

Epidemiological Profile of Influenza at Tertiary Care Hospital, Gandhinagar, Gujarat

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Abstract

The year 2009 witnessed emergence of novel H1N1 subtype of influenza A virus. This novel strain rapidly spread across the world and caused pandemic. In 2010, WHO declared pandemic to have crossed its peak and also warned that it will continue as seasonal influenza outbreaks in winter seasons. Several aspects of the epidemiology of influenza A H1N1/2009 strain have not been accurately determined. We sought to study whether the age & gender affects susceptibility to influenza. During the study period of one month, patients categorised as category C under national influenza guidelines and admitted to isolation ward were screened for influenza. Real-time reverse transcriptase PCR (rRT-PCR) was used for detection of influenza viral RNA. For PCR setup, WHO & CDC guidelines were followed. The result given was either Influenza A/H1N1/2009pdm strain positive or negative. Out of 75 samples received in the laboratory, 32 samples were positive (positivity rate of 42.66%). Positivity rate for females (46.51%) was higher than males (37.50%). Positivity rate was maximum in 70-79 years age group (100%) followed by 30-39 years age group (46.15%) and 20-29 years age group (44.44%). None of the patient was positive in 10-19 years age group (Positivity rate of 0%). The influenza (H1N1/2009) virus is still active several years after the 2009 pandemic in the various parts of the world. The incidence of H1N1 influenza is higher in old individuals. This emphasizes importance of vaccination especially in high risk group before the start of the flu season.

Keywords: Influenza A, H1N1, epidemiological analysis, pandemic, gender differences, age differences.

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INTRODUCTION

Influenza viruses belong to Orthomyxoviridae family of viruses. Orthomyxoviridae family viruses are negative-sense ssRNA viruses. Four genera are described; Influenza A, B, C & D. Among this, influenza type A infects humans, other mammals, and birds, and is responsible for all flu pandemics. The year 2009 witnessed emergence of novel H1N1 subtype of influenza A virus, thought to contain genes from human, swine & avian strains. This novel strain rapidly spread across the world and caused pandemic. In 2010, WHO declared pandemic to have crossed its peak and also warned that it will continue as seasonal influenza outbreaks in winter seasons. Several aspects of the epidemiology of influenza A H1N1/2009 strain have not been accurately determined. We sought to study whether the age & gender affects susceptibility to influenza.

MATERIAL & METHODS

Study was performed at a tertiary care hospital of Gandhinagar. The study period was one month.

During study period patients categorised as category C under national influenza guidelines [1] and admitted to isolation ward were screened for influenza. The sample collected was nasopharyngeal swab and/or throat swab [2]. After collection, swabs were immediately transferred to viral transport media (VTM) and the vials were labeled with patient identification. These samples were kept at 4°C until transported to molecular laboratory. Various methods of influenza virus detections are available such as viral culture, r RT-PCR and antigen detection. Among these methods, rRT-PCR is the test of choice for rapid and reliable diagnosis. For PCR setup, WHO & CDC guidelines were followed [3] Viral RNA was extracted from the VTM using QiaAMP Viral RNA Mini kit (Qiagen, Germany)[4]. rRT-PCR reaction mixture was prepared using Ag-Path ID One Step RT-PCR reagents (Applied BioSystems, USA) [5] and TaqMan Influenza A (H1N1) Assay Set (Applied BioSystems, USA)[6]. The instrument used was LightCycler 96 (Roche Diagnostics, Switzerland)[7]. The result given was either Influenza A/H1N1/2009pdm positive or negative.

RESULTS

During the period of one month, 75 samples were received in the laboratory. Out of these, 32 samples were positive. This gave positivity rate of (42.66%).

Total 32 samples were from male patients, out of which 12 were positive. So the positivity rate for male patients was 37.50%. Total 43 samples were received from female patients, out of which 20 were positive. Hence, the positivity rate for female patients was 46.51%. (See Table – 1 & Figure – 1).

