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Research Paper

Experience of emergency relief work and monitoring for bird flu in a city in eastern india

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ABSTRACT

Bird flu or avian influenza is a zoonotic disease that can be transmitted from migratory and wild birds to poultry birds and rarely also poultry birds to man. The disease is only rarely contagious to man from birds but can lead to very high mortality in humans. Hence there is need of constant control and monitoring activities by district, state and central authorities with active participation of the animal husbandry section. The central team deputed in a city in Eastern India actively monitored the control activities. The article emphasizes the actions and observations by such a central team in an Avian Influenza- affected area in a state in Eastern India.

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1. INTRODUCTION

Avian influenza or H5N1 is a deadly zoonotic disease caused commonly by Influenza A virus subtype H5N1, that can spread from migratory birds to poultry birds and from poultry birds to man, also affecting swine rarely [1]. Symptoms in affected birds include nasal discharge, shank hyperemia and sudden death [1]. The eggs laid by the infected birds can become shell less of white or soft eggs. It is caused by infection commonly due to a subtype of Influenza A virus, called H5N1 or Avian influenza virus, which is dominant in poultry birds in India, though other subtypes of Influenza A virus causing AI are also present worldwide, like H6N6 and H7N8. These viruses occur naturally among the wild aquatic birds worldwide and can also infect domestic poultry and other bird and animal species. Avian influenza outbreak have been reported in poultry birds in India since the year 2006 in the Indian states of Gujarat and Maharashtra. Outbreaks were also reported later in India from West Bengal in 2008, Odisha in 2018 and Kerala in 2014, 2015, 2016, 2021 and 2022.

The transmission of the LPAI (Low pathogenic Avian influenza) viruses – especially H5 and H7 subtypes from wild water fowl to poultry can be sufficient to trigger their evolution into HPAI (Highly pathogenic Avian influenza) viruses [2]. It has also been postulated that pigs can serve as 'mixing vessels' for the H5N1 virus evolution, because pigs share the viral receptors with both humans (SAα2, 6Gal) and avian species (SAα2, 3Gal) [2].

The chances of transmission of avian influenza (AI) to man from birds are quite rare and remote, but the mortality is about 50% in those incidental or rare human cases. Humans can acquire the infection either from directly handling the poultry or even by means of aerosol. Huan to human transmission of AI is almost impossible. Till now there have been 53 reported epizootics of Bird flu across the world, but only 240 human cases have been reported till date, out of which 135 have succumbed to their illnesses, taking the case fatality rate in man to about 56% [3]. In 2021, there had been 1 human case in India of Avian influenza in a young boy and the patient had died.

Hence, there is need of active concerted continuous surveillance, picking up early warning signs and culling of poultry birds with destruction of their feed, eggs and excreta to prevent the occurrence of possible human cases in the areas of bird flu outbreaks. Jharkhand state of India has witnessed a second outbreak of Bird flu in Ranchi following a similar outbreak a few weeks back in Bokaro, Jharkhand.

Migratory birds, ducks and geese are believed to be reservoirs of this virus and also the principal reason for spread of these epizootics among poultry birds. The disease manifests in birds as coryza, ruffled feathers and red eyes and reddish skin, followed by rapid death. Symptoms of avian influenza in man include high fever, fatigue, myalgia, dyspnoea, and rarely diarrhoea and suffused conjunctiva [4].

Objectives of the Central Team

So the central team was deployed to Ranchi with the following objectives:-

A. Surveillance for suspected human cases, and to ensure regular health check up of cullers and poultry workers.
B. Advice for case management, use of PPE (Personal Protective Equipment) and chemoprophylaxis in cullers and other high-risk personnel.
C. To ensure collection and transport of samples from suspected cases to designated laboratories.
D. To advise patients, contacts, travellers ad healthcare professionals about what to do and what not for management and surveillance.
E. To assist the state health authorities in implementing the contingency plan of the ministry for prevention and management of human cases of avian influenza.

