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Research Article

A study of correlation between the environmental factors and occurrence of Influenza an H1N1cases in Baroda district

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Abstract: The Influenza a H1N1 in humans can be a mild illness or in some people it may result in serious, even life-threatening complications such as pneumonia, acute bronchitis, worsening of chronic conditions, respiratory failure. The objective of this Study is to synthesize the results of these studies in an effort to increase the transparency of what is currently known about the effects of weather and climate on influenza. All the patients admitted in the swine flu isolation ward of both Government and Private Hospital of Baroda District was included in this study. This study includes only confirmed H1N1 virus infected patients in Category "C" admitted in "Isolation Ward" during the period of January to June, 2013 as well as secondary data from records. Correlation of environmental factors in Baroda district in year 2010 shown there was negative correlation between the monthly maximum temperature and occurrence of Influenza a H1N1 cases. (p=0.0087 r= -0.922) Similarly there was negative correlation between the monthly minimum temperature and occurrence of Influenza a H1N1 cases in year 2010 (p=0.0104 r=-0.9157). Monthly maximum and minimum temperature do not have any significant effect on occurrence of Influenza A H1N1 cases in year 2013. (r=0.13, p=0.802; r=-0.25 p=0.622).The atmospheric temperature remains lowest in December, correlating with an increase in the reported number of infected patients with influenza A (H1N1). It continues in January and the winter comes to an end by February; the number of reported positive cases also shows a fall. It signifies the relationship of influenza virus with cold season as maximum number of cases presented during these months of winter season, as reported by other studies. Therefore present study aimed at continued surveillance for detecting Influenza A H1N1 cases is required. Periodic analysis of the data so collected can give us information about the changing epidemiological pattern of the disease or its agent and its correlation with the associated factors.
Keywords: Influenza A H1N1, Environmental factors.

INTRODUCTION

Influenza is an acute respiratory tract infection caused by influenza virus, of which there three types-A, B and C. The disease characterized by sudden onset of chills, malaise, fever, muscular pain and cough. Influenza is truly an international disease. It occurs in all countries and affects millions of people every year. Its behaviour is unpredictable [1]. It may occur in several forms.The Influenza a H1N1 in humans can be a mild illness or in some people it may result in serious, even life-threatening complications such as pneumonia, acute bronchitis, worsening of chronic conditions, respiratory failure [2].

The most extensive and severe outbreaks are caused by influenza A viruses, because of the remarkable propensity of the H and N antigens of these viruses to undergo periodic antigenic variation. Influenza A has 16 distinct H subtypes and 9 distinct N subtypes, of which only H1, H2, H3, N1, and N2 have been associated with epidemics of disease in humans.

The unique features of Influenza epidemic are the suddenness with which they arise, and the speed and ease with which they spread. The short incubation period, large number of subclinical cases, high proportion of susceptible population, short duration of immunity, and absence of cross immunity, all contribute to its rapid spread. The fate of the virus during inter-epidemic period is also not known [3].

The study will help to correlate association between environmental factors and disease occurrence /peak of swine flu disease there by suggest preventive measure, if possible. The objective of this Study is to synthesize the results of these studies in an effort to increase the understanding of what is currently known about the factors which can influence the occurrence and outcome of influenza A H1N1 and what aspects

