ORIGINAL RESEARCH PAPER
Volume-9 | Issue-3 | March-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

RETROSPECTIVE ANALYSIS OF INFLUENZA A H1N1 (SWINE FLU) AT TERTIARY CARE CENTER

Microbiology

Dr. Nikhil Mathur Senior Resident, Department of microbiology, Government medical college, Kota

Dr. Charu Sharma* Senior Resident, Department of microbiology, Government medical college, Kota *Corresponding Author

Dr. Ghanshyam Soni Senior Professor and Head of the Department, Department of microbiology, Government medical college, Kota

ABSTRACT

Background : Influenza A H1N1 is an infectious disease caused by RNA viruses of the family Orthomyxoviridae (the influenza viruses).
Methods: Retrospective study was conducted on all the suspected cases of Influenza A H1N1 (Swine Flu) from October 2018 to September 2019 in the Department of Microbiology, Government Medical College, Kota, Rajasthan, India.
Results: Out of 3979 suspected cases, 606 were tested positive among which 51.32% were males and 48.68% were females. Maximum prevalence was noted among age group 0-10 years (18.67%) followed by 41-50 years of age group (18.26%).. There might exists a relation between the humidity and the virus activity.
Interpretation and Conclusion: Conscientious screening and expeditious management and other preventive measures for identifying the suspected cases and isolating them will go a long way in curtailing the recurrence of this epidemic.

KEYWORDS

Influenza A H1N1; swine flu; orthomyxoviridae ; prevalence; humidity.

INTRODUCTION

Influenza viruses are among the most common cause of human respiratory infections[1]. The swine-origin Influenza A (S-OIV) (H1N1) virus that appeared in 2009 was first found in human beings in Mexico, is a reassortant with at-least three parents. S-OIV is any strain of the influenza family of viruses that is endemic in pigs.[2] Six of the genes are closest in sequence to those of H1N2 'triple-assortant' influenza viruses isolated from pigs in North America around 1999-2000.

WHO declared H1N1 infection as a pandemic on 11 June 2009. About 208 countries reported laboratory-confirmed cases of H1N1 influenza including 12,220 deaths.[3] During the recent times, 2009 swine flu H1N1 pandemic has caused a great concern because of the rapid dissemination of the virus throughout the world.[4]

In India, Telangana (Hyderabad) witnessed the first case of influenza A H1N1 on 16th May 2009.[5] Soon the disease spread to other parts of the country. The WHO declared H1N1 post-pandemic on 10th August 2010.

In 2015, India had its worst tangle with the disease yet (2010-19) as 137,323 cases and 10,614 deaths were reported nationwide. The situation improved drastically in 2016 with just 1,786 cases and 265 deaths registered.[6]

The state of Rajasthan reported its first case on 23 July 2009. The national and state governments made a serious effort to contain the spread of the disease and the resultant morbidity and mortality in the population.[7]

Aims and objectives

1. To know the prevalence of Influenza A H1N1 (Swine Flu) cases by using real-time reverse transcriptase PCR.
2. To ascertain whether any relationship exist between the average temperature, relative humidity and Influenza A H1N1 (Swine Flu) virus activity.

MATERIALS AND METHODS

Retrospective study was conducted on all the suspected cases of Influenza A H1N1 (Swine Flu) from October 2018 to September 2019 in the Department of Microbiology, Government Medical College, Kota, Rajasthan, India.

We have included all suspected swine flu cases in our study irrespective of their categories (A, B or C) and age group.

As per the laboratory criteria for diagnosis of influenza specimen suggested by WHO, the RT-PCR protocol was adopted .The throat swabs were collected under all aseptic and universal precautions and kept in Viral Transport Medium and processed in a Biosafety level Class II type B3 cabinet. Real-time Reverse Transcriptase Polymerase Chain Reaction (rtRT-PCR) was done as per the CDC Protocol[8] using StepOne by Applied Biosystems(AB).

A total of 3979 sample results data was collected in the study. A specially designed data collection form was used to collect some epidemiological data like age, sex, and month of the test performance during study period.

Data of average temperature and humidity were collected from National Centre for Disease Control, Ministry of Health and Family Welfare last updated on 3rd November,2019.[6]

RESULT AND DISCUSSION

A total of 3979 samples were obtained during the study period. Out of which 606 samples (15.23%) were tested positive for swine flu influenza H1N1. Similar findings were observed by Amaravathi et al (17.2%)[9] and Singh et al (22.2%)[10]. On the contrary variation in prevalence was found in Vijaylakshmi et at (7.3%)[11] and Prakash et al (32.93%)[12].

Table 1: Distribution of cases according to H1N1 positivity

Tested Samples	Positive	Negative
3979	606	3373

In present study maximum prevalence was noted among age group 0-10 years (18.67%) followed by 41-50 years of age group (18.26%). 42.40% of the cases were from the age group 11-40 years while in the study conducted by Amaravathi et al[9] 61.36% cases were seen in the same age group which clearly reflects its high prevalence and pathogenicity among the younger population.

