

## Original Research Article

# A clinico-epidemiological profile of patients with influenza A H1N1 attending a tertiary care hospital in southern Rajasthan region of India

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## ABSTRACT

**Background:** Influenza, commonly referred to as the flu, is an infectious disease caused by RNA viruses of the family Orthomyxoviridae (the influenza viruses). Swine flu cases resurfaced in month of January 2015 in Southern region of India which are continuation of pandemic 2009. Aim of this study is to summaries the clinical and epidemiological factors associated with swine flu as well as to estimate the burden of Influenza A H1N1 (Swine Flu) cases.

**Methods:** A complete data of all the patients visiting swine flu OPDs, swine flu wards and ICU were maintained for year 2015. Each patient visiting either the swine flu OPD or the swine flu ward, who was suspected clinically to be H1N1 positive were tested for real time PCR.

**Results:** Out of 1247 samples tested for rt-PCR 491 (39.37%) cases were identified as positive for H1N1. Maximum swine positivity was seen in the age group of 16-30 year i.e. 147 (29.94%). Overall swine positivity was significantly ( $p < 0.001$ ) higher in females than male and extremely statistically significant ( $p < 0.0001$ ) higher in rural areas than urban. Cough was the most common clinical symptoms affecting 469(95.52%) patients followed by fever (92.26%) and breathlessness 402(81.87%).

**Conclusions:** Our study will help epidemiologist and clinician to identify epidemiological factors and clinical picture of swine flu.

**Keywords:** Influenza A H1N1, Nasopharyngeal swabs, rt-PCR, Rajasthan outbreak, Throat swabs, Swine flu

## INTRODUCTION

Influenza, commonly referred to as the flu, is an infectious disease caused by RNA viruses of the family Orthomyxoviridae (the influenza viruses), that affects birds and mammals.<sup>1</sup>

Swine influenza (also called Mexican flu, pig influenza, swine flu, hog flu and pig flu, stomach flu or 24-hour flu) is an infection by any one of several types of swine influenza virus. Swine influenza virus (SIV) or S-OIV

(swine-origin influenza virus) is any strain of the influenza family of viruses that is endemic in pigs.<sup>2</sup> As of 2009, the known SIV strains include influenza C and the subtypes of influenza A known as H1N1, H1N2, H3N1, H3N2, and H2N3.<sup>3</sup>

Rajasthan reported its first case of H1N1 infection on 23<sup>rd</sup> July 2009. Soon the disease spread to other parts of state. The pandemic influenza A (H1N1) started in southern part of Rajasthan in August 2009 and lasted until November 2010. A large number of H1N1 cases and

deaths have been reported during this pandemic. 2462 patients screened for Influenza like illness and a total number of 1022 throat swabs were taken for rt-PCR. Out of them 297 (29.06%) patients were found positive for H1N1.<sup>4</sup> After that, in next two years till August 2012, Southern Rajasthan reported little Influenza activity. In September 2012, this influenza A H1N1 virus once again has resurfaced in this region of India. The number of new cases, including fatal cases continues to increase since 13<sup>th</sup> September 2012 in Southern Rajasthan. It lasted till 28<sup>th</sup> February 2013.

Swine flu cases again resurfaced in month of January 2015 in Southern region of India. First death reported on 2<sup>nd</sup> February 2015 which continues till 24<sup>th</sup> March 2015. Swine flu positivity continues to increase with peak in the month of February and March 2015. Recently sudden outbreak of swine flu was more severe with high mortality and morbidity in compare to that of year 2012. Epidemic was declared on 12 February 2015 in Rajasthan which declared end on 15 April 2015, however screening of patients of influenza like illness was continue in swine flu OPD and infrequent cases of swine flu were found positive.

In above mentioned period 3837 patients screened for influenza like illness and a total number of 1247 throat swabs were taken for rt-PCR. Out of them 491(39.37%) patients were found positive for H1N1.

Aim of this study was to summarise the clinical and epidemiological factors associated with swine flu as well as to estimate the burden of influenza A H1N1 (swine flu) cases.

## METHODS

### ***Guidelines on categorization of influenza A H1N1 cases during screening for home isolation, testing treatment, and hospitalization***

In order to prevent and contain outbreak of Influenza-A H1N1 virus for screening, testing and isolation following guidelines are to be followed.<sup>5</sup>

At first all individuals seeking consultations for flu like symptoms should be screened at healthcare facilities both Government and private on examined by a doctor and these will be categorized as under.

#### *Category-A*

Patients with mild fever plus cough/sore throat with or without body ache, headache, diarrhoea and vomiting will be categorized as Category-A. They do not require Oseltamivir and should be treated for the symptoms mentioned above. The patients should be monitored for their progress and reassessed at 24 to 48hours by the doctor. No testing of the patient for H1N1 is required.

#### *Category B*

In addition to all the signs and symptoms mentioned under category-A, if the patient has high grade fever and severe sore throat, may require home isolation and oseltamivir.

In addition to all the signs and symptoms mentioned under category-A, individuals having one or more of the following high-risk conditions shall be treated with oseltamivir.