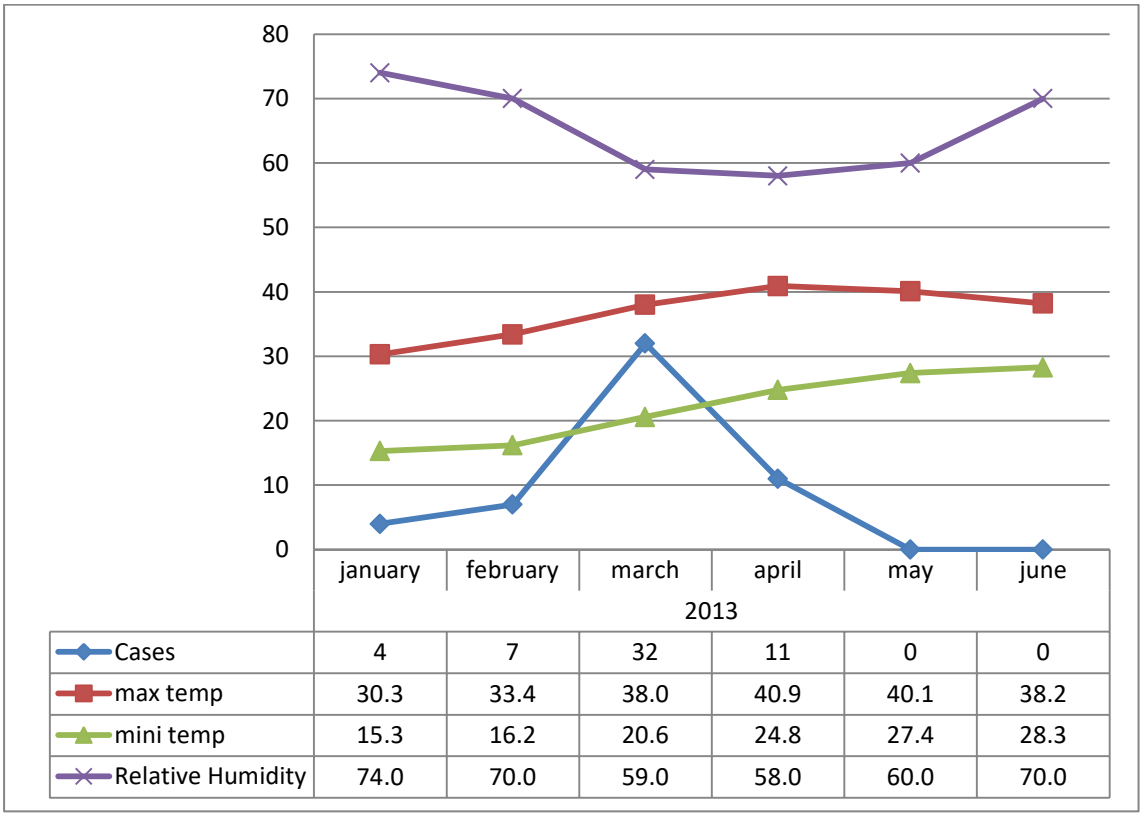
of the relationships remain unexplored. The atmospheric temperature remains lowest in December, correlating with an increase in the reported number of infected patients with influenza A (H1N1). It continues in January and the winter comes to an end by February; the number of reported positive cases also shows a fall. It signifies the relationship of influenza virus with cold season as maximum number of cases presented during these months of winter season, as reported by other studies [4-6].

MATERIALS & METHODS

This is a Cross-sectional observational study. The present study was carried out in Baroda district. All the patients admitted in the swine flu isolation ward of both Government and Private Hospital of Baroda District was included in this study. The study instrument was used in this study was standardized proforma of government of Gujarat for influenza A H1N1proforma. Study protocol was prepared and finalized. Each proforma filled up by the government/private doctor were reviewed in detail. Data of Baroda districts monthly temperature and humidity of 2009-2013 year were obtained from Meteorological department, Ahmadabad and were reviewed in detail in order to correlate with the Influenza a H1N1 cases. Secondary data of Influenza cases of year 2009 to 2012 also were also obtained from EMO to compare of two waves of the Influenza a H1N1 epidemic. Data collection was carried out between 1st March 2013 to 30th June, 2013. Patients treated at Government and Private hospitals were enrolled in study. Data collection was continued till the end of June to enable comparison of monthly statistics.

