



# IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH  
An official Publication of Human Journals

ISSN 2349-7203





Human Journals

Research Article

March 2018 Vol.:11, Issue:4

© All rights are reserved by Ragini Mishra et al.

## Brief Epidemiological Report on Influenza A (H1N1) Outbreak in Bihar, India in 2017: Implications for Control

			
<b>IJPPR</b> INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH An official Publication of Human Journals		<b>HUMAN</b>	
<b>Ragini Mishra<sup>(1)</sup>, Navin Mishra<sup>(2)</sup></b>			
<i><sup>(1)</sup> State Epidemiologist, State Health Society Bihar</i>			
<i><sup>(2)</sup> Asst. Prof. Dept. of Dentistry, IGIMS, Patna</i>			
<b>Submission:</b>	25 February 2018		
<b>Accepted:</b>	3 March 2018		
<b>Published:</b>	31 March 2018		



HUMAN JOURNALS

[www.ijppr.humanjournals.com](http://www.ijppr.humanjournals.com)

**Keywords:** Influenza A; H1N1; Swine flu; RT-PCR; Oseltamivir; Immunogenic

### ABSTRACT

Index case of Influenza A (H1N1) was reported on 6 June 2017. Thereafter, a sudden spurt of cases was reported till 26 Aug 2017. From 6 Jun till 15 Sep 2017, total 25 cases were reported from 7 districts in Bihar. Out of total 25 reported cases, 7 were cross-notified from other States while 18 cases were reported within the State. Cross-notified cases were reported from districts: Begusarai (1), Gopaganj (3), Bhagalpur (1), Gaya (1) & E Champaran (1). Out of these 7 cases, 1 case from Gopalganj got infected here before moving to Lucknow for treatment. Bhagalpur case belonged to Jharkhand. Internal cases were reported from Arwal (1), Patna (15) & Muzaffarpur (2) districts. District most affected was Patna (15 cases that represented 60% of the overall reported cases) > Gopalganj (3 cases that represented 12% of the overall reported cases) followed by Muzaffarpur (2 cases that represented 8% of the overall reported cases). 24% of the cases were migratory. The outbreak peak laid from 6-Jun to 26-Aug 17 when 18 cases were reported. Almost all age groups were affected but the frequency was greater in the age group 21-30 (24%)= 41-50 (24%)>21-60 (20%). Males (68%) were more affected than females (32%). Out of the total 25 cases, 92% of the cases were reported from Govt. institutions while 8 % of the cases were reported from private institutions. Case Fatality Rate (CFR) was Nil in the State. 89% of the internal cases were managed by providing drugs, masks and by keeping them in home isolation. 11% of the cases required hospital admission for treatment and management. All cases reported internally in the State had no migration history. State Health Department, Govt. of Bihar took many measures to limit the outbreak and through strengthening the surveillance activities, transmission of the disease was curtailed in the State.

## INTRODUCTION

Influenza (flu) is a viral respiratory infectious disease. The influenza viruses may be of 3 types A, B, and C that can cause human flu. Among these viruses, type A is common in pigs, type C is rare and type B has not been reported in pigs (1). Within A and C, the strains found in pigs and humans are largely distinct, although due to reassortment there have been transfers of genes among strains crossing swine, avian and human species boundaries (2). Both A and B viruses are responsible for outbreaks and epidemics [3]. Influenza pandemics are generally unpredictable [4]. A novel influenza H1N1 was reported in Mexico and USA in 2009 [5].

WHO declared the emergence of this virus as Public Health Emergency of International Concern (PHEIC) and informed that the disease caused by the virus may become pandemic. From 2009 till Aug 2010, 214 countries were affected worldwide and 18449 deaths were reported [6]. In India, first confirmed a case of H1N1 was reported in May 2009 in Hyderabad [7].

The virus is spread by droplet infection, coughing, sneezing and by close contact with infected person. Children and immuno-compromised patients are more vulnerable to the disease. Sudden onset of symptoms is seen that may last for several days [8]. Several intervention methods have been tried to contain the H1N1 outbreaks like installation of thermal scanners at Airports and asking the travelers to declare fever or respiratory symptoms at disembarkation. However, the utility of these interventions have been challenged, although if properly executed, the community transmission of the disease can delay by few weeks [9-10]. As per a study, school closures reduced population transmission when implemented early [11]. Use of personal protective interventions like using the masks, hand hygiene, and early isolation has also proved beneficial to reduce disease transmission at the individual level in home settings [12,13]. Antiviral like Oseltamivir and Zanamivir have been found to reduce disease severity with no adverse risks [14, 15]. Vaccines to prevent disease transmission have been found to be immunogenic, effective and safe [16]. In 2015, 346 H1N1 cases including 2 deaths were reported from Feb 2015 till April 2015 in Bihar. In 2016, no H1N1 case was reported while in 2017, 25 cases were reported. In comparison, from Jan 2017 till 31 Dec 2017, 38811 cases and 2266 deaths due to H1N1 were reported at the National level (Source: IDSP, Govt. of India). Case Fatality due to the disease was 6 at the National level while it was Nil in case of Bihar. A record based study was done to confirm the etiology, cases were