Avian Influenza Outbreak in Poultry Birds in Jharkhand in March 2023

There had been cases of poultry death due to bird flu in Bokaro in Jharkhand in mid- February 2023. A central team had been deployed there earlier. After this from 26th February 2023, illness and death among poultry birds were reported from Jail Chowk area in Ranchi. It was reported from a backyard. It was subsequently declared the epicentre. Awareness activities and IEC (Information,

Education and Communication) activities were started by the district authorities before the start of culling. All kinds of transportation of poultry and poultry products were banned in the area with immediate effect from 03.3.23.

Samples were taken from the 12 infected birds manifesting AI- like symptoms and sent to Regional Disease Diagnostic Laboratory (RDDL), Kolkata as well as the Biosafety level 4 laboratory of ICAR-NIHSAD (National Institute of High Security Animal Diseases), Bhopal for confirmation of H5N1 by Real-time PCR. The laboratory in Bhopal gave a positive report for avian influenza type H5N1, on 03.3.23. Just after this culling operations were started by district authorities on 6th March 2023, and consumption of chicken and egg and other poultry products were banned around 10 km from the epicentre, for 21 days. All shops selling poultry and eggs were shit down till completion of culling and sanitization operations. A cumulative total of 96 birds were culled and 5320 eggs were destroyed. Culling with mopping were completed by 08.3.23. Sanitization and disinfection were completed by district authorities on 12.3.23. Post-operative surveillance operations were started after issual of sanitization certificate. These include sending samples every 2 weeks from domestic birds in the surveillance zone, to NIHSAD, Bhopal for 2 months. If samples collected test negative, repopulation of poultry will be allowed in the affected area after completion of 3 months from the issual of sanitization certificate. Random clinical investigations of the repopulated flock will be carried out after a fortnight of restocking. Samples will be sent from repopulated stock every 2 weeks for a period of 2 months to NIHSAD, Bhopal.

Daily Activities Undertaken by the Central Team

The central team comprising the authors reached the capital city on 09.3.23 to assess the situation of Bird flu control and management and immediately treated the surveillance and monitoring work. The culling was over on 08.3.23. A total of 96 poultry birds were culled and their carcasses disposed. No feed was destroyed because in 1 km radius of epicentre there were no poultry farms as reported by authorities.

Briefing and Debriefing meeting with District Surveillance Officer on the first day

The team met the district surveillance Officer (DSO), state and district epidemiologists. He informed the team members about the current status of culling and mopping and surveillance activities; culling was started since 06.3.23 and completed on 08.3.23. A total of 96 birds were culled.

Meeting with Civil Surgeon

The team also met the Civil Surgeon, of the city and briefed him about the motive and activities of the team, and stressed on the need and immediate availability of Oseltamivir as chemoprophylaxis for cullers and also the state and district Rapid response team (RRT). The Civil surgeon told that currently the stock of Oseltamivir had expired in last month. On the team's further pursual, he agreed to procure it by local purchase. Active surveillance was being carried out in an area of 10 km of the epicentre. Culling was started by the district authorities on 03.3. 23 and was over by 06.3.23. The cullers were in absolute isolation, the facility of which has been made.

Visit to the Isolation Ward in Sadar (District Headquarter) Hospital Created for Possible Human Influenza Cases

The team also visited and monitored the isolation ward facility in the Sadar (district) hospital in Figure 1, Ranchi situated in the fourth floor with separate elevator facility. There were 20 beds in the isolation ward, with 10 rooms each having 2 beds. The rooms had attached bathroom facility. The team urged district authorities to put up signage and posters for nurses to detect symptoms of Bird flu in man. The stock of Oseltamivir was not there in Sadar hospital but came within 24 hours of telling by the team. However stock of PPE and sanitizer were sufficient. A total of 4880 eggs were seized and destroyed by animal husbandry department. On the second day, the team debriefed the DSO about their activities the day before and informed of today's activities. The team visited the epicentre and the burial ground on

10.03.2023 and ensured their proper sanitization. Burial was done in an 18 feet deep pit in Chadri Jail Talab area of the city.

Visit to Urban PHC in Doranda, Ranchi

The team also visited OPD of Urban Primary Health centre in Doranda, Ranchi. Briefing of bird flu situation was done. There had been no increase in ILI or ARI cases in the area.