Table 2: Age-wise distribution of cases

Age group (years)	Positive cases	Total cases	Prevalence (%)
0-10	121	648	18.67
11-20	51	382	13.35
21-30	121	773	15.65
31-40	85	564	15.07
41-50	105	575	18.26
51-60	66	447	14.76
61-70	45	391	11.50
71-80	9	154	5.84
81-90	3	40	7.50
>90	0	5	0

In the above table, Chi-square value obtained is 21.93 which belongs to critical region, therefore, Null hypothesis (H_0) is rejected and the variables are not independent.

In the present study, out of 606 positive cases 51.32% were males and 48.68% were females. Similar results were observed by Amaravathi et al[9] where 51.14% were males and 48.86% were females, Prakash et al[12] showing 56.91% and 43.09% respectively. In another study conducted by Vijaylakshmi et al[11] males were 60% and 40%.

Table 3: Sex-wise distribution of cases

Sex	Positive cases	Total cases	Prevalence (%)
Male	311	1957	15.89
Female	295	2022	14.59

From the above data, Chi-square value obtained is 0.9607 which does not belong to critical region, therefore, Null hypothesis (H0) is accepted at 0.05 significance level and the variables are independent which shows that the gender of the patient has no significance role in the prevalence of the disease.

In males maximum prevalence was noted in the age group of 41-50 years (16.18%) followed by age group of 0-10 years (18.44%).

Table 4 : Age-wise prevalence in males

Age group (years)	Positive Males	Total males	Prevalence (%)
0-10	78	423	18.44
11-20	32	198	16.16
21-30	49	308	15.90
31-40	33	245	13.47
41-50	55	281	19.57
51-60	33	204	16.18
61-70	24	197	12.18
71-80	5	78	6.41
81-90	2	20	10.00
>90	0	3	0

In females maximum prevalence was noted in the age group of 0-10 years (19.11%)followed by age group of 41-50 years(17.00%).

Table 5: Age-wise prevalence in females

Age group (years)	Positive Females	Total Females	Prevalence(%)
0-10	43	225	19.11
11-20	19	184	10.33
21-30	72	465	15.48
31-40	52	319	16.30
41-50	50	294	17.00
51-60	33	243	13.58
61-70	21	194	10.82
71-80	4	76	5.26
81-90	1	20	5.00
>90	0	2	0

In the present study maximum prevalence was found in the month of October (23.36%) followed by the month of January (17.50%) which clearly shows that there are two peaks in the seasonal pattern of swine flu infection.

This two peaks pattern was also noted in the studies done by Prakash et al[12], Nagaraja et al[13]. Studies in different countries also showed this two peaks pattern Elliot et al[14] in United Kingdom and Nguyen et al[15] in Vietnam.

Table 6: Temperature-wise distribution of cases

Month	Positive cases	Total cases	Average Temperature(°C)
Oct,18	232	993	31
Nov,18	10	198	27
Dec,18	5	87	21
Jan,19	80	457	20
Feb,19	156	966	13
Mar,19	67	474	28
Apr,19	12	151	36
May,19	11	80	38
June,19	1	36	38
July,19	5	52	32
Aug,19	12	194	29
Sept,19	15	291	28

In the present study cooler months (Oct-Mar) shows more prevalence i.e. 17.32% as compared to hotter months (Apr-Sep) which is 6.96% which shows that there might exists a relationship between temperature and swine flu virus activity. Few theories are suggestive of this:

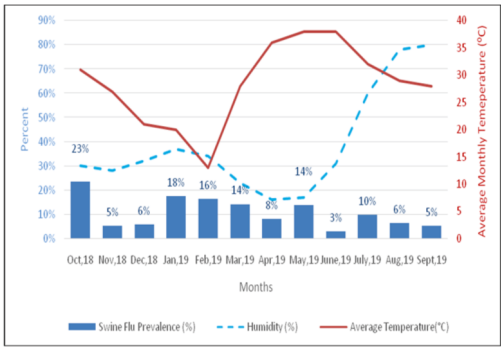
1. During the winter, people spend more time indoors with the windows sealed, so they are more likely to breathe the same air as someone who has the flu and thus contract the virus.
2. Days are shorter during winters, and lack of sunlight leads to low levels of vitamin D and melatonin, both of which require sunlight for their generation. This compromises our immune systems, which in turn decreases ability to fight the virus.
3. The influenza virus may survive better in colder, drier climates, and therefore be able to infect more people.

