Original Article

Epidemiological characteristics including seasonal trend of hospital based swine flu cases in Jamnagar region, Gujarat, India

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ABSTRACT

Background: Swine flu is an acute respiratory infection caused by influenza virus (H1N1 subtype A). It is a highly contagious virus. If remains undiagnosed & untreated, it causes significant morbidity and mortality and spread in community.

Aim: Primary goal of this study is to identify epidemiological characteristics including seasonal pattern of hospital based patients suspected with H1N1 infection.

Material & Methods: Hospital based study was designed from August 2009 to July 2013 for a 4 years period. A total of 747 throat/ nasopharyngeal/nasal swabs were collected from category C patients and tested by Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) who visited Guru Govind Singh Government Hospital, Jamnagar. Some epidemiological data like age, sex, location etc. were also collected of these cases.

Result: During the 4-year study period, a total of 747 samples were tested and 246 (32.93%) are recorded positive for H1N1. Most numbers of these cases were from young adults (34.55%) in age group between >15-30 years and pediatrics (25.61%) in age group of <15 years. Male (56.91%) were infected more than female (43.09%). Infection rate was higher in urban population (64.22%) than rural population (35.78%). Total two peaks of infection were noticed. One was in rainy season & second was in winter season.

Conclusion: epidemiological parameters and seasonal pattern of swine flu gives ideas to create the awareness and to improve the control strategies to minimize the morbidity & mortality and spread of disease.

Key words: Swine flu, Hospital based patients, Epidemiological characteristics

INTRODUCTION

Influenza is an acute respiratory infectious disease caused by influenza virus. It is an ancient disease since 1889-90. It occurs in sporadic, epidemic and pandemic forms. In nature it affects the birds and animals [1]. Influenza virus is repeatedly undergoes the antigenic variation due to mutational changes in H (Haemagglutinin) and N (Neuraminidase) antigen which results outbreak of influenza in the community. It spreads from person to person via direct contact or by droplet nuclei [2].

In March 2009 a novel influenza virus was detected called Swine Originated Influenza Virus (S-OIV) or commonly known as swine flu (2009 pandemic, H1N1 Subtype A) virus [1, 3]. This new strain is due to genetic reassortment between human, swine and avian strain [4]. In April 2009 human cases were detected from Mexico and United States than it spread to other country [5,6]. It was the most recent pandemic that threatened the world. Virus spread very rapidly to other regions of the world and on June 11, 2009, WHO raised the pandemic alert level 5 to 6, indicating a global pandemic [7]. The pandemic level identifies the spread of the disease or virus and not necessarily the severity of the disease [8].

First confirmed case of H1N1 in India was reported in May 2009 [9]. In Gujarat, first confirmed case was reported in June 2009 [10]. In Jamnagar district, first confirmed case of H1N1 was reported in August 2009. This study is design to identify epidemiological characteristics including seasonal trend of swine flu in hospital based patients which affects the spread and severity of diseases in our region.

MATERIAL AND METHOD

Study design and duration:
Hospital base study was designed from August 2009 to July 2013 for a 4 years period.

Cases and Categorization:
All the influenza like cases visited Guru Govind Singh Government Hospital, Jamnagar were categorized in category A, category B and category C as per guide lines on categorization of Influenza A (H1N1) cases given by Ministry of Health & Family Welfare, India, (Revised on 05.10.09) [11].

Inclusion and exclusion criteria:
Patients presented with clinical features of Category C were included in study after their verbal consent. We also received patients having features suggestive of Influenza A (H1N1) but they were from category A and category B and they were excluded from study.

Sample size:
A total of 747 cases were included in the study and their throat/ nasopharyngeal/nasal swabs were collected and tested during study period.

Data preparation:
A specially designed data collection form was used to collect some epidemiological data like age, sex, location and communication details of studied cases from laboratory records during study period.

Testing method:
Specimens were collected from all patients by using sterile nylon flocked swab. Samples were placed in 3-mL viral transport medium. All the samples were tested by Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR).

Statistical analysis:
All the relevant data collected and analyzed using Microsoft Excel. Statistical analysis was done by proportion and chi square test. P value less than 0.05 considered as statistically significant at 95% confidence level.

Ethical Considerations:
This is a retrospective analysis of routine laboratory work, so an ethical consideration was not necessary.

