State of the Globe: Human Nipah Virus Infection needs “One Health”

“There’s no one place a virus goes to die - but that doesn’t make its demise any less a public health victory. Throughout human history, viral diseases have had their way with us, and for just as long, we have hunted them down and done our best to wipe them out.” This statement of Jeffrey Kluge more or less sums up our general opinion about viral infections dictated largely by the continuous emergence of new viral infections or new foci of known viral infections. It is no secret that since the evolution of human life, viral afflictions have continued to affect our species; these afflictions were there even before we evolved into our present form. Humans have been fighting back, and this fight has not only ensured that certain viral infections cannot spread widely, but has also helped sick people recover through newer discoveries of vaccines and antiviral drugs. One major influence in this fight has been effective use of public health. However, our engagement with viruses and viral diseases will continue to intrigue us and stretch our resources. The recent Nipah virus (NiV) outbreak in India demonstrates one such engagement.[1]

First recognized in a large outbreak of 276 cases in Peninsular Malaysia and Singapore from September 1998 to May 1999 with pigs identified as the intermediate hosts during the outbreak, the infection can be transmitted without an intermediate host. A genetically different strain (from the 1999 strain) of human NiV (HNiV) was identified as the causative agent in an outbreak of human disease occurring in Bangladesh in 2001, and thereafter, on annual bases in Bangladesh from 2001 to 2008 occurring between December and May.[2] Outbreaks similar to this have been reported from India; Siliguri (West Bengal) in 2001 with reports of person-to-person transmission in hospital settings (nosocomial transmission, Nadia in West Bengal, 2007, reporting five cases and five deaths; 100% mortality). The recent outbreak in Kerala started with two siblings of the same family and a caregiver to them succumbing to the disease; a history of direct contact with a dead bat was found in the family. Fortunately enough, there are currently no studies on viral persistence in bodily fluids or the environment including fruits.

As per our present understanding, broadly there are three ways by which infection may be transmitted from the bats to the human population: (1) through the ingestion of fresh date palm sap as happened in the epidemic of 2005 in Bangladesh whereby maximum people affected developed symptoms during these months, or through domestic animals that consume fruit partially eaten by the bats or consume contaminated sap; (2) direct contact with NiV-infected bat secretions; and (3) person-to-person transmission through respiratory secretions.[3,4] NiV infection with an incubation period varying from 4 to 18 days (although an incubation period of as long as 45 days has been reported) in humans causes a range of clinical presentations, from asymptomatic infection (subclinical) to acute respiratory infection and fatal encephalitis.[4,5] With a case fatality rate, ranging from 40% to 75%, HNiV infection is one of the most pathogenic of organisms. The case fatality rate can vary by outbreak depending on local capabilities for epidemiological surveillance and clinical management. Added to this the fact that there is no treatment or vaccine available for either people or animals and the primary treatment for humans being supportive care; HNiV infection will continue to post challenges to our health-care delivery system. No surprise, therefore, that the 2018 annual review of the WHO R and D Blueprint list of priority diseases indicates that there is an urgent need for accelerated research and development for the NiV.

While the NiV infection may have exposed our limitations in dealing with emerging viral infections, the governments across the world have been making sustained efforts to strengthen the “surveillance and response system” for catching the disease outbreaks early and deal effectively with such infections. A concerted national effort based on public health research focused on infectious diseases and supported by a strong international network on research cutting across disciplines will be needed to make the “surveillance and response system” meaningful. As the doubters will keep pointing; the recent HNiV infection in India happened at a location with very good clinical system, a well-prepared state government, and a well-equipped laboratory in a nearby state and yet caused high mortality, what would have been the fate if the infection had happened in relatively lesser prepared health-care system with minimum preparedness? Also even though NiV has caused only a few known outbreaks in Asia, its capability of infecting a wide range of animals and causing severe disease and death in people, makes it a public health concern. Therefore, as the implications of infections such as HNiV are global and multisectoral, the response has to be global across geographies, across disciplines, and without compartmentalization.

By now, we have understood that human and wildlife interface will continue to bring diseases such as the HNiV into focus and with persistent geopolitical problems coupled with promotion of global trade and migration and continuous erosion of biodiversity will further increase this interface.[6]

Again as is known to us, that traditionally, the human beings and animals shared relatively discrete environment, and an increasing change in interface influences the commonality
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in the environment, affecting the occurrence of infectious diseases. The increasing dependence of humans and animals on this shared commonality affects human health, demonstrated by outbreaks such as the HNiV. The occurrence of outbreaks like these and the understanding that humans, animals, and wild fauna are inextricably intertwined, influences the need for an integrated approach to improve human, animal, and ecosystem health—“One health,” a multisectoral, multistakeholder approach with a global feel and orientation.[6] Specific to Nipah, as the virus outbreaks have involved pigs and/or fruit bats, establishing an animal health/wildlife surveillance system using this multisectoral, multistakeholder approach will be the key. Therefore, the success in mounting an efficient surveillance system for infections such as the HNiV will depend on our capabilities to use “One Health approach,” for the detection of Nipah cases and in improving our capabilities in providing early warning to veterinary and human public health authorities, thereby preventing mortality and reducing morbidity.

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REFERENCES
1. Pallivalappil B, Ali AG, Thulaseedharan NK, Karadan U, Chellenton J,
Dipu KP, et al. Dissecting an outbreak: A clinico-epidemiological study
of Nipah virus infection in Kerala, India, 2018. J Global Infect Dis 2020;12:21-7.
2. Nipah Virus (NiV) | CDC. Available from: https://www.cdc.gov/vhf/nipv/index.html. [Last accessed on 2019 Nov 15].
3. Luby SP, Gurley ES, Hossain MJ. Transmission of human infection with Nipah virus. Clin Infect Dis 2009;49:1743-8.
4. NIPAH Virus Advisory Professor Sunil Raina, MD – Indusem. Available from: http://www.indusem.org/wp-content/uploads/2018/05/nipah-virus-advisory. [Last accessed on 2019 Nov 15].
5. Signs and Symptoms | Nipah Virus (NiV) | CDC. Available from: https://www.cdc.gov/vhf/nipv/symptoms/index.html. [Last accessed on 2019 Nov 15].
6. Kumar D, Kumar R, Raina SK, Grover A, Panda A, Gupta R, et al. The AFPI-CAR policy paper on identifying basic framework of possible roadmap for one health. J Family Med Prim Care 2019;8:3465-8.

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