

Circulation of H9N2 virus in chicken at rural community in Northern Parts of Bangladesh

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Introduction

- The avian influenza subtype H9N2 is considered to be a low pathogenic virus which is endemic in domestic poultry of a majority of Asian countries.
- H9N2 is continuously monitored by the World Health Organization because of their continuous re-assortment with H5N1, H7N9 viruses and periodically cause human infections.
- On report of suspected human influenza A/H9 outbreak, a one health multidisciplinary team investigated to find out the source of infection and extend of the outbreak in a remote rural village, northern part of Bangladesh between 2 to 4 February, 2017.



Figure 1 & 2: Human animal interface in rural areas

Methods

- One health team surveyed on backyard and commercial poultry farms and market at 1km radius centering the suspected case house.
- Anthropologist observed close human-birds interaction as well as behavioral risk practices at community level.
- The team collected cloacal and oro-pharyngeal swabs from poultry and environmental samples (N=55) from a neighboring live bird market (LBM).
- After screening for influenza A (matrix (M) gene), all positive specimens were further subtyped as H5, H7 and H9 and N2
- A subset of samples were tested using PREDICT's pan-influenza consensus PCR to detect any additional subtypes that may be circulating. PCR products were sequenced to confirm positive PCR results.



Figure 3, 4 & 5: Sample collection from backyard poultry, commercial farms and LBMs

Results

- Poultry scavenged both inside and outside the house, frequently in the kitchen and the bedroom, the yard and veranda.
- Informants reported rare use of soap after handling and slaughtering of poultry and threw the poultry offal and entrails in the nearest water body or bushes. Children were enthusiastically involved in poultry raising activities.
- Community people keep backyard duck and chicken at same night shelter.
- Community villagers participate in the trade of poultry and poultry products in nearby LBM.
- No hygienic practices were observed among traders and workers at the LBM. The traders were handling sick chicken without any protection and after handling the sick chicken didn't wash their hand. Few traders were rearing duck freely beneath the poultry cages where duck scavenging on poultry droppings at LBM.
- None of the samples were positive for H5 and/or H7.

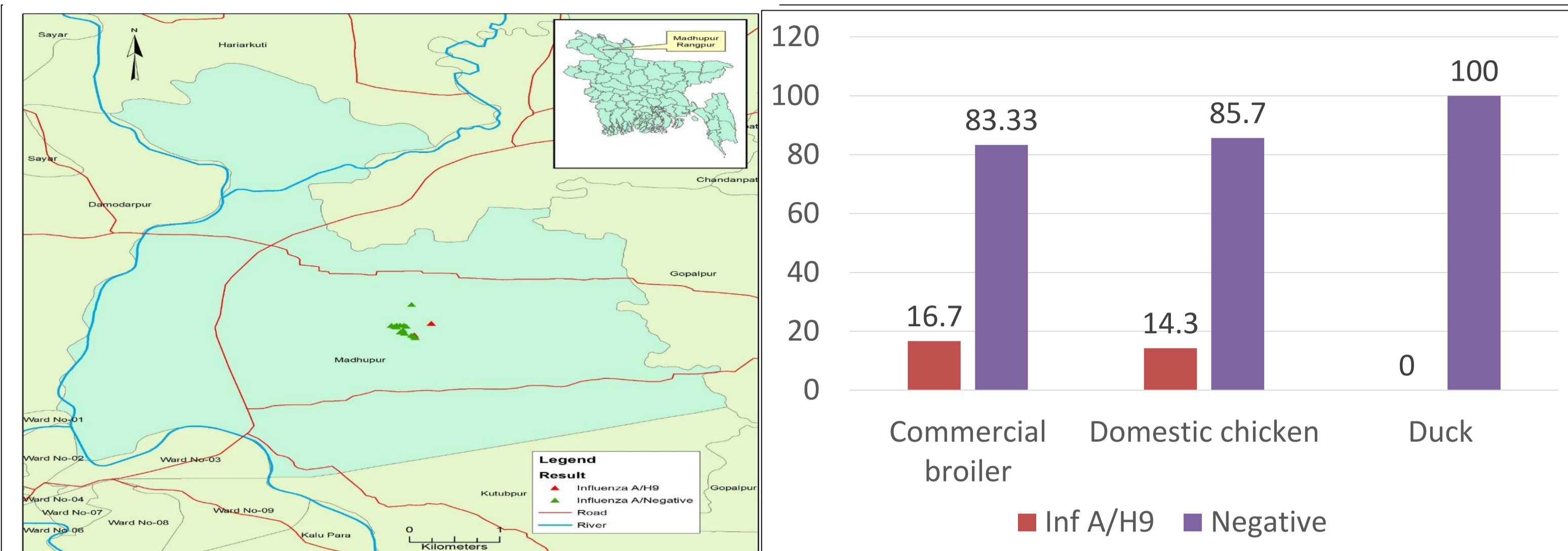


Figure 8: AI prevalent sites in Rangpur

Figure 8: Prevalence of AI in different poultry strain

- 9% of the samples were positive for avian influenza A/H9 (n=5; 95%CI: 03-19)
 - Of A/H9 samples, 20% (n=1;95%CI:0.5-72) were from suspected case house
 - 80% (n=4;95% CI: 28-99) from nearby LBM.
- Significant risk factors for the occurrence of AI: poultry management system and health status.
 - The LBM poultry are 25 times more likely to be positive for AIV than backyard poultry (95% CI: 2-253; p= 0.001).
 - Sick birds are 8 times more likely to become influenza positive than apparently healthy birds (95% CI: 1-60; p=0.03).
- All H9 positive samples were tested for N2 sub-type and found positive.
- Based on a BLASTN search the similarity matrices revealed these strains more closely related to H9N2 subtypes (99-100% nt identity) which were previously circulated in Bangladesh.



Figure 6, 7 & 8: Poultry management system at rural areas

Figure 9: Phylogenetic tree for AI isolate from chicken

Conclusion

- H9N2 is circulating in the rural community and highlights the importance of monitoring and characterizing this influenza subtype to better understand the potential risk these viruses pose to humans.
- An intensified surveillance is needed for controlling the future risks which would be created by H9N2 circulation at avian-human interfaces.
- Health education on sanitation, personal hygiene & proper waste management is need to be given regularly with demonstration & practice conducted by the local authority.

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