RESULTS

During the 4-year study period, a total of 747 samples were tested for H1N1and their results were shown in Table 1**.**

Table 1: Distribution of total samples tested for H1N1

Total	Positive (%)	Negative (%)
747	246 (32.93)	501 (67.07)

Table 2: Age, sex and location wise distribution of confirmed cases of H1N1

Variables	Tested n=747	Positive n=246	P value
Age (in years)			
<15	251	63 (25.61%)	
15-30	240	85 (34.55%)	< 0.05
>30-45	109	42(17.08%)	
>45-60	98	41(16.67%)	
>60	49	15(06.09%)	
Sex			
Male	423	140(56.91%)	> 0.05
Female	324	106(43.09%)	

Figure 1: Trend of Swine flu cases (tested and positive) according to month (Aug 2009-July 2013)

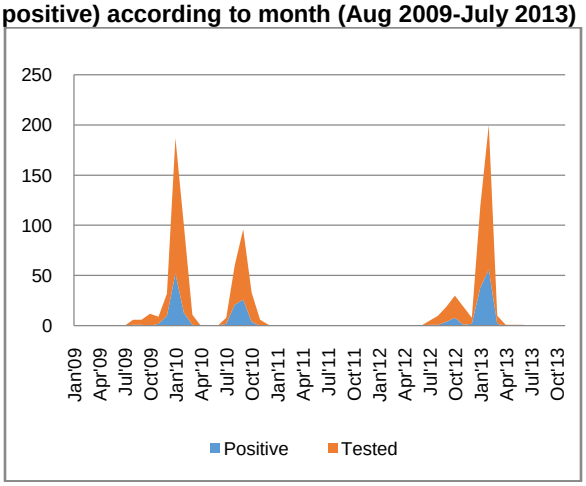

Table 2 shows the Age, sex and location wise distribution of confirmed cases of H1N1. In our study most numbers of H1N1 patients were from young adults (34.55%) in age group between >15-30 years and pediatrics (25.61%) in age group of <15 years. Least infection identified in older age group. P value is < 0.05 which indicates there is significant association between age & H1N1 ($\chi 2$ = 12.83, df = 4). Mean age of cases was 26.50 years. Infection rate was higher in male (56.91%) than female (43.09%), but statistically

it is not significant ($\chi 2 = 0.12$, df = 1, $p > 0.05$). Infection rate was higher in urban population (64.22%) than rural population (35.78%), but statistically it is not significant ($\chi 2 = 0.39$, df = 1, $p > 0.05$).

Figure 1 represents time trend of swine flu cases during study period. In our region two peaks of epidemic of H1N1 were observed during year. 1st peak was almost started in July-August and cases were increasing and reaches peak in September-October followed by decreasing cases and subsides in November-December. 2nd peak was observed in January-February with total subsides or decreasing cases in March –April.

DISCUSSION

Positivity during study period for H1N1out of total tested in our study was 32.93% which was little higher than study of Singh M et al (22.2%), Siddharth V et al (29.58%) and C P Sharma et al (29.06%) [12-14]. High prevalence may be due to hospital base study and it was restricted to small geographical area when compared against the entire state or country.

In present study most numbers of H1N1 patients were from young adults (34.55%) in age group between >15-30 years followed paediatrics (25.61%) in age group of < 15 years. Least infection identified in older age group. In study of Singh M et al most number of cases about 50.6% were in the 15-30 year age group which was slightly higher than our study and this age group was not followed by paediatrics age group, but followed by patients in the 30-45 years age group with 19.4% cases which is not in accordance to our study and <15 year age group comprised only 11.2% cases [12]. More proportion of cases in the young population may be due to lack of pre-existing immunity but still exact reason for this is not known. Similar observation was found by Delaney JW, Fowler RA in 2009 [15].

In our study infection rate was higher in male (56.91%) than female (43.09%). Similar results were found in study of Siddharth V et al [13] with maximum numbers of cases were males (56.48%) than females (43.52%) while in study of Singh M et al [12] the maximum numbers of cases were females (67.43%) than males (32.57%) which is contrary to present study.

In current study infection rate was higher in urban population (64.22%) than rural population (35.78%) similar results were observed in the study of CP Sharma et al with higher rate in urban population (67.68%) than rural population (32.32%) [14].

Month-wise analysis of influenza activity in the present study showed that in our region two peaks of epidemic of H1N1 were observed. First peak was almost started in July-August in rainy season and second peak was observed in winter season in January-February. Increased influenza activity in rainy season also observed in other research [16-18]. 2nd peak is almost started in January-February in cold & low solar radiation season with total subsides or decreasing cases in March –April in dry atmosphere. Some research pointed out that influenza activity increased in cold temperature and in low solar radiation [19-21]. Exact reason for increase influenza activity in winter is not known but when temperature drops people spend more time indoors, making it easier for the virus to spread. There were no cases were reported from January 2011 to June 2012 which may indicates that the strain identified previously was replaced by newer strain which may require further investigation and confirmation.

Although patients in this study comprised a sizeable proportion of cases from Jamnagar region, 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 based patients and many cases of community based 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.

CONCLUSION

The influenza (H1N1) virus is still active two years after the 2009 pandemic in the Jamnagar region of Gujarat, India. The incidence of H1N1 influenza was higher in young individual especially during the rainy and winter months. The presence of local unique seasonal pattern and its changes emphasizes to start the vaccination before the start of these two seasons and to optimize public health interventions to contain this deadly infection.

This study provides hospital-based epidemiological information, but a community based studies are required to arrive at a more precise and accurate understanding of Influenza A H1N1.

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