urban and 51 (7.9%) belonged to rural areas; 330 (51.5%) were female and 311(48.5%) were male patients. Mean and median age of patients was found to be  $35.6 \pm 19.7$  SD and  $36 \pm 19.7$  SD years respectively. Majority of patients were Hindu [571 (89.1%)], followed by Muslims [63 (9.8)] and Christians [7 (1.1)]

In the present study, the age wise distribution of H1N1 patients revealed that majority [375 (58.5%)] of patients were less than 40 years of age as compared to patients who were above 40 years of age [266 (41.5%)] (Table 1).

An epidemic curve gives a graphical display of the numbers

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of cases in an outbreak or epidemic, plotted over time. The epidemic curve as shown in Figure 1 is depicting the number of H1N1 patients from 27<sup>th</sup> December 2014 to 5<sup>th</sup> March 2015. The index case was reported on 4<sup>th</sup> January 2015 while the last case was reported on 25<sup>th</sup> February 2015. Successively larger peaks in January and February 2015 in both urban as well as rural area reflecting person-to-person transmission. Epidemic curve is also depicting successively taller peaks, initially separated by one incubation period, but the peaks tend to merge into waves with increasing numbers of cases in each generation. Hence, this was a Propagated (Progressive Source) Epidemic (Figure 1).

From Figure 2, it can be seen that among total 641 patients, majority 574 (89.5%) had complaint of cough; 556 (86.7%) had complaint of fever; 479 (74.7%) had complaint of breathlessness and 412 (64.3%) had complaint of sore throat (Figure 2).

In the present study, out of 414\* patients (\* Out of total 641 patients, data of only 414 was available), higher number of deaths [21 (6.8%)] were observed among delayed hospitalised patients (i.e. after 48 hours of onset of symptoms) as compared to those who were hospitalised before 48 hours of onset of symptoms [3 (2.9%)]. Although the association between delayed hospitalisation and mortality was not statistically significant (Table 2).

**DISCUSSION**

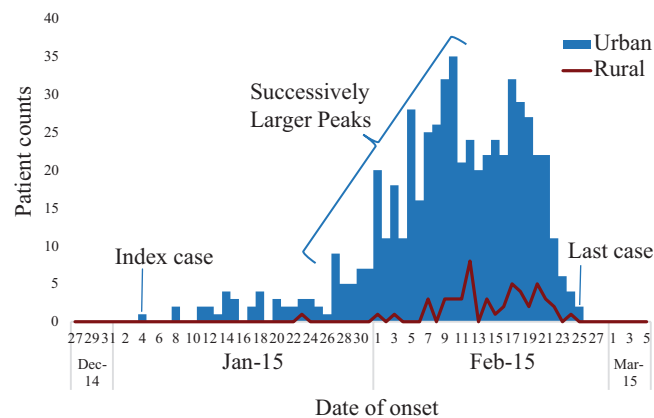
According to the present study findings, total 641 H1N1 positive patients were admitted in different hospitals of Surat city with Category C signs and symptoms. A study conducted in Hyderabad documented that out of the 514 patients attending hospital with features suggestive of influenza like illness during the study period, 17.1% were confirmed to have H1N1 infection and 59.09% patients out of 17.1% confirmed cases had Category C symptoms.<sup>6</sup>

In the present study it was found out that majority (92.1%) of patients belonged to urban and only 7.9% belonged to rural areas. A study in Kolkata revealed that 54.5% cases were from urban areas and 45.5% were from rural areas.<sup>7</sup> Urban areas are more overcrowded as compared to rural areas and also the

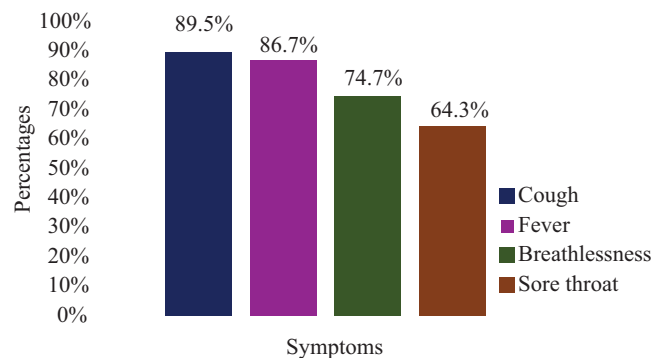
environment differs. Conditions in urban areas favour rapid spread of influenza epidemics.

