

Bird Flu: Not to be taken lightly

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Avian influenza (AI), commonly referred to as bird flu, is an infection of Influenza A virus in birds. Flu is a contagious disease caused by virus that infects the respiratory tract in all types of animals. In birds the virus is shed in feces, saliva, and nasal discharges. The virus is passed around in a population through droplets created when an infected individual sneezes or coughs. Influenza is a virus that is transmitted by breathing in contaminated air. Unlike other viruses, Influenza can survive outside the host, and thereby greatly facilitating its transmission.

To date, human cases of AI have been reported in six countries, most of which are in Asia: Cambodia, China, Indonesia, Thailand, Turkey, and Viet Nam. All human cases have coincided with outbreaks of HPAI H5N1 avian influenza in poultry. Vietnam has been the most severely affected country, with more than 90 cases. The H5N1 strain of avian flu characterized by very high mortality infected domestic poultry in several countries. It is a particularly dangerous threat to humans because it has a high mutation rate and recombines readily. Unlike the run of the mill epidemic influenza, almost all patients that are infected with influenza H5N1 develop a clinical pneumonia with diffuse patchy infiltrates on chest radiogram which progress to consolidation with air-bronchograms in more than one lung zone. At the time of hospitalization, this is typically a primary viral pneumonitis without secondary bacterial infection. This rapidly progresses to the Acute Respiratory Distress Syndrome (ARDS). Clinical evidence suggests that 50% of infected people die and almost 90% of those younger than 15 years of age do not survive. As far as treatment is concerned, there is no effective and complete treatment regime for individuals infected by this virus. Although researchers are trying to produce a vaccine against the virus, it may still take some time for a successful human trial. Until that happens, the mainstay of therapy is mechanical ventilation in an effort to keep the patient alive until the immune system and neuraminidase inhibitors, like Oseltamivir, can work. Medical practitioners recommend further broad spectrum standard antibiotics administration to patient to prevent secondary bacterial pneumonia.

Avian Flu and Nepal: Seeing is NOT believing

Nepal is located in a very vulnerable location from Avian Flu infection perspective. Nepal certainly is a transit point for all kinds of migratory birds, and where there have been cases of H5N1 outbreaks-those countries also share same transit points and migratory routes for some of the bird species that are of high risk for Avian Flu. Why is it that Nepal has not been affected by the bird flu yet? There could be many reasons, such as there are not many poultry or pig farms in Nepal and there is low population density in the higher altitude and hilly areas. The government has also been on high alert for any signs of the disease in the poultry population. In contrast to our assumptions and findings, because of our inadequate diagnostic ability and proper surveillance strategies, we might have been missing some of these dangerous infections in Nepal (see detection below). Therefore it is very critical that we initiate a comprehensive program to monitor the flu viruses in migratory birds, poultry farm, swine farm, companion animals, and humans before it becomes a pandemic in Nepal. Absence of symptoms does not necessarily mean absence of disease in the population. In this case, since Avian Influenza is such a dangerous and infectious disease, no shortcuts should be taken in its diagnosis. One argument is that antibody production is not immediate and when it is detected, it already may be too late to prevent further outbreak. The government should be willing to collaboratively work with private and public institutions nationally to make sure that all diagnostic aspects are looked into, in order to identify this disease outbreak. It is evident that molecular diagnostics is the best approach in AI diagnosis.

Avian Influenza detection in Nepali context: Are we prepared?

One of the common methods of AI detection involves indirect detection while another method employs direct detection of the viral genome itself. The indirect method is based on detection of presence of antibodies in response to the viral infection. There are detection assays like ELISA, Western Blotting and Immuno-chromatography (Lateral Flow or Rapid assays) that either detect antibodies against the virus, or the viral antigen. Indirect method is often employed as a first screening tool on surveillance studies. In Nepal, tracheal samples are used for testing the

presence or absence of antibodies to this virus using lateral flow technology. Real Time Q-PCR is a highly accurate direct method that is a routinely used technique to detect the virus. Upon confirmation from both the techniques further analysis can be done to determine the exact genomic composition by performing DNA Sequencing. In Nepal, real time PCR has never been used in AI detection as it is not available to use, to date, in national health laboratories. In the case of AI, a specialized laboratory setup known as PC3 lab setup is the first step in using the molecular technology. In Nepal, since this type of setup has not been established, PCR or real-time QPCR to detect AI has not been initiated. Private laboratories have not been able to garner support from government to setup such laboratories either. Real Time QPCR is available at Center for Molecular Dynamics Nepal (CMDN) as part of public private initiative with the potential to setup BL3 facility subject to governmental support.

It would be a serious shortsightedness in part of the government to not support interested public or private institutions if those are in a position to establish such a facility in terms of grants, subsidies and policy. If the government tries to go at it alone, it will only be a matter of time before Nepal succumbs to this pandemic spreading across Asia.