Research Article

Demographic analysis of influenza-like illness categories including seasonal trend of swine flu cases attending a teaching hospital in Southern Rajasthan, India

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ABSTRACT

Background: Influenza-like illness is a self-limiting non-specific acute respiratory illness characterized by common clinical features including fever, chills, malaise, headache, coughing, nausea, loss of appetite, and generalized weakness. Influenza A H1N1 is an important cause of ILI because it can lead to serious complications requiring hospitalization. Swine flu infection rates usually higher during the winter season in temperate regions. **Objectives:** This studyis designed to analyze the demographic data of different ILI categories including seasonal trend of H1N1-related ILI in the patients attending a teaching hospital to know the spread and severity of diseases in Southern Rajasthan in India. **Materials and Methods:** It is a hospital-based retrospective study in which epidemiological and demographic data of all the patients attended swine flu outpatient departments, isolation wards, and intensive care unit were obtained and analyzed. All patients of ILI-B and ILI-C categories were tested for real-time polymerase chain reaction. **Results:** Of 3933 patients, 2686 (68.29%) patients were categorized in ILI-A, 724 (18.41%) patients were in ILI-B, and remaining 523 (13.30%) patients were in ILI-C. Overall, swine positivity among ILI-B and ILI-C categories was significantly (<0.05) higher in females than male and extremely statistically significant ($P < 0.0001$) higher in rural areas than urban. It was found that the transmission of influenza H1N1 peaked during winter season and affected the individuals of all age groups with high incidence in those aged 16–30 and 31–45 years. **Conclusions:** The higher incidence of H1N1 winter season emphasizes the need of special preventive and public health measures before the start of winter season. Information, education, and communication activities need to be strengthened specially for the rural people who were affected more in the present outbreak.

KEY WORDS: Influenza-like Illness; Seasonal Trend; Swine Flu

INTRODUCTION

Influenza-like illness is a self-limiting non-specific acute respiratory illness characterized by common clinical features including fever, chills, malaise, headache, coughing, nausea, loss of appetite, and generalized weakness. Most cases of influenza-like illness are caused by non-influenza viruses (e.g., parainfluenza viruses, adenoviruses, respiratory syncytial virus, coronaviruses, and rhinoviruses). Some bacteria such as *Streptococcus pneumonia*, *Chlamydia pneumoniae*, *Legionella,* and *Mycoplasma pneumonia* are also responsible for influenza-like illness to a lesser extent. Importance of influenza virus is due to capacity of developing serious complications which leads to need of prolonged hospitalization. A suspected case of ILI can be examined using combined approach of epidemiological profile, clinical knowledge, history of contact, and laboratory as well as radiological investigations.[1]

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Swine flu infection rates usually higher during the winter season in temperate regions; however, the pattern of influenza is different in different climatic areas, with year-round circulation in some areas and biannual peaks in others.[2-5]

This study is designed to analyze the demographic data of different ILI categories including seasonal trend of H1N1-related ILI in the patients attending a teaching hospital to know the spread and severity of diseases in Southern Rajasthan in India.

MATERIALS AND METHODS

As per guidelines of the Ministry of Health and Family Welfare (MoHFW), all suspected cases for influenza A H1N1 are categorized into three categories, i.e. ILI-A, ILI-B, and ILI-C (Revised on October 05, 2009).[6] Suspected cases fall under category ILI-A and ILI-B do not require H1N1 testing, but due to severity of epidemic, it was decided to perform H1N1 testing on category ILI-B too. Due to similar reason, patients under ILI-A category were prescribed oseltamivir; however, it was not recommended as per guidelines of MoHFW.

Study Design

This was a hospital-based, retrospective study.

Place of Study

This study was conducted in swine flu outpatient department (OPD), ward, and intensive care unit (ICU) at a teaching hospital of Southern Rajasthan in India during 2015 swine flu outbreak. All the cases suspected for ILI were categorized as per guidelines on categorization of influenza A H1N1 cases given by MoHFW, India.[6]

Study Population

Data of all suspected cases visited swine flu unit (OPD visits, swine flu wards, and ICU admissions) were collected for 2015. Each patient clinically suspected for swine flu was tested for real-time polymerase chain reaction (rt-PCR).

Sample Size

In the year 2015, during the outbreak of influenza A H1N1, a total of 3933 patients attended 24 h running swine flu OPD. Of them, 1247 (31.7%) patients were subjected for rt-PCR. The number of patients found to be swine positive was 491 (39.37%).

