H1N1 Swine flu: An Experience in a district of Western Maharashtra, India

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Abstract

Background: Genetic re-assortments in the influenza virus have caused fast and unpredictable changes leading to recurrent epidemics of febrile respiratory disease. Surveillance is the foundation of all efforts to understand and control influenza. Effective case detection and treatment as per WHO guidelines is necessary to reduce the mortality.

Objectives: The purpose of this study was to find the proportion of swine flu "cases" among the total suspects, to study their epidemiological profile and the various correlates affecting the outcome.

Material and Methods: A Cross-sectional study was carried out in 4 centres, identified as per Govt. guidelines for screening, diagnosis and management of H1N1 cases in 1 year period (Oct'2009 to Sept'2010). Information was collected using predesigned proforma from 100% "suspects" of Influenza A admitted to isolation wards, after duly informing the patients.

Results: Out of total 466 "suspects", 142 (30.47%) were found to be positive. M:F ratio of cases was 1.3:1. Maximum cases (47.18%) reported between >20 – 40 years of age group. 105 cases (73.94%) reported from Sangli district and 94 cases (66.20%) residing in rural area with most of them being admitted in the month Aug'2010 i.e. 229 (49.14%). The outcome of disease was poor in females compared to males. The duration of illness before hospitalization was longer and stay in the hospital was shorter in the cases who died.

Conclusions: Early case detection can reduce the burden of disease, so the health system should be strengthened and voluntary early reporting should be encouraged through various health

campaigns. Special measures should be taken during pre-monsoon season to reduce the risk of transmission.

Key words: Influenza, Surveillance, Western Maharashtra, India

Running title: H1N1 Flu in West Maha

Introduction

Influenza (Flu) pandemics are caused by new influenza viruses that have recently adapted to humans and resemble major natural disasters both in terms of recurrence and magnitude. The influenza virus, known to be circulating as a pathogen in the human population since 16th century is notable for its unique ability to cause recurrent epidemics and global pandemics. Genetic re-assortments in the influenza virus cause fast and unpredictable changes leading to recurrent epidemics of febrile respiratory disease every 1 to 3 years consistently necessitated the development of new vaccines. Each century has seen some pandemics rapidly progressing to all parts of the world due to emergence of a novel virus strain (A/California/07/2009) to which the overall population holds no immunity.[1]

Influenza like Illness caused by Influenza A [H1N1], a quadruple re-assorted influenza virus, was reported from Mexico on 18th March'2009 and rapidly spread to neighbouring United States and Canada. Subsequently the disease spread to all the continents.[2-4] World Health Organization [WHO] has raised the level of Influenza pandemic alert from Phase 5 to 6 on 11th June 2009**.** As per WHO, India has experienced the start of 2009 Influenza pandemic. The overall severity of Influenza pandemic was moderate, implying that most people recovered from infection without the need for hospitalization or the medical care.[1]

India reported its first case on 16th May 2009 in Hyderabad. Most of the cases reported subsequently were travel related cases among those travelling to India from affected countries. Substantial number of cases reported from Maharashtra (Mumbai and Pune), Karnataka (Bangalore) and Tamil Nadu (Chennai) were indigenous cases.[5] In Maharashtra, first case was reported on 19th June 2009 in Mumbai and on 10th July in Pune in a school student. As on 3rd Oct'2010, total lab confirm cases were 9895 and death of positive patients were 917. Sangli district in Western Maharashtra experienced a strong wave of transmission in Oct'2009 and Aug'2010.[6]

The magnitude of the problem of Swine flu is ever increasing in India. The qualitatively and quantitatively effective case detection and treatment as per WHO guidelines is necessary to reduce the mortality from Influenza A H1N1 virus. The present study was carried out to find out the proportion of swine flu "cases" in relation to total suspected swine flu cases in one calendar year and also to study the epidemiographical profile and the various correlates affecting the outcome of the swine flu cases.

Material & Methods

Study Area: The present study was carried out in four hospitals namely, Govt. Medical College Hospital, Miraj, Padmabhushan Vasantdada Patil Govt. Hospital, Sangli, Bharti Medical College Hospital, Sangli and Wanless Hospital, Miraj, identified as per Govt. guidelines for screening, diagnosis and management of H1N1 cases in Sangli district from 1st October'2009 to 30th September'2010.

