

Nipah Virus Infection: Current Situation and Public Health Measures in Bangladesh

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Background

The Nipah virus (NiV) infection is one of the newly emerging deadly zoonotic diseases in Bangladesh.¹ Nipah virus can be transmitted to humans from animals (such as bats or pigs), or contaminated foods and can also be transmitted directly from human-to-human. Fruit bats of the Pteropodidae family are the natural host of Nipah virus. Outbreak of this infection is seasonal in Bangladesh, and usually occur annually between December & May. The first case of Bangladesh was reported in 2001 and the number of yearly cases has ranged from zero to 67 though in the last five years, reported cases have been comparatively lower ranging from zero in 2016 to eight in 2019. A total of 325 cases were detected till 2022 among which 229 were died due to this infection.² This article highlights history and epidemiology of Nipah virus infection, clinical characteristics of Nipah cases in Bangladesh, year and district wise case distribution (2001-2022) in Bangladesh. In addition it also highlights public health responses and raising public awareness for taking preventive measures.

History of Nipah Virus Infection

The virus was first isolated from pig farmers when they suffered from an outbreak of encephalitis syndrome in 'Kampung Sungai Nipah' village of Malaysia during 1999 and the name "Nipah" was derived from the area of origin of the virus. Just after the discovery, different outbreaks were reported in Singapore (1999), Bangladesh (2001), India (2001) and Philippines (2014)¹

Epidemiology of Nipah Virus Infection

The Nipah Virus belongs to the Family *Paramyxoviridae* and Genus *Henipavirus*. It is a pleomorphic enveloped virus with a single-stranded non-segmented negative-sense RNA which encodes six structural proteins, out of which proteins G and F are responsible for viral attachment and fusion, respectively, using ephrinB2/B3 as their receptors. During first outbreak it was thought that virus was firstly spread from bat to pig and then pig to human. Recently, specially Bangladesh and some Asian countries disease is transmitted by raw or partially fermented date palm sap, which were contaminated with bat saliva and/or excreta containing Nipah virus.¹⁻³ Subsequent human-to-human transmission of Nipah virus occurs via close contact

with NiV-infected persons or exposure to NiV-infected body fluids (e.g., blood, urine, nasal secretions). Most experts do not classify Nipah virus as airborne, though Indirect transmission of Nipah virus via contaminated fomites is likely responsible for many cases in which there was no known direct contact with a NiV-infected person or animal.⁴⁻⁵

Clinical characteristics of Nipah cases in Bangladesh⁶

Fever (100%) Altered mental status (86%) Severe weakness/lethargy (72%) Headache (67%) Acute respiratory distress syndrome (63%) Cough (55%) Vomiting (54%) Myalgia (41%) Convulsions (30%)

Bangladesh Scenario: Year and District Wise Case Distribution (2001-2022)⁷

Coordination:

The Communicable Disease Control unit and the Directorate General of Health Services (CDC-DGHS) regularly arrange meeting regarding the outbreak with all Divisional Directors, Civil Surgeons, Health and Family Planning Officers, and other public health experts to discuss and strategize the response to the outbreak.

Surveillance:

Outbreak investigation including contact tracing is ongoing by the National Rapid Response Team (NRRT) in collaboration with ICDDR,B, CDC-DGHS, IEDCR, the Health Education Bureau, and WHO. They are focusing on strengthening the existing surveillance system, formulating strategy for immediate interventions, advocacy and awareness.

Case Management:

CDC-DGHS and the Dhaka Medical College Hospital's senior clinicians are strengthening case management. COVID-19-designated Intensive Care Unit (ICU) beds in the hospital were repurposed temporarily for Nipah virus infection case management. The infectious disease hospital (IDH) in Dhaka has been designated to support the quarantine and isolation of suspected Nipah virus infected cases.

Infection Prevention and Control:

Health care workers across all levels are instructed to observe optimal infection, prevention and control including wearing masks and gloves, investigating, and managing cases locally, and not referring cases to Dhaka for management except when necessary.