RESULTS

As shown in the figure 1, the recent epidemic of Influenza a H1N1 cases shows peak during the months from January to March. After that number of H1N1 cases show decreasing trend and merely it touches the baseline by the month of May in year 2013.Monthly maximum and minimum temperature do not have any significant effect on occurrence of Influenza a H1N1 cases. (r=0.13, p=0.802; r=-0.25 p=0.622) Similarly monthly change in relative humidity also did not have any significant effect on Influenza a H1N1 cases. (r=-0.495, p=0.317).



	january	february	march	april	may	june
Cases	4	7	32	11	0	0
max temp	30.3	33.4	38.0	40.9	40.1	38.2
mini temp	15.3	16.2	20.6	24.8	27.4	28.3
Relative Humidity	74.0	70.0	59.0	58.0	60.0	70.0

Fig 1: Environmental factors and Influenza H1N1 Cases 2013

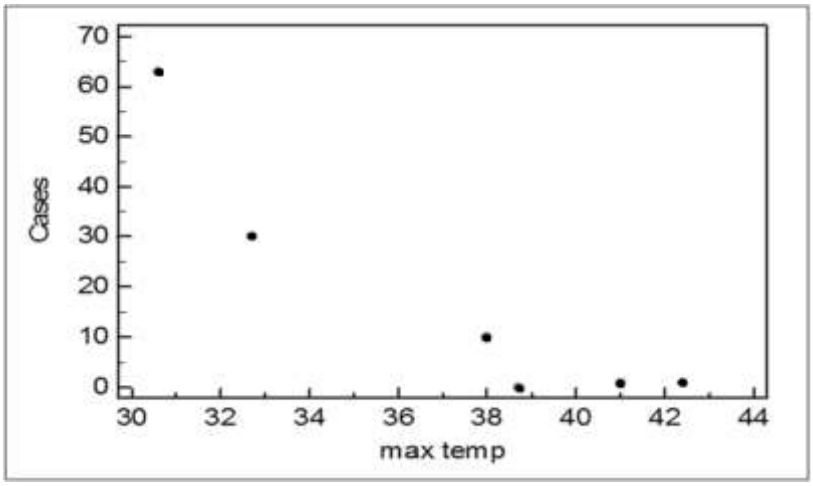


Fig 2: Monthly maximum temperature and Influenza H1N1 Cases (r= -0.922, P=0.0087, 95% CI of r = -0.9917 to -0.4434)

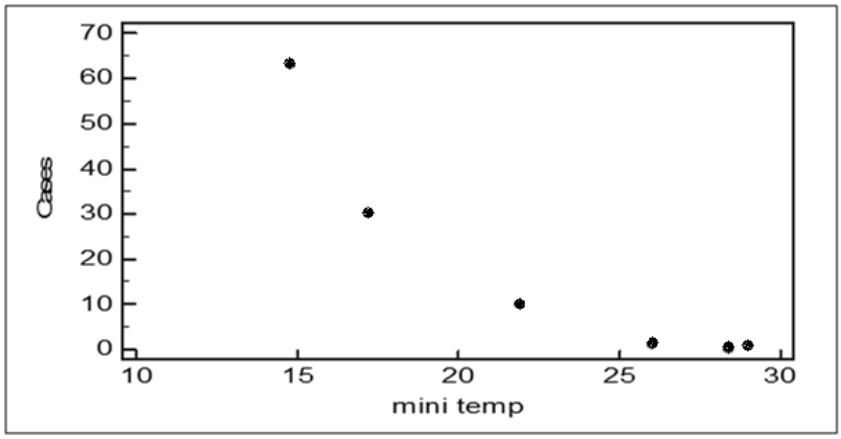


Fig 3: Monthly minimum temperature and Influenza H1N1 Cases (r=-0.9157, P=0.0104, 95% CI of r = -0.9909 to -0.4054)

Figures 2 & 3 depicts association of monthly maximum and minimum temperature with occurrence of Influenza A H1N1 in year 2010. As shown in figure no 2 and 3 there was negative correlation between the monthly maximum temperature and occurrence of Influenza A H1N1 cases. (p=0.0087 r= -0.922) Similarly there was negative correlation between the monthly minimum temperature and occurrence of Influenza a H1N1 cases. (p=0.0104 r=-0.9157)

