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Nipah Virus: Role of Pharmacist for Prevention

Rajashri R. Kulkarni[1]*, Laxmi Kanna[2]
[1]D. S. T. S. Mandal's College of Pharmacy, Solapur, Maharashtra, India
[2]Gandhi Natha College of Pharmacy, Solapur, Maharashtra, India

Corresponding Author
Email Id: kulkarniraj1993@gmail.com

ABSTRACT

Nipah Virus as a zoonotic virus infection caused by animals to human beings. It is a natural process but its transmission was occurred due to consumption of food products that have been contaminated by body fluids of infected animals. This can be followed by dizziness, drowsiness, altered consciousness, and neurological signs that indicate acute encephalitis. Nipah virus infection can be diagnosed with clinical history during the acute and convalescent phase of the disease. The test may include RT-PCR, ELIZA etc. for the detection of Nipah Virus. Also, this article represents the role of pharmacist for prevention of such type of communicable diseases caused from virus.

Key Words: *Nipah, NiV, Human, Spread, Bat, Infection.*

INTRODUCTION

As a zoonotic virus, the nipah virus (NiV) can pass from people to animals. Fruit bats, often known as flying foxes, are the animals that naturally harbour NiV. Pigs and humans have both been reported to become ill with the Nipah virus. NiV infection is linked to encephalitis, or brain swelling, and can result in mild to severe disease or even death. In several parts of Asia, primarily Bangladesh and India, outbreaks happen virtually every year. Nipah virus infection can be prevented by avoiding exposure to sick pigs and bats in areas where the virus is present, and not drinking raw date palm sap which can be contaminated by an infected bat. During an outbreak, standard infection control practices can help prevent person-to-person spread in hospital settings. [1,2]

Transmission

The majority of human infections during the first known outbreak in Malaysia, which also affected Singapore, happened as a direct result of coming into touch with sick pigs or their contaminated tissues. Unprotected contact with the tissue of a sick animal or unprotected exposure to the pigs' fluids are the two most likely routes of transmission. Consumption of fruits or fruit products (such raw date palm juice) contaminated with urine or saliva from infected fruit bats was the most likely cause of infection in following outbreaks in Bangladesh and India. Family members and carers of sick patients have also been observed to contract the Nipah virus from one another.

Later epidemics in Bangladesh and India were caused by Nipah virus (NiV) can spread to people from:

- Direct contact with infected animals, such as bats or pigs, or their body fluids (such as blood, urine or saliva)
- Consuming food products that have been contaminated by body fluids of infected animals (such as palm sap or fruit contaminated by an infected bat)

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- Close contact with a person infected with NiV or their body fluids (including nasal or respiratory droplets, urine, or blood). [2,7]

Signs and Symptoms

- Human infections range from asymptomatic infection to acute respiratory infection (mild, severe), and fatal encephalitis.
- Infected people initially develop symptoms including fever, headaches, myalgia (muscle pain), vomiting and sore throat.
- This can be followed by dizziness, drowsiness, altered consciousness, and neurological signs that indicate acute encephalitis.
- Some people can also experience atypical pneumonia and severe respiratory problems, including acute respiratory distress.
- Encephalitis and seizures occur in severe cases, progressing to coma within 24 to 48 hours. The incubation period (interval from infection to the onset of symptoms) is believed to range from 4 to 14 days. However, an incubation period as long as 45 days has been reported.
- Most people who survive acute encephalitis make a full recovery, but long-term neurologic conditions have been reported in survivors. Approximately 20% of patients are left with residual neurological consequences such as seizure disorder and personality changes.
- A small number of people who recover subsequently relapse or develop delayed onset 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.

Symptoms may initially include one or several of the following:

- Fever
- Headache
- Cough
- Sore throat
- Difficulty breathing
- Vomiting

Severe symptoms may follow, such as:

- Disorientation, drowsiness, or confusion
- Seizures
- Coma
- Brain swelling (encephalitis)[2,3]

Diagnosis

Initial signs and symptoms of Nipah virus infection are nonspecific, and the diagnosis is often not suspected at the time of presentation. This can hinder accurate diagnosis and creates challenges in outbreak detection, effective and timely infection control measures, and outbreak response activities. In addition, the quality, quantity, type, timing of clinical sample collection and the time needed to transfer samples to the laboratory can affect the accuracy of laboratory results.

