# RESEARCH ARTICLE

## CLINICO-EPIDEMIOLOGICAL PROFILE & OUTCOME OF PATIENTS INFECTED WITH SWINE FLU INFLUENZA A H1N1 IN A TERTIARY CARE HOSPITAL

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**ABSTRACT**

**Background:** Pandemic influenza A (H1N1) 2009 has posed aserious public health challenge world-wide. Genetic re-assortments in the influenza virus cause fast and unpredictable leading to recurrent epidemics of febrile respiratory disease every 1 to 3 years.
**Aim & Objectives:** To study the clinico-epidemiological profile of the swine flu influenza A H1N1. To study the certain epidemiological correlates affecting the outcome of disease.
**Material & Methods:** A descriptive study conducted on suspected swine flu Influenza A H1N1 patients admitted in infectious disease ward (IDW). The personal interview technique combined with clinical examination was done uniformly using the pre-tested structured questionnaire.
**Results:** Out of total patients admitted in IDW, 60.34% were females & 39.66% were males. 55.17% of patients were from urban area while 44.83% from rural area. Out of 58 patients 12 patients were confirmed cases of swine flu influenza A H1N1, while 46 were confirmed negative. Proportion of confirmed cases of swine flu influenza A H1N1 83.33% in females as compared to 16.67% in males. Influenza A H1N1 resulted in death of 05 (41.67%) confirmed cases among total 12 confirmed cases. Out of 12 (100%) confirmed swine flu influenza A H1N1 cases 09 (75%) expired patients had one or other predisposing factor associated.
**Conclusion:** Cough, running nose, body ache and fever are the most common symptoms with which the patients usually present. The risk of death was seen more in patients associated with predisposing factors.

## INTRODUCTION

Influenza is an acute respiratory illness affects the upper and/or lower respiratory tract and is often accompanied by systemic signs and symptoms such as fever, headache, myalgia, and weakness. Outbreaks of influenza result in significant morbidity in the general population and increased mortality rates among certain high-risk patients. The disease is usually most severe in very young children (under 5 years of age) and the elderly. Common symptoms of the flu such as fever, headaches, and fatigue come from the huge amounts of pro inflammatory cytokines and chemokines. (Khanna *et al.*, 2008) 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 2009, when a man travelling from New York via Dubai and Delhi tested positive for theH1N1 Influenza virus in

Hyderabad. The second case was reported by the National Institute of Virology (NIV), Pune, in a mother andson duo from

Chennai on 1 June 2009. (Vijaydeep Siddharth *et al.*, 2012) In 2015 India has reported 2,276 swine flu deaths between January 1 and August 31. Of them, as many as 1,830 deaths were collectively reported from Maharashtra, Gujarat, Rajasthan and Madhya Pradesh. In Maharashtra 6,843 swine flu cases and 623 causalities were reported till August 31. (The Times of India, 2015) The present study was carried out to assess the socio-demographic &, clinical profile of swine flu cases and to determine the epidemiological correlates affecting outcome of swine flu influenza A H1N1 virus infection.

## MATERIALS AND METHODS

The personal interview technique combined with clinical examination was done uniformly using the pre-tested structured questionnaire.

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**Study Area:** Government Medical College and Hospital (GMCH), Solapur.

**Type of study:** Hospital based descriptive study.

**Study period:** 1st February 2015 to 31st May 2015.

**Study Sample:** Suspected Influenza A H1N1swine flu patients admitted in infectious disease ward (IDW) during the study period.

**Case definition of Swine flu Influenza A H1N1: A suspected case** of swine flu influenza A H1N1 virus infection is defined as a person with acute febrile respiratory illness (fever $\geq 38^0$C) and at least one of the other symptom (running nose, sore throat, cough, diarrhoea, bodyache, headache, etc.) and either history of travel to a place where infection had been reported in previous 7 days or epidemiological link with a person with confirmed or suspected infection in the previous 7 days. A confirmed case of swine influenza A H1N1 virus infection is defined as a person with an acute febrile respiratory illness with laboratory confirmed swine influenza A H1N1 virus infection at WHO approved laboratory (NIV Pune).