Visit to the Isolation Ward of a Tertiary Care Hospital of the City

The team also visited the isolation ward of a Government tertiary care cum teaching hospital in Ranchi and assessed lab facilities there. It had 6 Real time PCR machines but no primer for H5N1. The central team also met the Head of Microbiology Department there and briefed him about the purpose of the central team. A meeting was also held in chamber of a faculty member of Community medicine Department in the tertiary teaching hospital.

The department was requested to participate in awareness campaign among the masses. Adequate ventilator facilities were also present in Sadar (district headquarter) hospital and the tertiary care hospital with sufficient trained staff. Chemoprophylaxis was started for the cullers. On the third day, Bhagwan Birsa Munda Biological Park near the city was visited by the central team. The aviary had already been barricaded and entry of visitors had been restricted. The team met the compounder in the zoo animal hospital. He told that there have been no death or illness reported in the zoo birds in the last 1 week. There was enough stock of medicines in the hospital but no stock of Oseltamivir was present. The stocks of PPE, and swab sticks for taking nasal and nasopharyngeal swabs from birds were adequate.

However, N95 masks were not available and surgical masks were available instead. The team recommended the usage of N95 masks wherever possible by zoo hospital workers and cleaners. The zoo hospital also had an isolation ward for birds and also stretcher. Cleaning and sanitation of the zoo premises and hospital were being done with Sodium hypochlorite and a mixture of Glutaraldehyde and 1-6 dihydroxy-2, 5- diohexane. They burnt the dead animal carcass, if any, in a secluded area, shows in Figure 2. The team also visited the bird enclosure which the authorities had barricaded to restrict the entry of visitors there. There were signboards regarding bird flu which were displayed inside.

The road leading to the bird enclosure was sprayed with a mixture of lime and bleaching powder. The team recommended masks for the cleaners of the bird enclosure and also netting above adjacent ponds and small water bodies, if possible to restrict sitting or nesting of migratory birds there.

The road of the bird enclosure was also sprayed with disinfectants. There was no stock of PPE. There were surgical masks but no N95 masks. Team inquired and found no illness in the zoo birds and also migratory birds. The next day was Sunday and the team telephonetically inquired the district authorities about their daily activities. The district authorities carried out door to door surveillance and generated awareness among the masses regarding bird flu, in Chadri (Gopalganj) area in the city. They also carried out sanitization job there. Team told district authorities to ensure chemoprophylaxis for all the workers involved in this work.

Sanitization and disinfection was completed by district authorities on 12.3.23. The next day, the team briefed the DSO and state epidemiologist about their activities the day before and discussed activities of the day. The ID (Infectious Diseases) hospital in Plaza Chowk area was visited but the beds in isolation wards were not earmarked for human access of avian influenza. There was lack of adequate lighting and ventilation. The premises of the wards were not clean. Overall the team found that in the area as a whole, the awareness among general masses as well as healthcare workers about the infection was not adequate.

The ID hospital also needed to be strengthened and urgent and thorough repair work was needed since its roof was damaged. So overall the coordination between district health professionals and animal husbandry units could be improved.

Observations and Recommendations of the Central Team in these Aspects

The team thus observed that culling and mopping and other control activities were satisfactory but coordination between medical team and animal husbandry unit could be improved, and made recommendations accordingly. Some pictures highlighting the team's observations are appended below.

Figure 1. Isolation Ward in the Infectious Diseases Hospital

Figure 2. The Burial Site for Carcass of Killed Birds

The team finally recommended the following

(A) Generating more awareness among hospital staff and also general population regarding bird flu and provision of permanent IEC materials which should be displayed properly in the hospital premises as well as in the locality within 10 km of the epicenter.

(B) Thorough and prompt culling and mopping up with combing activities are needed in such circumstances.

(C) The idea of home quarantine for cullers should be done with for near future. Office of the Deputy Commissioner or District Magistrate should issue an order for Institutional Quarantine of all high-risk persons and not home-based quarantine, and ensure compliance of Quarantine and chemoprophylaxis. The availability of chemoprophylaxis by Oseltamivir should be guaranteed before start of culling. The body temperature of the cullers should be monitored twice daily.