classified by time, place and person for descriptive epidemiological studies, daily monitoring of the health conditions of each case was done and control measures were recommended and taken by the Health Department, Govt. of Bihar. The report highlights the impact of strengthening the disease surveillance to improve the desired outcomes and proper allocation of resources.

## **MATERIALS AND METHODS:**

### **Case definition**

A case of influenza-like illness (ILI) was defined as an acute onset of fever ( $>38^{\circ}\text{C}$ ) with or without a cough or a sore throat in the absence of any other diagnosis [17]. A person with ILI with laboratory confirmation for influenza A (H1N1) on a throat swab by real-time reverse transcriptase polymerase chain reaction (RT-PCR) was considered as confirmed case of pandemic influenza (H1N1) [18]. All the patients meeting the above case definitions and attending the swine flu OPD of RMRI, Patna and as per above criteria cases as confirmed in other Medical College and Hospitals outside the State were included in the study.

### **Data collection**

At the time of collecting throat swabs for laboratory confirmation, complete address of the suspected patients was collected. Patients with positive laboratory tests for pandemic H1N1 were encouraged to get admission in the swine flu ward of Infectious Disease Hospital, Patna for treatment. Patients (or their relatives) admitted in other nursing homes/private hospitals were also contacted using the addresses provided by them. Daily sharing of the line list of the cases as collected from State Nodal Lab was shared with the District Surveillance Unit for follow-up of the cases, for contact tracing, for collecting other details like demographic details, residence, date of onset of illness, clinical details, results of laboratory investigations, history of travel within and outside the country and history of contact with positive case of influenza (H1N1).

### **Laboratory investigation**

Throat swabs were collected from all the suspected Influenza-like illnesses (ILI) patients from various districts in sterile viral transport medium and transported under cold chain to the RMRI, Patna the State nodal laboratory, for RT-PCR.

## Data analysis

The cases were analyzed with respect to time, place and person. Daily reporting on the health conditions of the cases and on the number of calls received by the districts on the Helpline number was done in a prescribed format.

## RESULTS AND DISCUSSION:

The index case of Influenza A (H1N1) was reported on 6 June 2017. Thereafter, the sudden spurt of cases was reported till 26 Aug 2017. From 6 Jun till 15 Sep 2017, total 25 cases were reported from 7 districts in Bihar. Out of total 25 reported cases, 7 were cross-notified from other States while 18 cases were reported within the State. Cross-notified cases were reported from districts: Begusarai (1), Gopaganj (3), Bhagalpur (1), Gaya (1) & E Champaran (1). Out of these 7 cases, 1 case from Gopalganj got infected here before moving to Lucknow for treatment. Bhagalpur case belonged to Jharkhand. Internal cases were reported from Arwal (1), Patna (15) & Muzaffarpur (2). District most affected was Patna (15 cases that represented 60% of the overall reported cases) > Gopalganj (3 cases that represented 12% of the overall reported cases) followed by Muzaffarpur (2 cases that represented 8% of the overall reported cases). 24% of the cases were migratory. The outbreak peak laid from 6-Jun to 26-Aug 17 when 18 cases were reported. Almost all age groups were affected but the frequency was greater in the age group 21-30 (24%) = 41-50 (24%) > 21-60 (20%). Males (68%) were more affected than females (32%). 72% of the cases had complaints of a cough, fever, sore throat, breathlessness and body pain. 5 % of the cases had co-morbid conditions. Out of the total 25 cases, 92% of the cases were reported from Govt. institutions while 8 % of the cases were reported from private institutions. 89% of the internal cases were managed by providing drugs, masks and by keeping them under home isolation. 11% of the cases required hospital admission for treatment and management. Results have been summarized in Table 1 & 2 and Figure 1 & 2.