## RESULTS

Total 58 suspects of swine flu influenza A H1N1 infection were hospitalized in infectious disease ward. Out of which 12 (20.69%) were positive and 46 (79.31%) were negative for swine flu influenza A H1N1 infection (Figure 1). Out of total 58 patients, 60.34% were females & 39.66% were males. Among male patients, most common age group was 0-15 years; while 16-30 years age group was most common among female patients (Table 1).

**Table 1. Age & Gender profile of patients (n=58)**

| S. No. | Age group (yrs) | Male (%) | Female (%) | Total (%) |
|---|---|---|---|---|
| 1 | 0 - 15 | 08 (34.80) | 10 (28.58) | 18 (31.03) |
| 2 | 16 - 30 | 03 (13.04) | 07 (20) | 10 (17.24) |
| 3 | 31 - 45 | 07 (30.43) | 12 (34.28 ) | 19 (32.76) |
| 4 | 46 – 60 | 01 (4.34) | 04 (11.43) | 05 (8.62) |
| 5 | > 60 | 04 (17.39) | 02 (5.71) | 06 (10.35) |
| | Total | 23 (100) | 35 (100) | 58 (100) |

\* Median age was 25 years.
\*\* $\chi^2 = 0.003$d.f. = 1p = 0.4778Not significant

**Table 2. Age & gender wise profile of swine flu confirmed cases (n=12)**

| S. No. | Age group (yr) | Male (%) | Female (%) | Total (%) |
|---|---|---|---|---|
| 1 | 0 - 15 | 01 (50) | 04 (40) | 05 (41.67) |
| 2 | 16 - 30 | 00 (00) | 01 (10) | 01 (8.33) |
| 3 | 31 - 45 | 01 (50) | 03 (30 ) | 04 (33.33) |
| 4 | 46 – 60 | 00 (00) | 02 (20) | 02 (16.67) |
| 5 | > 60 | 00 (00) | 00 (00) | 00 (00) |
| | Total | 02 (100) | 10 (100) | 12 (100) |

\*Median age was 31 years and 6 months.
\*\*Fisher Exact Test: p= 1Not significant

**Table 3. Area wise distribution of patients (n=58)**

| S. No. | Age group(yr) | Urban (%) | Rural (%) | Total (%) |
|---|---|---|---|---|
| 1 | 0 - 15 | 14 (43.75) | 04 (15.38) | 18 (31.03) |
| 2 | 16 - 30 | 04 (12.50) | 06 (23.07) | 10 (17.24) |
| 3 | 31 - 45 | 08 (25) | 11 (42.31) | 19 (32.76) |
| 4 | 46 – 60 | 02 (6.25) | 03 (11.54) | 05 (8.62) |
| 5 | > 60 | 04 (12.50) | 02 (7.70) | 06 (10.35) |
| | Total | 32 (100) | 26 (100) | 58 (100) |

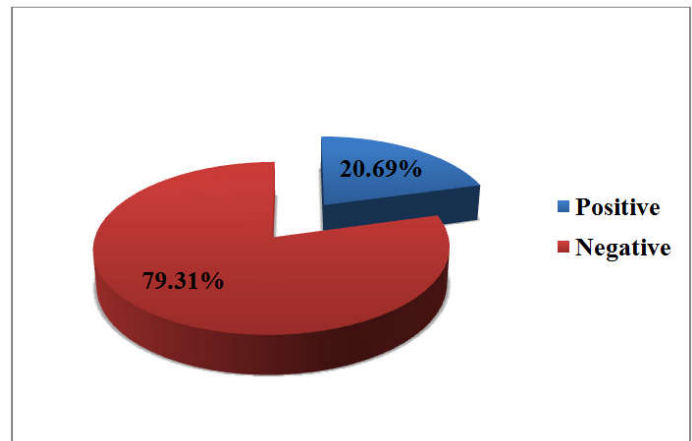\*$\chi^2 = 1.818$d.f. = 1p = 0.089Not significant
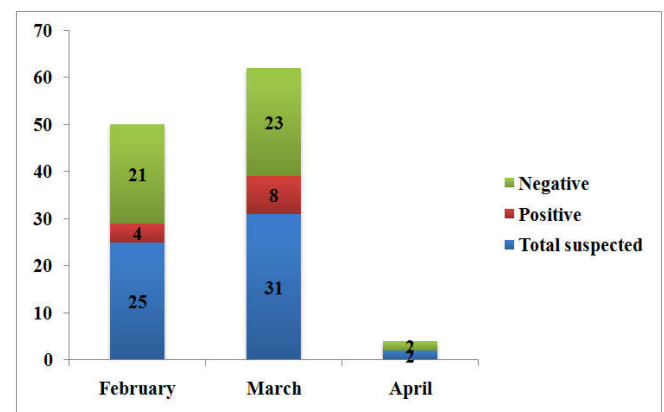