Children with mild illness but with predisposing risk factors.

- Pregnant women.
- Persons aged 65 years or older;
- Patients with lung diseases, heart disease, liver disease, kidney disease, blood disorders, diabetes, neurological disorders, cancer and HIV/AIDS;
- Patients on long term cortisone therapy.

No tests for H1N1 is required for category-B (1) and (2).

#### *Category C*

In addition to the above signs and symptoms of Category-A and B, if the patient has one or more of the following:

- Breathlessness, chest pain, drowsiness, fall in blood pressure, sputum mixed with blood, bluish discoloration of nails.
- Children with influenza like illness who had a severe disease as manifested by the red flag signs (Somnolence, high and persistent fever, inability to feed well, convulsions, shortness of breath, difficulty in breathing, etc).
- Worsening of underlying chronic conditions.

#### *Diagnosis*

Confirmed diagnosis of influenza A H1N1 flu requires testing of a nasopharyngeal, nasal, or oropharyngeal tissue swab from the patient. Real-time RT-PCR is the recommended test.

This was a cross-sectional, descriptive, hospital based study. This study was conducted in swine flu OPD, ward and ICU at Maharana Bhupal Government Hospital of Ravindra Nath Tagore Medical College, Udaipur during year 2015 swine flu outbreak which included Southern region of Rajasthan (Udaipur, Chittorgarh, Bhilwara, Rajsamand, Dungarpur, Banswara, Pratapgarh districts).

A complete data of all the patients visiting swine flu OPDs, swine flu wards and ICU were maintained for year 2015. Each patient visiting either the swine flu OPD or the swine flu ward, who was suspected clinically to be H1N1 positive were tested for real time PCR.

In the year 2015 during the outbreak of influenza A H1N1, a total about 3837 patients attended twenty-four hour running swine flu OPD at MBGH hospital Udaipur. Out of them 1247(32.50%) patients were subjected for rt-PCR. Number of patients found to be swine positive was 491(39.37%).

A standardized pre-structured questionnaire with consent was filled by direct interview of admitted patients including the clinical and epidemiological data of patients like age, sex, residence, communication detail, clinical signs and symptoms, exposure history, type and numbers of sample collected, treatment taken and chest x-ray findings. Ethical clearance from ethical committee has been obtained prior to beginning of study.

## RESULT

Table 1 shows that total 1247 samples were tested for rt-PCR from January 2015 to December 2015. 491 (39.37%) cases were identified as positive for H1N1 and 756 (60.63%) were negative (Table 1).

**Table 1: Distribution of cases according to H1N1 positivity.**

Total Screened	Total tested	Total Positive	Total Negative
3837	1247	491 (39.37%)	756 (60.63%)

**Table 2: Age and sex wise distribution of all category patients.**

	Total tested Patients (n=1247)	Swine positive (n=491)
	n (%)	n (%)
<b>Age group</b>		
0-15	60 (04.81)	19 (3.87)
16-30	356 (28.55)	147 (29.94)
31-45	349 (27.99)	137 (27.90)
46-60	305 (24.46)	134 (27.29)
>60	177 (14.19)	54 (11.00)
Total	1247	491
<b>Sex</b>		
Male	561 (44.99)	209 (42.57)
Female	686 (55.01)	282 (57.43)

Table 2 shows maximum swine positive patients 147 (29.94%) were from the age group of 16-30 year followed by 137 (27.90%) patients which were from the age group of 31-45 year. It shows that among all patients

tested for swine flu, female population 686 (55.01%) were more than male. Female patients 282(57.43%) showed more swine positivity (Table 2).

Table 3 shows that in the age group of 16-30 years, swine positive confirmed patients were higher in females than males and the difference was extremely significantly ( $p<0.0001$ ). In age group 46-60 years and more than 60 years, swine positive confirmed patients were significantly ( $<0.05$ ) higher in females. Overall confirmed patients were significantly ( $<0.001$ ) higher in females (Table 3).

**Table 3: Age and sex wise distribution of swine flu cases (n=491).**

Confirmed patients							
Age group (yrs)	Male		Female		Total		P value
	No.	%	No.	%	No.	%	
0-15	11	57.89	8	42.11	19	100	$>0.05$
16-30	36	24.49	111	75.51	147	100	$<0.0001$
31-45	64	46.72	73	53.28	137	100	$>0.05$
46-60	67	50.00	67	50.00	134	100	$<0.05$
>60	31	57.41	23	42.59	54	100	$<0.05$
Total	209	42.57	282	57.43	491	100	$<0.001$

Table 4 shows that the majority of patients 680 (54.53%) who were tested for swine flu belong to urban area while maximum swine positive patients 261(53.16%) were belong to rural area and this difference was extremely statistically significant ( $p<0.0001$ ) (Table 4).