Present study findings showed that, out of total 641, 51.5% were females and 48.5% were male patients. Similar findings were seen in studies conducted in Australia and New Zealand (51% females).<sup>8</sup> Male preponderance of cases was seen in studies conducted in Hyderabad (51.13%), Kolkata (66.83%), North Karnataka, Chandigarh (56.48%) and Surat (55.84%).<sup>6,7,9-11</sup> In studies conducted in Sangli, Chennai and in a study conducted by Asmita et al, there was equal distribution of cases in both the sexes.<sup>12-14</sup> Males or females are not susceptible only by virtue of gender. The differences in male or female preponderance of cases could be due to increased exposure of the individuals to the host and also the environmental factors. It also could be due to differences of reporting due to accessibility to healthcare and treatment seeking behavior of individuals due to which the cases may not have come in contact with the health system.

In the present study mean age of patients was found to be 35.6 ± 19.7 SD. Similar findings with mean age more than 30 years was seen in a study conducted by Asmita et al (31.6 ± 15.9



**Figure-1:** Epidemic Curve of H1N1 patients (n = 641)



**Figure-2:** Symptomatology of positive cases (n = 641)

Age group (in completed years)	H1N1 patients n (%)
0-10	111 (17.3)
11-20	48 (7.5)
21-30	92 (14.4)
31-40	124 (19.4)
41-50	106 (16.5)
51-60	104 (16.2)
>60	56 (8.7)

**Table-1:** Age wise distribution of H1N1 patients (n = 641)

		Outcome		Total
		Discharge	Death	
Hospitalisation delay after onset of symptoms	< 48 hours	102 (97.1%)	3 (2.9%)	105 (25.4%)
	> 48 hours	288 (93.2%)	21 (6.8%)	309 (74.6%)
	Delayed hospitalisation			
Total		390 (94.2%)	24 (5.8%)	414

Chi square value = 2.227, degree of freedom = 1, p value = 0.1

\*Out of total 641 patients, data of only 414 was available.

**Table-2:** Effect of delayed hospitalisation (> 48 hours) on outcome (n = 414\*)

years) and also in study conducted in Hyderabad (31.5 years).<sup>14,6</sup> In studies conducted in Kolkata and Chandigarh, the mean age was around 24 years.<sup>7,10</sup> In an observational cohort study conducted in Australia and New Zealand, the median age was 48 years.<sup>8</sup> Across all studies individuals belonging to productive age group are mostly affected. It may be due to the fact that they are exposed to outdoor environment more often due to work and travel.

The H1N1 epidemic in the present study was a propagated epidemic from January 2015 to February 2015 with large peaks in mid-February. The H1N1 epidemic in Hyderabad from December 2014 to April 2015 saw a peak in January 2015.<sup>6</sup> A 2012 swine flu epidemic in North Karnataka documented a peak rise in cases between July and September 2012.<sup>9</sup> A propagated epidemic was noted in Chandigarh from May 2009 to April 2010 with peak in cases in December 2009.<sup>10</sup> In a study on H1N1 profile of patients in Surat, two peaks were found, one in September 2009 and the other in January 2010.<sup>11</sup> Though influenza is more common in winter months, it can be seen that since the 2009 H1N1 epidemic, the occurrence of epidemic is seen round the year in different places across India.

In the present study, out of total 641 H1N1 patients, cough (89.5%), fever (86.7%), breathlessness (74.7%) and sore throat (64.3%) were the main symptoms. Similar presentations in majority of the patients were seen in studies conducted in Hyderabad, Kolkata, Australia and New Zealand, North Karnataka, Chandigarh, Surat, Sangli, and in a study conducted by Asmita et al.<sup>6-12,14</sup> There has been no change in the presentation of H1N1 cases since the 2009 epidemic. The clinical presentation has been the same whether in 2009 or 2015 swine flu epidemic.