State Health Department took many measures to limit the outbreaks and with enhancing the surveillance measures, transmission of the disease was curtailed in the State. No deaths were reported. In view of the upsurge of H1N1 cases in other States, Govt. of Bihar had already issued Health Alert (including all guidelines and protocols) to all the districts & Govt. MC & Hospitals much earlier. Drugs, kits, PPEs, and logistics were made available in all key Hospitals including district level hospitals. Health Advisory was issued for Schools and for

travelers visiting the State from Swine Flu affected States. Rapid Response Team was activated in each district for outbreak management. Regular monitoring of Swine Flu preparedness by the districts via Video-Conferencing was done at the level of Principal Secretary Health, Govt. of Bihar. The present study would aid the State Health Department to understand the seasonality of the disease and for early preparedness to control the outbreak.

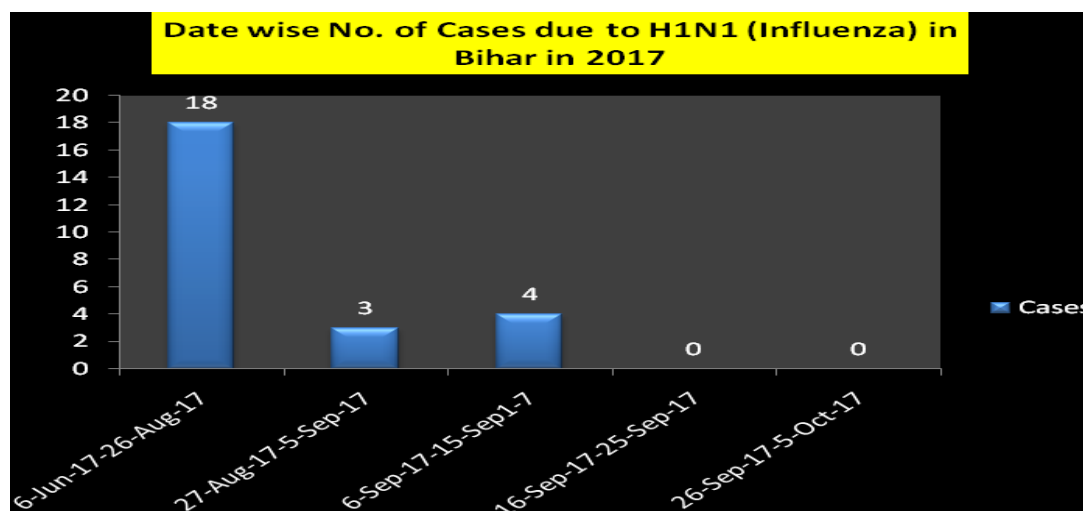


Figure 1: Time Distribution of H1N1 cases

Table 1: Person distribution of H1N1 cases

Age Group	Frequency	Percentage (%)
0-10	1	4
11-20	4	16
21-30	6	24
31-40	2	8
41-50	6	24
51-60	5	20
61 & 61+	1	4
<b>Total</b>	<b>25</b>	<b>100</b>
Sex	Frequency	Percentage (%)
Male	17	68
Female	8	32
<b>Total</b>	<b>25</b>	<b>100</b>



Figure 2: Place distribution of H1N1 cases

Table 2: Institution wise status of H1N1 cases

Institution wise status of Swine Flu (H1N1) cases in Bihar: 2017			
Institution wise status			
Institution/Facility	Admit	Discharged till date	Outcome of Case
PMCH, Patna	0	0	
NMCH, Patna	0	0	
SKMCH, Muzaffarpur	0	0	
JLNMCH, Bhagalpur	0	0	
DMCH, Darbhanga	0	0	
ANMCH, Gaya	0	0	
District Hospitals	0	0	
Private Hospitals (Ruben Hosp, Patna)	1	1	Healthy & Recovered
IDH, Patna	0	0	
<b>Sub-total</b>	<b>1</b>	<b>1</b>	
Other State institutions (where Bihar H1N1 case was infected, diagnosed & treated)			
KGMU, Lucknow	2	2	Healthy & Recovered.
SGPGIMS, Lucknow	4	4	Healthy & Recovered
CMCH, Vellore	1	1	Healthy & Recovered.
Medanta Gurgaon	1	1	Healthy & Recovered
<b>Sub-Total</b>	<b>8</b>	<b>8</b>	
<b>Home Isolation</b>	<b>16</b>		Healthy & Recovered
<b>Overall Total</b>	<b>9</b>	<b>9</b>	