Study Design: A descriptive cross-sectional study

Study Sample: It comprised of 100% "suspects" of Influenza A HINI swine flu admitted to isolation wards of all the above identified hospitals.

Exclusion Criteria: Patients who were brought dead by relatives & those who were non-willing to participate were excluded.

Ethical Aspects: The approval and clearance on ethical and operational aspects from the Institutional Ethical Committee was procured prior to conduction of this study. Informed consent of the patients was obtained prior to their interviews and examination. No investigative/ diagnostic/ therapeutic interventions were made in any patient by any of the authors.

Standard case definitions were used for the categorization of influenza A patients as per clinical features. The personal interview technique combined with clinical examination was used uniformly using the pre-designed structured questionnaire. The information regarding results of investigations was taken from hospital case sheets after duly informing to the doctor-in-charge as well as the patient about the same. The data obtained was fed up in Microsoft Excel sheet and was analyzed.

Results & Discussion

As can be seen in Table 1- , total 466 "suspects" of swine flu influenza A H1N1 infection were hospitalized from Oct' 2009 to Sept' 2010. Out of which, 142 (30.47%) were positive and 324 (69.53%) were negative for Influenza A H1N1 infection. At the same time, for more than 4044 contacts of positive cases, post exposure prophylaxis was given during this period.

Table 2 shows M:F ratio of cases was 1.3:1. Maximum cases (47.18%) were reported between >20 – 40 years of age group. These findings were consistent with the various other similar studies done by Sabra L Klein et al.[7] in USA, Mohammad A et al (2010)[8] in Saudi Arabia. The probable reason for predilection of male sex may be due to greater mobility, susceptibility and exposure to infection and also this age group consists of economically productive mobile population, travelling more for various reasons and most susceptible to exposure to infection, so they get exposed to virus easily and get infected easily.

Figure 1 shows that 105 cases (73.94%) were reported from Sangli district and 94 cases (66.20%) were residing in rural area. Out of 37 cases (26.06%) from out of Sangli district, 14 cases were from Karnataka, 19 cases were from Kolhapur, 1 case each from Solapur, Satara, Beed and Thane district. More number of cases from rural area may be due to increased referral due to increased awareness among health care personnel[9] about H1N1Influenza A infection and also lack of health care facilities to manage such cases in rural area.

It was observed from Figure 2, that most of the suspected cases were admitted in the month August'2010 i.e. 229 (49.14%), followed by September - 89 (19.10%), October - 52 (11.16%) and July – 41 (8.80%). Least number of cases i.e. 2 (0.43%) were admitted in the month of June'2010.

Table 3 shows that, out of 81 male patients, 65 (80.25%) got cured while 16 (19.75%) died, similarly, out of 61 female patients, 41 (67.21%) got cured while 20 (32.79%) died. Although males outnumbered females but mortality was more in females as compared to males. These observations were found to be statistically significant and were comparable with the following studies.

Sabra L Klein et al.[7] at USA, and Fielding J et al.[10] at Australia, in their study observed that the outcome of disease was worse in females. Mortality was more in females most probably due to late reporting in hospital after initiation of symptoms and late Oseltamivir treatment leading to complications and poor outcome in these cases.

Table 4.A shows that 104 (73.24%) cases reported themselves within 1-4 days of duration of illness followed by 37 (26.06%) at >4-10 days of duration of illness & only 1 (0.70%) case was reported after 10 days. It was also observed that, among 104 cases reported within 1-4 days, 86 (82.69%) were cured while 18 (17.31%) cases died. Similarly, those reported after >4 days i.e. among 38 cases, 20 (52.63%) were cured, while 18 (47.37%) cases died, indicating poor outcome, due to involvement of lower respiratory tract in cases of late reporting. This was found to be statistically highly significant.

Libster R et al (2010) at Argentina[11], Kumar A et al.[12] at Canada in their study observed that median duration of onset of illness to hospital admission and diagnosis of infection was 4 days with good outcome of disease.