Table-1: Gender wise samples and positives

Gender	No. of samples received	No. of samples positive	No. of samples negative	Positivity Rate (%)
Male	32	12	20	37.50
Female	43	20	23	46.51
Total	75	32	43	42.66

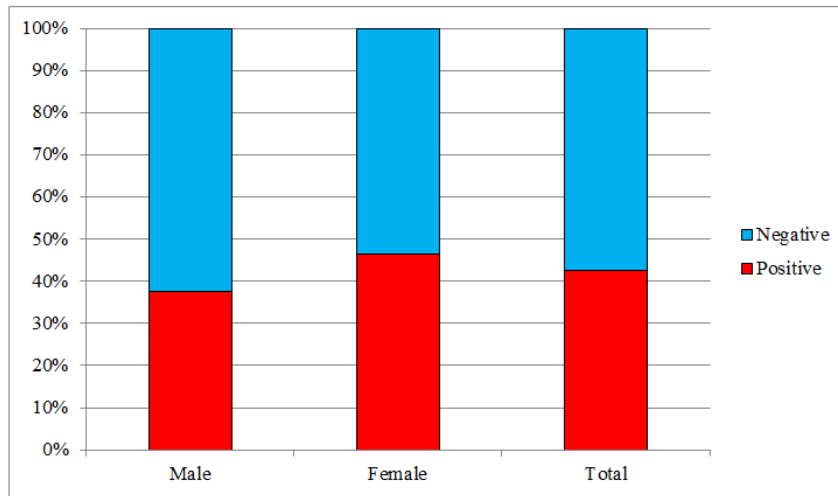


Fig-1: Gender wise positivity rate

Analysis by age group showed maximum samples were received in the 40-49 years age group (n=21) followed by 50-59 years group (n=19) and 30-39 years group (n=13). Contrastingly positivity rate was maximum in 70-79 years age group (100%) followed

by 30-39 years age group (46.15%) and 20-29 years age group (44.44%). None of the patient was positive in 10-19 years age group (Positivity rate of 0%). (See Table – 2 & Figure – 2).

Table-2: Age group wise samples and positives

Age group	No. of samples received	No. of samples positive	No. of samples negative	Positivity Rate (%)
10-19	2	0	2	0
20-29	9	4	5	44.44
30-39	13	6	7	46.15
40-49	21	8	13	38.10
50-59	19	8	11	42.11
60-69	8	3	5	37.50
70-79	3	3	0	100
Total	75	32	43	42.66

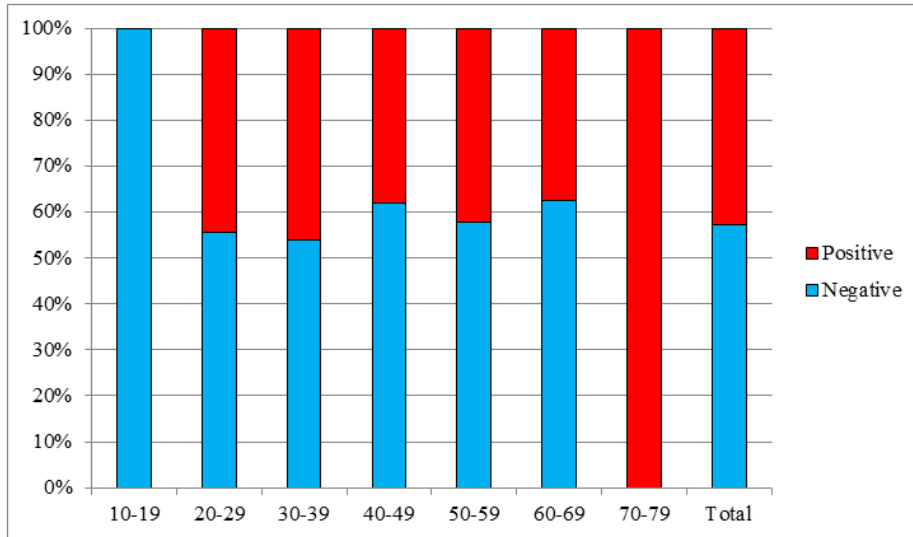


Fig-2: Age group wise positivity rate

Analysis by age group & gender showed that among most age groups females had higher positivity rate than males. However, in the 40-49 years age group,

the positivity rate was higher for males (50.00%) as compared to females (27.27%).