**Figure 1. Influenza A H1N1 swine flu**



**Figure 2. Month wise distribution of patients**

Maximum cases of swine flu (41.67%) were from 0 to 15 years age group followed by 31 to 45 years, 46 to 60 years & 16 to 30 years. Out of 12 confirmed swine flu influenza A H1N1 cases 10 (83.33%) were females and 02 (16.67%) were males & showed that females outnumbered males (Table 2). In the presents study it was observed that most of suspects were admitted in the month of March 2015 i.e. 31 (53.45%), followed by February i.e. 25 (43.10%) and least number of patients i.e. 02 (3.45%) were admitted in April 2015 (Figure 2). Out of total 58 patients admitted in IDW 32(55.17%) were from urban area and 26 (44.83%) were from rural area (Table 3). Most common symptoms observed in patients were

cough in 46 (79.31%) patients followed by headache & bodyache in 42 (72.41%) patients, running nose in 40 (68.96%) patients, sore throat in 27 (46.55%) patients, vomiting in 22 (37.93%), high grade fever in 20 (34.48%) patients, breathlessness in 18 (31.03%) patients, diarrhoea in 15 (25.86%) patients and chest pain in 12 (26.68%) patients (Table 4). We observed hypertension as most common predisposing factor followed by diabetes mellitus, infant/ children < 5, old age (>60 yr) and others, while 34 patients were without any predisposing factor (Table 5).

**Table 4. Distribution of patients according to symptoms (n=58)**

| S. No. | Symptoms* | Swine flu +ve | Swine flu −ve | Total (%) |
|---|---|---|---|---|
| 1 | Cough | 12 | 34 | 46 (79.31) |
| 2 | High grade fever | 10 | 10 | 20 (34.48) |
| 3 | Running nose | 7 | 36 | 40 (68.96) |
| 4 | Headache & Bodyache | 12 | 30 | 42 (72.41) |
| 6 | Sore throat | 7 | 20 | 27 (46.55) |
| 7 | Breathlessness | 8 | 10 | 18 (31.03) |
| 8 | Vomiting | 10 | 12 | 22 (37.93) |
| 9 | Chest pain | 2 | 10 | 12 (26.68) |
| 10 | Diarrhoea | 5 | 10 | 15 (25.86) |

(* Multiple responses)

**Table 5. Predisposing factors associated with patients (n=58)**

| S. No. | Predisposing factors* | Male | Female | Total |
|---|---|---|---|---|
| 1 | Hypertension | 14 | 04 | 18 |
| 2 | Diabetes Mellitus | 08 | 01 | 09 |
| 3 | Bronchial Asthma | 03 | 00 | 03 |
| 4 | HIV/ AIDS | 00 | 00 | 00 |
| 5 | CHD/ IHD | 02 | 01 | 03 |
| 6 | Pregnancy | -- | 02 | 02 |
| 7 | Chronic kidney disease | 00 | 00 | 00 |
| 8 | Chronic liver disease | 00 | 00 | 00 |
| 9 | Infant / children < 5yrs | 03 | 03 | 06 |
| 10 | Old age > 60yrs | 04 | 02 | 06 |
| 11 | No any predisposing factor | 09 | 25 | 34 |

(* Multiple responses)