**Table 4: Area wise distribution of all patients (n=1247).**

Area	Total tested patients (n=1247)	Swine positive (n=491)	P value
Rural	567 (45.47%)	261 (53.16%)	$<0.0001$
Urban	680 (54.53%)	230 (46.84%)	
Total	1247	491	

Table 5 shows that among all swine positive patients cough was the most common clinical symptoms affecting 469(95.52%) patients followed by fever (92.26%) and breathlessness 402(81.87%) (Table 5).

Table 6 shows that among all swine positive patients, 58.25% patients had no consolidation in chest X-ray. Bilateral consolidation was seen in 21.18% swine positive patients (Table 6).

## DISCUSSION

In present study of the swine flu outbreak-2015, a total about 3837 patients screened, out of them 1247(32.50%)

patients were tested for swine flu by rt-PCR. Number of patients found to be swine positive was 491(39.37%). In compare to a study conducted by CP Sharma et al (2012) during 2009-2010 in same study area showed swine positivity was 29.06% (297 out of 1022), our study reported more swine positivity.<sup>6</sup>

**Table 5: Distribution of patients according to clinical signs and symptom in confirmed patients of H1N1 (n=491).**

Symptoms	Number	Percentage
Fever-mild to moderate	199	40.53
High grade fever	254	51.73
Nasal catarrh	245	49.90
Sore throat	259	52.75
Cough	469	95.52
Expectoration	181	36.86
Hemoptysis	37	7.54
Breathlessness	402	81.87
Headache	138	28.11
Body ache	169	34.42
Chest pain	147	29.94
Vomiting	131	26.68
Diarrhoea	108	22.00
Drowsiness	52	10.59

**Table 6: Chest X-ray findings in confirmed patients (n=491).**

Chest X-ray findings	Number	Percentage
Bilateral consolidation	104	21.18
Right side consolidation	59	12.02
Left side consolidation	42	8.55
No consolidation	286	58.25

In our study H1N1 primarily affected the younger population, maximum swine positive patients 147(29.94%) fall in the age group of 16-30 year which corroborates with the study of Mahendra Singh et al (2013) at Jodhpur, Rajasthan which showed maximum swine positive patients 70.1% (213 cases out of 304) fall in the age group of 16-30 year.<sup>7</sup>

Our study finding corroborates with the study of Domadia K et al (2015) at a tertiary care centre of western India reported.<sup>8</sup> Maximum number of positive cases were in the age group of 12-40 years (108 cases).

Our study reported confirmed cases were extremely significantly ( $p<0.0001$ ), higher in females than males in 16-30 years age group. This finding is corroborated with the study of Sharma CP et al (2012) during 2009-2010 in same study area showed that confirmed cases were significantly ( $p<0.05$ ), higher in females than males in 21-40 years age group.<sup>6</sup>

Our study reported that majority of swine positive patients 261(53.16%) belong to rural area which is extremely statistically significant ( $p<0.0001$ ). Our finding is corroborated with the study of Malkar VR et al (2012) conducted a clinic-epidemiological study on swine flu patients at Government Medical College, Akola, Maharashtra which showed that 75% (45 cases) were resident of rural area.<sup>9</sup>

In our study majority of male cases 55.98% (117 cases) and female cases 51.06% (144 cases) were belonged to rural area while in compare to a study of Sharma CP et al (2012) majority of male cases (71.1%) and female cases (63.8%) were belonged to urban area.<sup>6</sup>

Our study reported that among all swine positive patients cough (95.52%) and fever (92.26%) were the most common clinical symptoms followed by breathlessness 402(81.87%). Our findings are coinciding with the study of Prakash G (2009) which reported that fever (96.46%) and cough (100.00%) were the most common clinical symptoms.<sup>10</sup> Our findings are also coinciding with the study of Malkar VR et al (2012) which reported that fever (96.67%) and cough (91.67%) were the most common clinical symptom.<sup>9</sup>

Our findings are similar to the study of Kashinkunti MD et al (2013) which reported that fever (95.5%) and cough (90.9%) were the most common clinical symptoms followed by breathlessness (81.8%).<sup>11</sup> Our study findings also corroborates with the study of Humne AY et al (2013) which showed that fever (100.00%) and cough (79.80%) were the most common clinical symptom.<sup>12</sup>

The study of Domadia K et al (2015) was reported that common presenting symptoms in H1N1 positive cases were fever (80%) followed by sore throat (61%), breathlessness (59%), cough (49%).<sup>8</sup>

In our study, among all swine positive patients 58.25% patients had no consolidation in chest X-ray. Bilateral consolidation was seen in 21.18% swine positive patients. This finding corroborates with the finding of study of Prakash G (2009) which reported that 61.95% cases were identified without consolidation and bilateral consolidation was seen in 18.58%.<sup>10</sup> Our finding also corroborates with the finding of study of Vyas C et al (2013) which reported that 53.00% cases were identified without consolidation and bilateral consolidation was seen in 21.00%.<sup>13</sup> This study has several limitations. The data was taken only from hospitalized patients. Patients belonging to category A and B, treated on outpatient basis and not being tested, were not included in the study.

## CONCLUSION

Present study will help epidemiologist and clinician to identify epidemiological factors and clinical picture of swine flu.

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