Table-3: Positivity Rates by Age & Gender

Age group	No. of samples received (Male)	No. of samples positive (Male)	Positivity Rate (%) (Male)	No. of samples received (Female)	No. of samples positive (Female)	Positivity Rate (%) (Female)
10-19	0	0	-	2	0	0.00%
20-29	4	1	25.00%	5	3	60.00%
30-39	4	1	25.00%	9	5	55.56%
40-49	10	5	50.00%	11	3	27.27%
50-59	10	3	30.00%	9	5	55.56%
60-69	3	1	33.33%	5	2	40.00%
70-79	1	1	100.00%	2	2	100.00%
Total	32	12	37.50%	43	20	46.51%

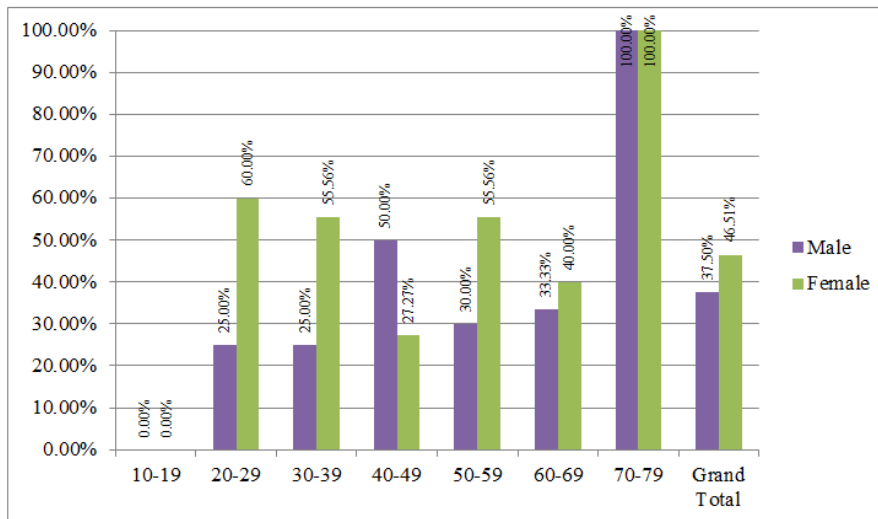


Fig-3: Positivity Rates by Age & Gender

DISCUSSION

Out of total samples tested, positivity for H1N1 was 42.66% in our study, which was higher than

study of Singh M *et al.* (22.2%), Siddharth V *et al.* (29.58%) and C P Sharma *et al.* (29.06%) [8-10]. Higher prevalence in our study may be due to hospital

based study. In present study most numbers of H1N1 patients were from old patients (100.00%) in age group between 70-79 years followed by 30-39 years group. Least infection identified in young 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 lower 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 [8]. More proportion of cases in the old age population may be due to presence of pre-existing conditions which predispose them to rapid deterioration in health and convert them in to category C patient. Similar observation was found by Delaney JW, Fowler RA in 2009 [11].

In our study infection rate was higher in female (46.51%) than male (37.50%). Similar results were found in study of Singh M *et al.* [8] the maximum numbers of cases were females (67.43%) than males (32.57%) while in study of Siddharth V *et al.* [9] with maximum numbers of cases were males (56.48%) than females (43.52%) which is contrary to present study.

The patients in this study comprised a small proportion of cases from Gandhinagar district; 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 (Category C) 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 (H1N1/2009) virus is still active several years after the 2009 pandemic in the various parts of the world. The incidence of H1N1 influenza was higher in old individuals. This emphasizes importance of vaccination before the start of the flu season 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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