(D) Regional laboratory in cities or district headquarters should be strengthened and provided with primers for H5N1 AI virus detection by Real time PCR.

(E) Private practitioners and if possible also pet clinics should also be included in the action plan and they should also help in dissemination of information by display of posters and banners in and outside their clinics.

(F) Also the ID (Infectious Diseases) hospital needs to be revamped and it should keep some beds dedicated for AI patients.

(G) There should be close coordination between central, state and district administration in such outbreaks. District Animal Husbandry department should work in tandem with the authorities mentioned above. The team recommends a One Health approach which should be followed and a One Health Unit or section can be created at state or district level for better coordination and execution of the contingency plan for prevention of emerging zoonoses. This approach may also help prevent the occurrence of such frequent outbreaks of Bird flu.

(H) General public should get the knowhow of protecting themselves from avian influenza, by proper IEC activities shows in Figure 3.

(I) Reimbursement rates for poultry owners should be revised and increased as per the existing market rates.

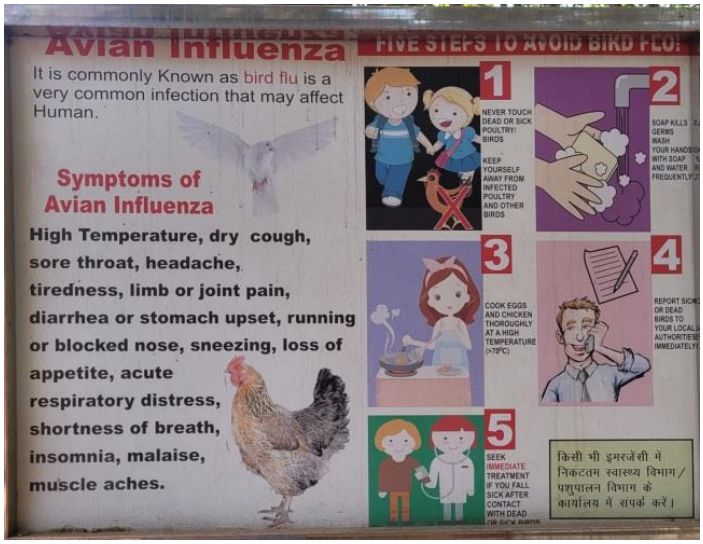

Figure 3. Metal Placards for IEC Which Can Create Awareness among Masses about AI

2. RESULTS AND DISCUSSION

Avian influenza can be highly fatal in birds, and can jump the species barrier to infect man also. Such jumping of species barrier may not be that rare, even, since recently, it has been proven that the epithelial cells of the lower respiratory tract of man (terminal bronchioles and alveolar epithelial cells) have both SA (Sialic acid) α-2,3 (for bird tropism) and SA α-2,6 receptors (for human tropism) [5]. Proper awareness is needed among the masses along with coordinated control and surveillance activities to prevent human cases. Timely diagnosis by molecular techniques, prompt culling of poultry birds along with stoppage of consumption of chicken meat and poultry products can help in limiting spread of the infection. All bird feed and faecal matter should be destroyed and disposed. Culling of the poultry birds should be followed by meticulous mop-up and combing activities. Absolute quarantine of the cullers for 10 days after the culling is over, also goes a long way in mitigating the communicability of the infection. Proper and permanent IEC materials should be used to spread awareness about AI. Central, state and district authorities should act together, along with the animal husbandry unit to successfully control Bird flu.

3. CONCLUSION

A coordinated and concerted approach between Clinical medicine, Medical Microbiology, Public health professionals and veterinarians, in accordance with latest and revised guidelines, can go a long way in containing avian influenza and prevention of human cases.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Lahiri S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bhattacharyya S	✓			✓	✓	✓			✓		✓		✓	
Thakur S		✓	✓		✓		✓			✓		✓		✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study, and their voluntary consent was obtained prior to data collection.

Ethical Approval

The study was conducted in compliance with the ethical principles outlined in the Declaration of Helsinki and approved by the relevant institutional authorities.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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