Data Collection and Analysis

A pre-structured pro forma of standardized questionnaire was filled to collect demographic and clinical details of cases from hospital records. Data were analyzed using excel sheet and statistical software SPSS 21.

Ethical Issues

Ethical clearance from ethical committee has been obtained before beginning of the study.

RESULTS

In the year 2015, during the outbreak of influenza A H1N1, a total of 3933 patients attended 24 h running swine flu OPD at a teaching hospital in Udaipur. Of them, 2686 (68.29%) patients were categorized in ILI-A, 724 (18.41%) patients were in ILI-B, and remaining 523 (13.30%) patients were in ILI-C.

Table 1 shows that majority of patients of ILI-A and ILI-B category belonged to 16–30 years age group. While majority of patients of ILI-C category belonged to 46–60 years age group. However, overall majority of patients belonged to 16–30 years age group.

Table 2 shows that majority of patients tested for H1N1 in ILI-B and ILI-C categories were belong to female gender. Swine positivity was higher in female population and this difference is statistically significant ($P < 0.05$). It shows that in ILI-B category, majority of the patients tested for H1N1 and swine positive patients belong to urban area while in ILI-C category, majority of patients tested for H1N1 and swine positive patients belong to rural area. However, 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 belonged to rural area and this difference was extremely significant statistically ($P < 0.0001$).

Figure 1 shows seasonal trend of swine cases during our study period. It shows that swine flu cases were at peak in winter season. Majority of patients 1075 (86.20%) tested for swine flu in February and March while highest swine positivity 252 (47.91%) was observed in the month of February.

Figure 2 explains that in compare to the previous swine flu outbreaks, it has been observed that swine flu outbreak in 2015 had greater number of tested and swine positive patients followed by the year 2009 epidemic.

DISCUSSION

In our study, majority of patients of ILI-A category belong to the age group of 16–30 years. Similarly, majority of ILI-B category also belong to the age group of 16–30 years. Age group of 46–60 years has maximum contribution in ILI-C category. Our study reported that majority of patients in each ILI category belong to female gender, i.e., 61.73%,

Table 1: Age-wise distribution of patients according to ILI category

Age group (years)	ILI-A (*n*=2686) (%)	ILI-B (*n*=724) (%)	ILI-C (*n*=523) (%)	Total (*n*=3933) (%)
0–15	271 (10.09)	47 (06.49)	13 (02.49)	331 (8.42)
16–30	952 (35.44)	231 (31.91)	125 (23.90)	1308 (33.26)
31–45	806 (30.01)	205 (28.31)	144 (27.53)	1155 (29.37)
46–60	402 (14.97)	154 (21.27)	151 (28.87)	707 (17.98)
>60	255 (09.49)	87 (12.02)	90 (17.21)	432 (10.98)
Total	2686 (68.29)	724 (18.41)	523 (13.30)	3933

Table 2: Sex-wise distribution of patients according to ILI category

Variables	ILI-B		ILI-C		Total	
	Tested	Positive	Tested	Positive	Tested	Positive
	n=724 (%)	*n*=224 (%)	*n*=523 (%)	*n*=267 (%)	*n*=1247 (%)	*n*=491 (%)
Sex						
Male	335 (46.27)	89 (39.73)	226 (43.21)	120 (44.94)	561 (44.99)	209 (42.57)
Female	389 (53.73)	135 (60.27)	297 (56.79)	147 (55.06)	686 (55.01)	282 (57.43)
Area						
Rural	221 (30.52)	73 (32.59)	346 (66.16)	188 (70.41%)	567 (45.47%)	261 (53.16%)
Urban	503 (69.48)	151 (67.41)	177 (33.84)	79 (29.59%)	680 (54.53%)	230 (46.84%)