Table 4.B shows that 98 (69.01%) cases had hospital stay of >10 days followed by 33 (23.24%) cases having a stay of ≤ 2 days, 8 (5.63%) cases >5-10 days and 3 (2.11%) cases having hospital stay of >2-5 days. The Mean duration of hospital stay was 10.89±1.30 days in those who were cured as compared to 1.58 ± 0.73 days in those who died, indicating that proper treatment has good outcome.

Denholm JT et al in the hospital based study conducted in 2009 at Australia[13] observed that Mean hospital stay was 10.7 days and outcome of disease was good in those patients.

Conclusions

The present study revealed that proportion of swine flu positive cases were higher in 20-40 years of age group, with maximum being reported from Sangli district and from rural area. Monsoon season was associated with maximum number of cases. The outcome of disease was poor in females as compared to males. The duration of illness before hospitalization was longer and stay in the hospital was shorter in the cases that died, indicating the poor outcome. As, the magnitude of the problem of Swine flu is ever increasing in our country, similar type of studies must be promoted in future.

Recommendations

1. Early detection of cases can reduce the burden of disease, so the health system should be strengthened to detect the suspected cases in early stage of disease. Voluntary early reporting of cases should be encouraged through various health campaigns.

2. As there is a risk of cases in monsoon season, special measures should be taken during "pre-monsoon season" in the community.

3. "High alert" should be declared during monsoon season for community as well for Health system.

4. As the large numbers of cases were reported from rural area, primary health care infrastructure should be strengthened.

5. Referral system from primary- secondary- tertiary care should be strengthened, to avoid delay in transfer and management of diagnosed cases.

6. Health education and preventive measures can reduce the disease transmission and overall disease burden in community.

Limitations

As this is the hospital based study all the limitations pertaining to the use of hospital statistics are applicable to this study. Especially, the generalization of prevalence rates on the basis of present study is not possible nor can representativeness of the sample be commented. Besides, hospital sample has tendency to result "Spurious association" which cannot be ignored.

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Table 1: Total cases of Swine flu during the study period

Negative	324(69.53)
Positive	142(30.47)
Total Suspects	466(100.0)
Total contacts treated	>4044

(* - Figures in parenthesis represent percentages)

Table 2: Age and Genderwise distribution of cases

Age group (years)	Male (%)	Female (%)	Total (%)
0-20	24(29.63)	10(16.39)	**34(23.94)**
>20-40	35(43.21)	32(52.46)	**67(47.18)**
>40-60	17(20.99)	15(24.59)	**32(22.54)**
>60	5(6.17)	4(6.56)	**9(6.34)**
Total	**81(57.04)**	**61(42.96)**	**142(100.0)**