**Table 6. Age wise outcome of patients**

| S. No. | Age group (yrs) | Cured (%) | Deaths (%) | AMA (%) | Absconded (%) | Total (%) |
|---|---|---|---|---|---|---|
| 1 | 0 - 15 | 12 (38.71) | 04 (33.34) | 02 (18.18) | 00 | 18 (31.03) |
| 2 | 16 - 30 | 05 (16.12) | 00 | 04 (36.36) | 01 (25) | 10 (17.24) |
| 3 | 31 - 45 | 07 (22.59) | 06 (50) | 04 (36.36) | 02 (50) | 19 (32.76) |
| 4 | 46 – 60 | 03 (9.68) | 01 (8.33) | 01 (9.10) | 00 | 05 (8.62) |
| 5 | > 60 | 04 (12.90) | 01 (8.33) | 00 | 01 (25) | 06 (10.35) |
| | Total | 31 (100) | 12* (100) | 11 (100) | 04 (100) | 58 (100) |

* 5 patients were confirmed cases of swine flu influenza A H1N1.

Out of 58 patients 31 patients were cured, 12 patients were died, 11 patients took discharge against medical advice and 4

patients absconded from IDW. We observed death in 12 patients, out of which 5 were confirmed cases of swine flu influenza A H1N1 (Table 6).

**Table 7. Predisposing factors & outcome of patients**

| S. No. | Predisposing factors | Cured (%) | Deaths (%) | Total (%) |
|---|---|---|---|---|
| 1 | Yes | 12 (38.70) | 09 (75) | 21 (48.84) |
| 2 | No | 19 (61.30) | 03 (25) | 22 (51.16) |
| | Total | 31 (100) | 12* (100) | 43 (100) |

* 5 patients were confirmed cases of swine flu influenza A H1N1.
**$\chi^2$ = 4.56 d.f. = 1 p = 0.016 Significant

**Table 8. Duration of hospital stay & outcome of patients**

| S. No. | Time interval Median = 4.5 days | Cured (%) | Deaths (%) | AMA (%) | Absconded (%) | Total (%) |
|---|---|---|---|---|---|---|
| 1 | ≤2 days | 00 | 09 (75) | 08 (72.72) | 02 (50) | 19 (37.76) |
| 2 | >2-5 days | 10 (32.26) | 03 (25) | 02 (18.18) | 01 (25) | 16 (27.58) |
| 3 | >5-10 days | 12 (38.71) | 00 | 01 (9.10) | 01 (25) | 14 (24.14) |
| 4 | >10 days | 09 (29.03) | 00 | 00 | 00 | 09 (15.52) |
| | Total | 31 (100) | 12* (100) | 11 (100) | 04 (100) | 58 (100) |

* Out of 12 deaths 5 were confirmed positive cases of swine flu influenza A H1N1.

Case fatality rate was 41.66%. Out of 12 deaths 09 (75%) confirmed cases of swine flu had predisposing factors while 03 (25%) had no any predisposing factor (Table 7). Out of 58 patients 19 (37.76%) patients had hospital stay of < 2 days followed by 16 (27.58%) patients with hospital stay of > 2 to 5 days, 14 (24.14%) patients had > 5 to 10 days of hospital stay and 09 (15.52%) had > 10 days of hospital stay.
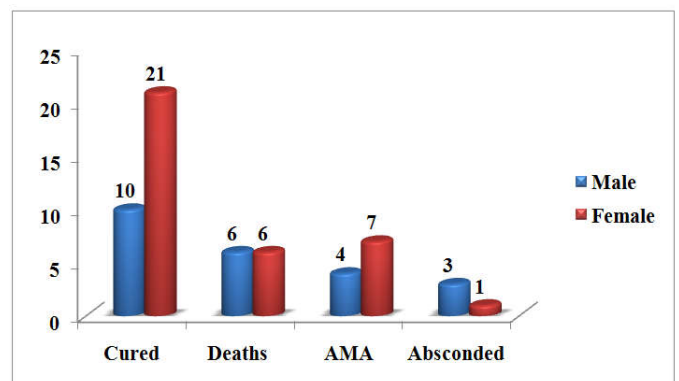


**Figure 3. Gender wise outcome of patients**

The median time for hospital stay was 4.5 days. Out of total 12 deaths 5 were confirmed cases of swine flu influenza A H1N1; 3 positive swine flu cases died < 2 days of hospital admission while 2 positive swine flu cases died during >2- 5 days of hospital stay (Table 8). In the present study among 31 cured patients 10 were and 21 females, 6 male & 6 female patients died and 4 males & 7 females took discharge against medical advice while 3 male & 1 female patients absconded from IDW (Figure 3).