Since winter air is also much drier than summer air, cold air can't hold as much water vapor. The researchers also ran experiments where they varied the humidity in the room but kept the temperature constant: the drier the air, they found, the more animals got sick.[16]

Table 7: Humidity-wise distribution of cases

Month	Positive cases	Total cases	Humidity (%)
Oct,18	232	993	30
Nov,18	10	198	28
Dec,18	5	87	32
Jan,19	80	457	37
Feb,19	156	966	34
Mar,19	67	474	23
Apr,19	12	151	16
May,19	11	80	17
June,19	1	36	31
July,19	5	52	60
Aug,19	12	194	78
Sept,19	15	291	80

Graph : Month-wise prevalence of swine flu with respective average temperature and humidity



CONCLUSION

During the present study we observed that swine flu prevalence was relatively more in younger individuals with the peak of cases in the month of October with almost equal distribution among males and females. There is also an increase in swine flu virus activity at low temperature and low humidity

REFERENCES

1. Wright PF, Neumann G, Kawaoka Y. Orthomyxoviruses. In: Knipe DM, Howley PM, editors. Fields Virology. 5th Phladelphia: Lippincott Williams & Wilkins; 2007. pp. 1691–740. [Google Scholar]
2. Nobusawa E, Sato K. Comparison of the mutation rates of human influenza A and B viruses. J Virol. 2006 Apr 1;80(7):3675-8.
3. World Health Organization. Pandemic (H1N1) 2009 - update 81; [Last accessed on 2009 Dec 30]. Available from: http://www. who. int/csr/don/2009_12_04/en/index.html.
4. Girard MP, Tam JS, Assossou OM, Kieny MP. The 2009 A (H1N1) influenza virus pandemic: A review. Vaccines. 2010;28:4895-902.
5. Choudhry A, Singh S, Khare S, Rai A, Rawat DS, Aggarwal RK, et al. Emergence of pandemic 2009 influenza A H1N1, India. Indian J Med Res 2012;135:534-7.
6. National Centre for Disease Control, Ministry of Health and Family Welfare
7. Gupta SD, Lal V, Jain R, Gupta OP. Modelling of H1N1 outbreak in Rajasthan. Indian J Community Med 2011; 36:36-38.
8. CDC protocol of real time RTPCR for Influenza A (H1N1) April 28, 2009 revision 2.

Published from The WHO collaborating centre for Influenza
9. Kadadanamari Subbaramareddy Amaravathi, Putrevu Sakuntala, Budithi Sudarsi, Siddula Manohar, Ramapantula Nagamani, Sunkara Rajeswar Rao Clinical profile and outcome of recent outbreak of influenza A H1N1 (swine flu) at a tertiary care center in Hyderabad, Telangana 2015/Volume8/6/267-271.
10. Mahendra Singh and Savitri Sharma An epidemiological study of recent outbreak of Influenza A H1N1 (Swine Flu) in Western Rajasthan region of India J. Med Allied Sci 2013;3 (2): 48-52.
11. Vijayalakshmi, B Sreekanth Reddy, A Surekha, A RenukaDevi Surveillance of Swine Flu Influenza H1N1 by Chip Based Real Time PCR Technology from the Clinical Specimens in a Tertiary Care Hospital 2018/37768.12360
12. Prakash S Gelotar, Kanizfatma Durani, Kapil M Gandha, Mithun M Sanghavi Epidemiological characteristics including seasonal trend of hospital based swine flu cases in Jamnagar region, Gujarat, India DOI: 10.5455/jrmds.2015319
13. Nagaraja Mudhigeti, Rishi Gowtham Racherla, Padmalatha Anjaneyulu Mahalakshmi, Madhavi Latha Pamireddy, Umapathi Nallapireddy, Meenakshi Kante, Usha Kalawat A study of influenza 2017–2018 outbreak in Andhra Pradesh, India 2018/Volume :36/4/526-531 IJMM
14. Hershel Jick,Dean S. MacLaughlin,Pascal Egger and Peter Wiggins The United Kingdom 2009 Swine Flu Outbreak As Recorded in Real Time by General Practitioners 10.1155/2011/381597 Epidemiology Research International.
15. Van Phan Le, Dae Gwin Jeong, Sun-Woo Yoon, Hye-Min Kwon, Thi Bich Ngoc Trinh, Thi Lan Nguyen, Thi To Nga Bui, Jinsik Oh, Joon Bae Kim, Kwang Myun Cheong, Nguyen Van Tuyen, Eunhye Bae, Thi Thu Hang Vu, Minjoo Yeom, Woonsung Na, and Daesub SongOutbreak of African Swine Fever, Vietnam, 2019 Emerg Infect Dis2019 Jul; 25(7): 1433–1435.doi: 10.3201/eid2507.190303
16. Elert, E. 2013. FYI: Why is There a Winter Flu Season? Popular Science. <http://www.popsci.com/science/article/2013-01/fyi-why-winter-flu-season> [2 November, 2014]