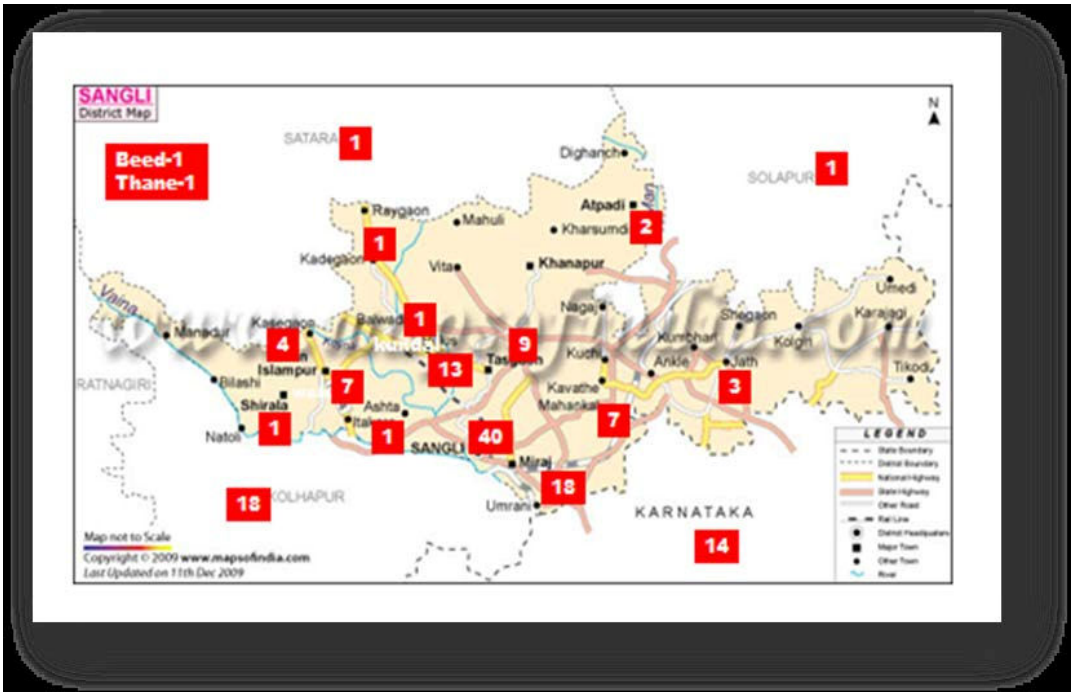

Figure 1: Sangli district Map showing area wise distribution of swine flu cases

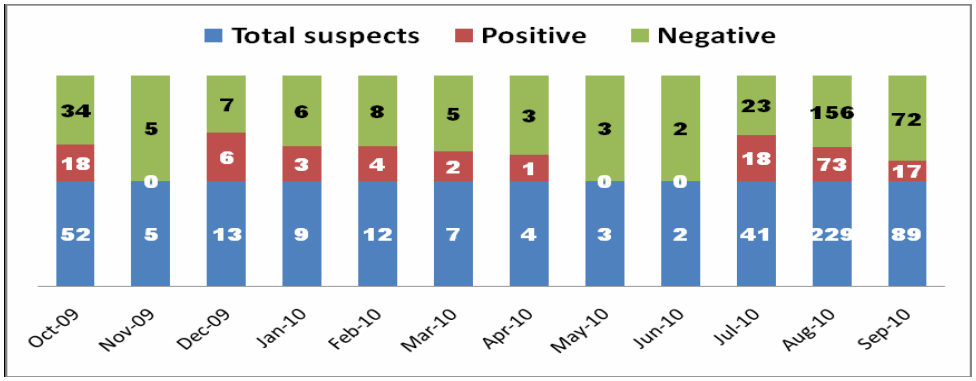

Figure 2: Month-wise distribution of the cases

Table 3: Association of age/gender with disease outcome

Age group (years)	Cured (n=106)		Deaths (n=36)		Total (n=142)	
	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)
0-20	20(30.77)	7(2.44)	4(25.0)	3(15.0)	24(29.63)	10(16.39)
>20-40	30(46.15)	21(51.22)	5(31.25)	11(55.0)	35(43.21)	32(52.46)
>40-60	12(18.46)	9(21.95)	5(31.25)	6(30.0)	17(20.99)	15(24.59)
>60	3(4.62)	4(9.76)	2(12.5)	0(0.00)	5(6.17)	4(6.56)
Total	**65(100.0)**	**41(100.0)**	**16(100.0)**	**20(100.0)**	**81(100.0)**	**61(100.0)**

*($\chi 2 = 3.123$, df = 1, $p < 0.05$, Significant, Totals of each column was considered.)

Table 4: Association of illness duration before hospitalization and hospital stay with disease outcome

Time interval		Cured (%)	Deaths (%)	Total (%)
A. Duration before hospitalization	**1-4 days**	86(81.13)	18(50.0)	**104(73.24)**
	>4-10 days	20(18.87)	17(47.22)	**37(26.06)**
	>10days	0(0.00)	1(2.78)	**1(0.70)**
B. Duration of hospital stay	**≤ 2 days**	0(0.00)	33(91.67)	**33(23.24)**
	>2-5 days	0(0.00)	3(8.33)	**3(2.11)**
	>5-10 days	8(7.55)	0(0.00)	**8(5.63)**
	>10 days	98(92.45)	0(0.00)	**98(69.01)**
Total		**106(100.0)**	**36(100.0)**	**142(100.0)**
Mean duration of Hospital stay		**10.89±1.30**	**1.58±0.73**	**8.53±4.23**

A. ($\chi 2 = 13.29$, df = 1, $p<0.0005$, Highly Significant, Yates Correction applied)