- Nipah virus infection can be diagnosed with clinical history during the acute and convalescent phase of the disease.

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- The main tests used are real time polymerase chain reaction (RT-PCR) from bodily fluids and antibody detection via enzyme-linked immunosorbent assay (ELISA).
- Other tests used include polymerase chain reaction (PCR) assay, and virus isolation by cell culture.
- Later in the course of illness and after recovery, testing for antibodies is conducted using an enzyme-linked immunosorbent assay (ELISA). [3]

Treatment

While Nipah virus infection has been designated as a priority disease for the WHO Research and Development Blueprint, there are presently no specific medications or vaccinations for this infection. Treatment for serious respiratory and neurological issues should involve intensive supportive care. For the treatment of NiV infections, immunotherapeutic medicines (monoclonal antibody therapy) are being developed and tested at this time. As an example, m102.4, a monoclonal antibody, has been utilised compassionately after completing phase 1 clinical trials. Remdesivir, an antiviral medication, has also shown promise in nonhuman primates as a post-exposure prophylactic and could be used in conjunction with immunotherapeutic therapies. In the early Malaysian NiV outbreak, ribavirin was administered to a small number of patients, despite its effectiveness. [4,6]

Natural Host: Fruit Bats

Fruit bats of the family *Pteropodidae* – particularly species belonging to the *Pteropus* genus – are the natural hosts for Nipah virus. There is no apparent disease in fruit bats. It is assumed that the geographic distribution of *Henipaviruses* overlaps with that of *Pteropus* category. This hypothesis was reinforced with the evidence of *Henipavirus* infection in *Pteropus* bats from Australia, Bangladesh, Cambodia, China, India, Indonesia, Madagascar, Malaysia, Papua New Guinea, Thailand and Timor-Leste. [2,3,8]

Prevention

In areas where Nipah virus (NiV) outbreaks have occurred (Bangladesh, Malaysia, India, and Singapore), people should:

- Practice handwashing regularly with soap and water
- Avoid contact with sick bats or pigs
- Avoid areas where bats are known to roost
- Avoid eating or drinking products that could be contaminated by bats, such as raw date palm sap, raw fruit, or fruit that is found on the ground
- Avoid contact with the blood or body fluids of any person known to be infected with NiV

Because NiV can be spread from person-to-person, standard infection control practices and proper barrier nursing techniques are important in preventing hospital-acquired infections (nosocomial transmission) in settings where a patient has confirmed or suspected NiV infection.

In addition to steps that individuals can take to lower their risk for NiV infection, it will be critical for scientists, researchers, and communities at risk to continue learning about NiV to prevent future outbreaks. Broader prevention efforts include:

- Increasing surveillance of animals and people in areas where NiV is known to exist.
- Increasing research on the ecology of fruit bats to understand where they live and how they spread the virus to other animals and people.

- Evaluation of novel technologies or methods to minimize spread of the virus within bat populations.
- Improving tools to detect the virus early in communities and livestock.
- Reinforcing protocols for healthcare settings on standard infection control practices to prevent person-to-person spread.
- Raising awareness about the signs, symptoms, and risk of NiV among populations at higher risk due to:
  - ✓ Geographic location
  - ✓ Contact with fruit bats or items contaminated by fruit bats
  - ✓ Contact with pigs or animals that could come into contact with fruit bats
  - ✓ Work in a healthcare setting or as a caregiver for people infected with NiV. [4,7]

Role of Pharmacist to Prevention of NiV:

- In the lead-up to, during, and following an epidemic, chemists are invaluable team members.
- Vaccination recommendations and administration, the dissemination of evidence-based guidance on disease transmission, and a reduction in the spread of disease in their communities and healthcare settings are all provided by chemists, the most approachable health care practitioner.
- Public anxiety can be reduced and community-supporting activities can be undertaken by chemists through the use of interdisciplinary teams during disease outbreaks, which can be unsettling for patients and carers alike. [1,5,7]

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