## DISCUSSION

In our study 12 patients (20.69%) were found swine flu influenza A H1N1 positive among 58 suspects. In Vijaydeep Siddharth et al. (2012) study 4379 patients were screened and 365 patients were tested, of which 29.58% (108) were found to be swine flu influenza A H1N1 positive. In our study age wise distribution of patients showed that maximum number (41.67%) of swine flu influenza A H1N1 cases were from 0-15 years age group followed by 31-45 years, 46-60 years & 16-30 years. Study done by Malkar et al. (2012) showed maximum number (51.76%) of cases were from 16-25 years age group followed by 36-45 years (26.67%). Asmita A. Mehta et al. (2013)study observed 74% of H1N1 patients in the age group of 18-50 years. A study done in Chennai at two government hospital concluded that, in 2010, Influenza A H1N1 predominantly affected young patients (Puvanalingam et al., 2011). Among 12 positives, female patients (10 i.e. 83.33%) outnumbered male patients (02 i.e. 16.67%). Malkar et al. (2012) observed 44 (73.33%) males and 16 (16.67%) females among total 60 positive patients. Asmita A Mehta (2013) observed equal number of Influenza A H1N1 swine flu cases (44 each) among males and females. Rao et al. (2011) study showed 70% cases among females as compared to only 30% cases in males among total cases. Most of the patients in our study presented with cough, Bodyache & headache, running nose, sore throat & high grade fever that was similar to those which were seen in other Indian studies (Samara et al., 2011; Chudasama et al., 2010; Puvanalingam et al., 2011) & other International studies done in USA (Dawood et al., 2009), Japan (Human infection with new influenza A (H1N1) virus) & Mexico (Human infection with new influenza A (H1N1) virus 2009).In our study case fatality rate among swine flu influenza A H1N1 positive cases was 41.66%, while a study done by Chandrashekhar Taklikar et al. (2013) & Vijaydeep Siddharth et al. (2012) observed 41% and 25.49% case fatality rate among swine flu positive cases respectively. A study done by Asmita A Mehta (2013) observed 6.8% mortality among swine flu patients. A study done by Patel Bhavin (2012) showed 22.5% mortality rate while in Saurashtra study (Chudasama et al., 2010) it was 25.91%. In another study done by Singh (2013) there were 58 expired patients out of total 304 Influenza A H1N1 cases, with an overall case fatality ratio of 19.1 among total swine flu patients. We observed one or other predisposing factor in 9 (75%) confirmed swine flu influenza A H1N1 cases among total 12 deaths due to swine flu. Ketan K. Patelstudy (2013) observed comorbidities/predisposing factors in 8 (61.53%) patients who died due to swine flu. In another study done in Oman (AkhwandShakeel Ahmad et al., 2009) 09 (16.4%) patients having swine flu associated with comorbidities died among total 55 swine flu patients. In a study conducted by Jain et al. (2009) underlying predisposing disease was reported at a rate of 68% in patients who presented a mortal course. In series from United Kingdom, comorbidconditions were also associated with increased risk of death, where obesity was present in significant number of patient as a comorbidity and in another study from USA obesity was a risk factor for high mortality in H1N1 patients. (Prasad et al., 2011; Pebody et al., 2010) We observed 5 deaths among confirmed swine flu cases; 3 died in < 2 days of hospital stay while 2 died in > 2-5 days of hospital stay. In VijaydeepSiddharth et al .(2012)study it has been observed that 12 swine flu cases died within 48 hours of stay among total 28 deaths. So chances of mortality due to swine flu influenza A H1N1 cases were more within 48 hours of admission.

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