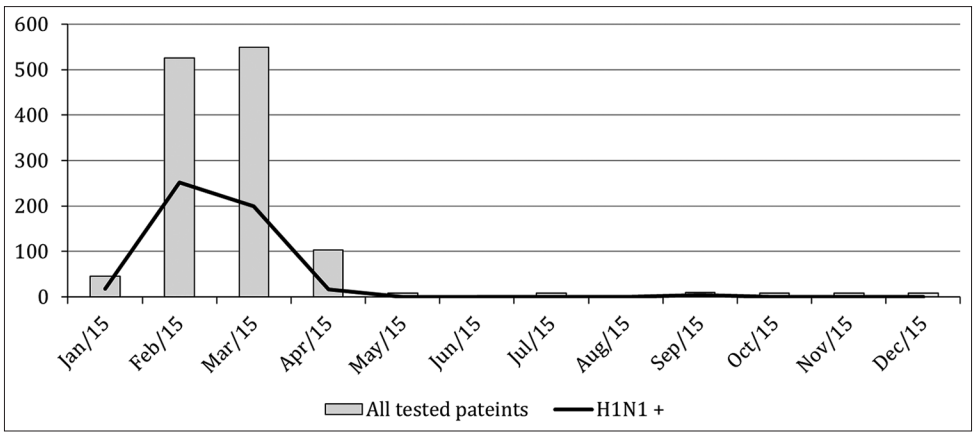

Figure 1: Trend of swine flu cases (tested and positive) according to month-wise distribution

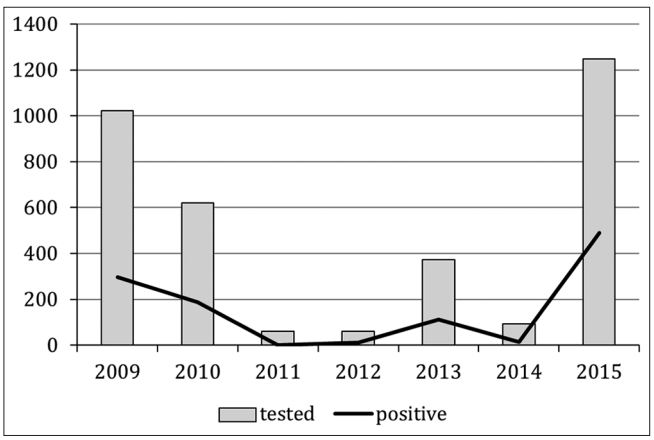

Figure 2: Year-wise trend of swine flu cases (tested and positive) from 2009 to 2015

53.73%, and 56.79%, respectively, in ILI-A, ILI-B, and ILI-C category. In our study, majority of population in ILI-A and ILI-B category belong to urban area, i.e., 85.55% and 69.48%, respectively. Majority of population 346 (66.16%) in ILI-C category belong to rural area. It showed the easy and convenient approach of urban population to health-care facilities. Greater rural population in ILI-C category was due to high admission rate of rural patients. It may be due to delayed approach to health-care facility by rural population. In our study, it has been observed that maximum number of suspected 1075 (86.20%) and confirmed cases 252(47.91%) were reported in winter season.

Our findings were corroborating with the study of Singh *et al*.[7] conducted in Western region of Rajasthan which showed that the maximum number of swine positive cases (33.2%) were reported in the winter season. Our study findings are contrary with a study conducted by Malkar *et al*.[8] which showed that incidence of influenza A H1N1 was at peak in late summer and early autumn (82.35% in

August and September 2009; similarly, 76.92% in August and September 2010). Our study findings corroborate with the study of Vasanthi and Kanimozhi[9] which showed that majority of cases were seen in the winter season. Our study findings corroborate with the study of Domadia *et al*.[10] which showed that majority of cases were in the winter season. Gelotar *et al*.[11] in their study reported that H1N1 culminates 2 times during their study year. First high incidents were observed in late summer-early autumn and second peak was observed winter. In compare to the previous swine flu outbreaks, it has been observed that swine flu outbreak in 2015 had greater number of tested and swine positive patients followed by 2009 epidemic.

This study provides knowledge about burden of influenza-like illness in the study area as well as about seasonal trend so that need health-care system can be prepared to combat with such issue. This is a hospital-based study which provides limited information so a community-based study is required to identify more precise and accurate knowledge to understand the influenza A H1N1. This study is hospital centered involving hospitalized patients only. Patients belonging to category ILI-A are not being tested, were not included in the study.

CONCLUSIONS

In our study findings, the transmission of influenza H1N1 peaked during February–March months which affect all age groups with high incidence in the age groups of 16–30 and 31–45 years. The higher incidence of H1N1 winter season emphasizes the need of special preventive and public health measures before the start of winter season. Information, education, and communication activities need to be strengthened specially for the rural people who were affected more in the present outbreak.

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