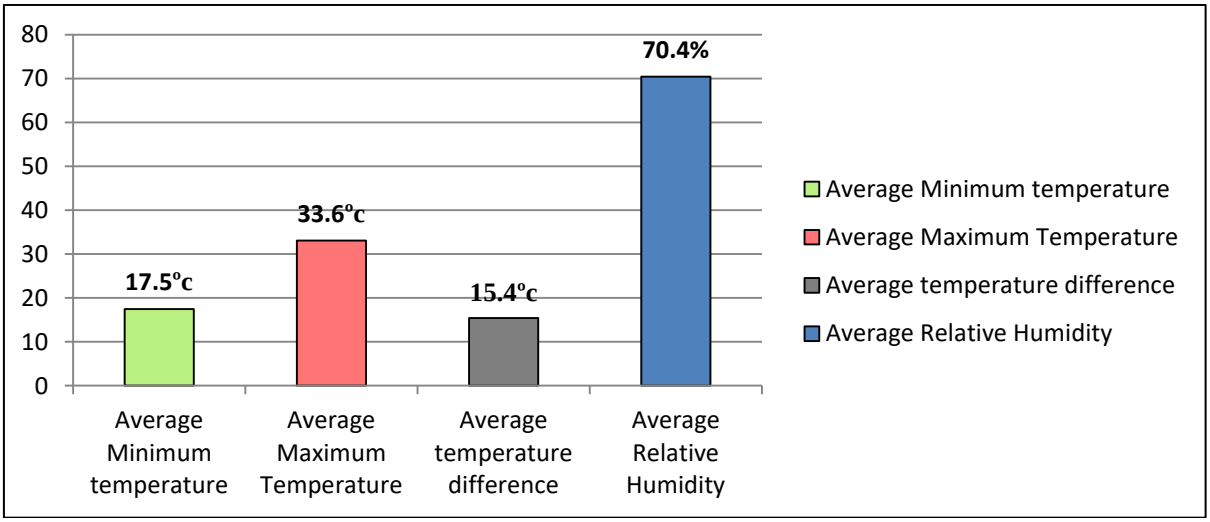


Fig 4: Average Humidity and Temperature at time of occurrence of maximum number of Influenza A H1N1 cases
***The data of temperature (monthly maximum and minimum) and relative humidity for Gujarat, assuming that it was more or less similar value applied for Baroda region**

As shown in the figure 4 Maximum numbers of H1N1 cases were observed when average temperature difference 15.4ºc(14ºc-17ºc), average minimum temperature was 17.5ºc (12.5ºc-22.9ºc), average maximum temperature was 33.06ºc(29.4ºc-38ºc) and average relative humidity was 70.4%(59% - 80%).Figure showing effect of temperature (monthly maximum and minimum) and relative humidity on occurrence of Influenza a H1N1 cases in Gujarat. The percentage of cases has increased as increase in the minimum temperature. The percentage of Influenza A H1N1 cases have increased as decrease in the maximum temperature. There is apparently no significant effect of changes in relative humidity on occurrence of Influenza A H1N1 cases.

DISCUSSION

The current study does not show any relation with environmental factors and occurrence of influenza A H1N1 cases which is not in congruence with other studies [4-6]. Possible reasons for such non association with environmental factors like changes in disease trend, mutation in viral genome or antigenic shift/drift needs to be explored through further research. However it is similar to seasonal trends of viral diseases in general which peaks at the end of winter and beginning of summer.

In India, the monsoon ends by September and October, which is followed by start of winter from November. The atmospheric temperature remains lowest in December, correlating with an increase in the reported number of infected patients with influenza A (H1N1). It continues in January and the winter comes to an end by February; the number of reported positive cases also shows a fall. It signifies the relationship of influenza virus with cold season as maximum number of cases presented during these months of winter season, as reported by other studies [4-6].

CONCLUSION

Monthly maximum, minimum temperature and relative humidity did not show any significant effect on occurrence of Influenza a H1N1 cases in year 2013 while negative correlation was found in year 2010.

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