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Table 1: Year wise case distribution from the year 2001 to 2022 in different district of Bangladesh

Districts	Year wise case distribution																						Grand Total
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Bogura												1						2					3
Chapainawabganj														1									1
Chuadanga														1									1
Cumilla										1													1
Dhaka				1																			1
Dinajpur									1		6	1		1									9
Faridpur				37				1		12		1	1	8	3		2	1		5			71
Gaibandha													1										1
Gopalganj				1						2		1	1	1	1					1			8
Jhalokathi																				1			1
Jhainadaha													1	1									2
Jaipurhat				4								6											10
Khulna														1									1
Kurigram											1		1		1								3
Kushtia							8			1			2	1									12
Lalmanirhat											23		1										24
Madaripur										1				3	2								6
Magura													1	4	1								6
Manikganj				6				4					6	1									17
Meherpur	13																						13
Mymensingh													2										2
Naogaon			12	2			1						3	1	4				1		1	2	27
Natore				1			1					1	2	1	1				1				8
Nilphamari								1		1		3	1										6
Narail														1									1
Pabna							1						2				1						4
Panchagarh														1									1
Rajbari				14				6	1	2	2	1	2		1						1	1	31
Rajshahi												4	2	3	1			1	1				12
Rangpur				1				1		9	1			4									16
Shariatpur														2									2
Tangail					12																		12
Thakurgaon							7													5			12
Grand Total	13	0	12	67	12	0	18	11	4	18	43	17	31	37	15	0	3	4	8	7	2	3	325

All the health professionals are advised to notify any suspected Nipah virus infected case to the proper authority as soon as suspected. So that chance of transmission is decreased and early case detection is possible.

Formulation of National Guideline:

The National Guideline for Management, Prevention, and Control of Nipah Virus Infection is being reviewed and updated, focusing on safety measures for healthcare workers and infection, prevention, and control (IPC).

Risk Communication and Community Engagement:

Advocacy, risk communication and community engagement activities (RCCE) are ongoing.

Two hotline numbers have been activated for Nipah, one at IEDCR and the other at ICDDR, B, with the aim to collect

formal and informal reporting of Nipah cases and also to meet the general queries of the public about Nipah and other infectious diseases.

Raising Public Awareness for taking preventive measure^{2,3,6,8}

As the vaccine is not available, the only way to reduce or prevent infection in people is by raising awareness of the risk factors and educating people about the following measures to be taken into consideration in reducing exposure to the Nipah virus.

a. Reducing the risk of bat-to-human transmission:

Efforts to prevent transmission should first focus on decreasing bat access to date palm sap and other fresh food products. Keeping bats away from sap collection sites with protective coverings (such as bamboo sap skirts) may be helpful. Freshly collected date palm juice should be boiled, and fruits should be thoroughly washed and peeled before consumption. Fruits with sign of bat bites should be discarded.

b. Reducing the risk of human-to-human transmission:

Close unprotected physical contact with Nipah virus-infected people should be avoided. Regular hand washing should be carried out after caring for or visiting sick people.

c. Controlling infection in health-care settings:

Health-care workers caring for patients with suspected or confirmed infection, or handling specimens from them, should implement standard infection control precautions at all times. As human-to-human transmission has been reported, in particular in health-care settings, contact and droplet precautions should be used in addition to standard precautions. Airborne precautions may be required in certain circumstances. Samples taken from people and animals with suspected Nipah virus infection should be handled by trained staff working in suitably equipped laboratories.

Conclusion

Nipah virus infection in humans causes a range of clinical presentations, from asymptomatic infection (subclinical) to acute respiratory infection and fatal encephalitis. The case fatality rate is estimated at 40% to 75%. This rate can vary by outbreak depending on local capabilities for epidemiological surveillance and clinical management. There is no treatment or vaccine available for either people or animals. The primary treatment for humans is supportive care. So only public health measures and raising awareness among the population is key point to prevent and control the Nipah virus outbreak in Bangladesh.

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