## CONCLUSION

From 6 Jun till 15 Sep 2017, total 25 cases were reported from 7 districts in Bihar. Out of total 25 reported cases, 7 were cross-notified from other States while 18 cases were reported within the State. District most affected was Patna (15 cases that represented 60% of the overall reported cases) > Gopalganj (3 cases that represented 12% of the overall reported cases) followed by Muzaffarpur (2 cases that represented 8% of the overall reported cases). 24% of the cases were migratory. The outbreak peak laid from 6-Jun to 26-Aug 17 when 18 cases were reported. Almost all age groups were affected but the frequency was greater in the age group 21-30 (24%)= 41-50 (24%)>21-60 (20%). Males (68%) were more affected than females (32%). 89% of the internal cases were managed by providing drugs, masks and by keeping them in home isolation. 11% of the cases required hospital admission for treatment and management. Daily monitoring of the health conditions of each case was done and control measures were taken by the Health Department, Govt. of Bihar. Due to rigorous monitoring and active involvement by the Health Department at the State level, the H1N1 outbreak was efficiently managed and substantial mortality due to the disease was reduced in the State when compared to other States where many deaths were reported. The report would guide other outbreak-prone States for early preparedness and to ensure public health response to manage future outbreaks due to H1N1.

## ACKNOWLEDGMENT

The Author is thankful to Secretary Health-Cum-Executive Director, State Health Society, Bihar for his encouragement to carry out the work. The author is also thankful to District Surveillance Unit teams for their cooperation in providing a daily update during the outbreak

## CONFLICT OF INTEREST

There are no conflicts of interest among the authors.

## REFERENCES

1. Van Reeth K. Avian and swine influenza viruses: our current understanding of the zoonotic risk. *Vet Res* 2007; 38: 243-260.
2. Bouvier NM, Palese P. The biology of influenza viruses. *Vaccine*. 2008; 26: 49-53.
3. Ashishtha Vm, Kalra A, Choudhury P (2013) Influenza Vaccination in India: Position Paper of Indian Academy of Pediatrics, IAP POSITION PAPER, 2013. *Indian Pediatr* 50(9): 867-874.
4. Kilbourne ED (2006) Influenza pandemics of the 20th century. *Emerg Infect Dis* 12(1): 9-14.

5. Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team, Dawood FS, Jain S, Finelli L, Shaw MW, Lindstrom S, et al. (2009) Emergence of a novel swine-origin influenza A (H1N1) virus in humans. *N Engl J Med* 360(25): 2605- 2615.
6. World Health Organization (WHO). Pandemic (H1N1) 2009- Update 112, 6 August 2010.
7. (2009) Ministry of Health and Family Welfare, Government of India. Pandemic Influenza A (H1N1).
8. Cowling BJ, Lau LL, Wu P, Wong HW, Fang VJ, et al. (2010) Entry screening to delay local transmission of 2009 pandemic influenza A (H1N1). *BMC Infect Dis* 10: 1-82.
9. Pitman RJ, Cooper BS, Trotter CL, Gay NJ, Edmunds WJ (2005) Entry screening for the severe acute respiratory syndrome (SARS) or influenza: policy evaluation. *BMJ* 331: 1242-1243.
10. Hien TT, Boni MF, Bryant JE, Ngan TT, Wolbers M, et al. (2010) Early pandemic influenza (2009 H1N1) in Ho Chi Minh City, Vietnam: a clinical virological and epidemiological analysis. *PLoS Med* 7(5): e1000277.
11. Wu JT, Cowling BJ, Lau EH, Ip DK, Ho LM, et al. (2010) School closure and mitigation of pandemic (H1N1) 2009, Hong Kong. *Emerg Infect Dis* 16(3): 538-541.
12. Cowling BJ, Chan KH, Fang VJ, Cheng CK, Fung RO, et al. (2009) Facemasks and hand hygiene to prevent influenza transmission in households: a cluster randomized trial. *Ann Intern Med* 151(7): 437- 446.
13. France AM, Jackson M, Schrag S, Lynch M, Zimmerman C, et al. (2010) Household transmission of 2009 influenza A (H1N1) virus after a school-based outbreak in New York City, April–May 2009. *J Infect Dis* 201(7): 984-992.
14. Uyeki T (2009) Antiviral treatment for patients hospitalized with 2009 pandemic influenza A (H1N1). *N Engl J Med* 361(23): e110.
15. Weber JT, Nicoll A, Bridges CB, Ciancio BC (2010) The truth about Tamiflu? Neuraminidase inhibitors in pandemic A/H1N1 flu. *BMJ* 340: c130.
16. Wichmann O, Stocker P, Poggensee G, Altmann D, Walter D, et al. (2010) Pandemic influenza A(H1N1) 2009 breakthrough infections and estimates of vaccine effectiveness in Germany 2009-2010. *Euro Surveill* 15: 1-4.
17. Safety Precautions to Deal with H1N1 Swine Flu: Symptoms of Swine Flu. (2011) Ministry of Health and Family Welfare, Government of India.