Out of 414 patients whose data was available, higher proportion of deaths (6.8%) were observed in the patients who were delayed hospitalised (i.e. after 48 hours of onset of symptoms) in the present study. Details of hospital admission since symptom onset were not available in other studies. In a study conducted in Chandigarh, about 28 deaths occurred out of the 153 admitted H1N1 cases. Out of the 28 deaths, 46% of the deaths occurred within 48 hours of hospital admission, of which 7 were within 24 hours of admission.<sup>10</sup> In a study in Hyderabad, it was seen that 42.04% patients reported to the hospital within 48 hours and 52.27% patients reported to hospital between 3 to 7 days after symptom onset.<sup>6</sup> In a study in Sangli, it was documented that 16.67% of the patients died within 1-5 days of hospitalisation.<sup>12</sup> But, the data regarding duration of hospitalisation of the patients who died indicates that patients who died within 24-48 hours of hospital admission might be due to delayed hospitalisation. The rapidity of spread of infection and worsening of symptoms in swine flu require hospitalisation at the earliest to initiate early treatment. Separate swine flu OPDs in all districts across the state in 2015 were set up to screen and treat cases of H1N1 accordingly and hospitalise patients if required.

## CONCLUSION

In our study, majority of cases were from urban areas, females and less than 40 years of age. Cough followed by fever and breathlessness were the presenting symptoms in majority of patients. Mortality was higher among patients admitted after 48 hours of symptom onset.

## RECOMMENDATIONS

Strengthening of surveillance activity should be carried out for early detection and hospitalization of positive cases.

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## REFERENCES

1. Park K. Epidemiology of communicable diseases. In: Park's Textbook of Preventive and Social Medicine. 24th ed. Jabalpur: M/s Banarsidas Bhanot; 2017. p. 163-4.
2. Centers for Disease Control and Prevention. Swine Influenza A (H1N1) Infection in Two Children --Southern California., March--April 2009. Vol. 58. Atlanta, USA.
3. World Health Organization. World now at the start of 2009 influenza pandemic. Media centre. 2009.
4. Government of India (MoHFW). Situation update on H1N1. 2010. Ministry of Health and Family Welfare. 2010.
5. The Times of India. First swine flu case surfaces in Gujarat. TOI. 2009 Jun.
6. Amaravathi KS, Sakuntala P, Sudarsi B, Manohar S, Nagamani R, Rao SR. Clinical profile and outcome of recent outbreak of influenza A H1N1 (swine flu) at a tertiary care center in Hyderabad, Telangana. *Ann Trop Med Public Heal.* 2014;8:267-71.
7. Mandal PK, Sardar JC, Bhandari B. Clinical profile of H1N1 Influenza: A hospital based epidemiological study in Kolkata, India. *Sudan J PUBLIC Heal.* 2013;8:21-4.
8. Cheng AC, Kotsimbo T, Reynolds A, Bowler SD, Brown SG, Hancox RJ, et al. Clinical and epidemiological profile of patients with severe H1N1/09 pandemic influenza in Australia and New Zealand: an observational cohort study. *BMJ Open.* 2011;1:e000100.
9. Kashinkunti MD, Gundikeri SK, Dhananjaya M. Study of clinical profile of patients with H1N1 Influenza in a teaching hospital of North Karnataka. *IJRRMS.* 2013;3:53-5.
10. Vijaydeep S, Goyal V, Koushal VK. Clinical-Epidemiological Profile of Influenza A H1N1 Cases at a Tertiary Care Institute of India. *Indian J ournal Community Med.* 2012;37:232-5.
11. 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.
12. Jadhav VB, Borade VB, Kulkarni RB, Shrivasthi RK, Palange PB. Clinical Profile of the H1N1 Influenza. *Ind Med Gaz.* 2014;237-44.
13. 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;59:14-6,18.
14. Mehta AA, Kumar VA, Nair SG, K Joseph F, Kumar G, Singh SK. Clinical Profile of Patients Admitted with Swine-Origin Influenza A (H1N1) Virus Infection: An Experience from A Tertiary Care Hospital. *J Clin Diagn Res.* 2013;7:2227-30.

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