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Scope of Homoeopathic Perspective in an Epidemic Zoonotic Nipah Virus Outbreak in a Community

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Abstract:- Zoonosis related emerging infectious diseases especially have been recognised as significant global health issues. The recent outbreaks of West Nile virus encephalitis in New York and avian influenza in Hong Kong confirm this. Another illustration is the outbreak of Nipah viral encephalitis in Malaysia in 1998, which was brought on by a newly identified and deadly virus. The Nipah virus an epidemic, which resulted in significant economic loss and human misery, was summarised in this article along with its epidemiological, clinical, and laboratory findings. However, based on the principles of homoeopathy, it is possible to offer potential medications for Nipah patients based on the available symptomatology, i.e., a group of medications that have been shown to cause symptoms and pathogenesis that are similar in healthy humans. In 2018, a Nipah virus (NiV) outbreak with a 91% (21/23) case fatality rate occurred in Kerala, India's Kozhikode district. 2019 observed only one case in the Ernakulam district that fully recovered. We discussed the Kerala State Government's and the Indian Council of Medical Research's response to and control strategies for the 2019 NiV outbreak.

Keywords:- *Nipah virus, Homoeopathy, Symptomatology, Outbreak.*

I. INTRODUCTION

The Nipah Virus (NiV) infection was originally discovered during an outbreak of the disease in Kampung Sungai Nipah, Malaysia, in 1998. It is a serious zoonosis with a high case fatality rate. NiV can spread disease to humans, domestic animals, and pigs. A zoonosis known as the Nipah virus (NiV) infection is brought on by a Henipavirus from the Paramyxoviridae family. The disease's progression can be fatal and highly serious. Fruit bats, commonly referred to as megabats, of the Pteropodidae family, particularly those of the Pteropus genus, are NiV's natural hosts. Farming pigs, horses, domestic and feral dogs, and cats have all been reported to have natural infections caused on them. Natural NiV transmission can occur both within species (human to human and pig to pig) and across species (flying bat to human, pig to human, and horse to human). Different methods can be used by either humans or animals to propagate the virus. It is peculiar how diverse breeding practises, dietary preferences, and recently discovered genetic traits/molecular properties of the primary virus proteins related to virulence affect viral transmission modes among various hosts differently depending on the geographical area. There have been outbreaks reported in Malaysia, Singapore, Bangladesh, India, and the Philippines, some of which have been associated with severe neurological and respiratory illness and significant mortality rates in both humans and pigs. Serological, molecular, virological, and immunohistochemical techniques can all be used to make a diagnosis. Biosecurity (via the proper management of reservoir and intermediate/amplifying hosts) and prospective vaccines, which are currently in development, are the pillars for disease control. However, it is crucial to assess the possible impact of human and climate change on the NiV reservoir bats and their habitat, as well as on the transmission of disease and inter-specific infections. Bats serve as the virus's natural reservoirs, which causes the virus to propagate and, as a result, causes disease epidemics in both humans and animals.

II. EPIDEMIOLOGY

In Malaysia's province of Perak, a severe febrile encephalitis outbreak among pig farmers that was linked to a high fatality rate was first noted in September 1998. Future reports and spillovers should not be discounted due to the fact that bats are found all over the world. An extensive outbreak of 276 recorded cases in Malaysia and Singapore from September 1998 to May 1999 led to the first identification of the human Nipah virus (NiV) infection, a new zoonotic disease. Two human outbreaks from Bangladesh's bordering West Bengal were reported in India between 2001 and 2007. The natural source of NiV is the Pteropus genus of large fruit bats. In India in 2001, there is questionable evidence of human-to-human transmission. . 33 medical staff members and hospital attendees fell ill during the Siliguri outbreak after being exposed to Nipah virus patients who were hospitalised, suggesting nosocomial infection. Cases of nipah typically appear in groups or as an outbreak.

- *Detection of the Virus*

University of Malaya virologists discovered a virus in the cerebral fluid of a patient with encephalitis in the beginning of March 1999. Syncytia formed in vero cells that had been injected with cerebrospinal fluid samples from three fatal encephalitis cases. Studies using electron microscopy (EM) on the virus revealed traits that are typical of viruses in the Paramyxoviridae family. virus had characteristics of a member of the Paramyxoviridae family of viruses. Because the initial isolate was made from clinical

samples from a fatal human case from Kampung Sungai Nipah, a community in Negeri Sembilan, the name Nipah virus was suggested. According to immunofluorescence antibody assays, Nipah virus-infected cells responded strongly with Hendra virus antiserum but not via antisera against other paramyxoviruses, such as those for measles virus, respiratory syncytial virus, parainfluenzaviruses 1 and 3, as well as other viruses, such as herpesvirus, enteroviruses, and JE virus. According to cross neutralisation experiments, the Nipah and Hendra viruses had neutralising antibodies that were 8 to 16 times different from one another, despite the fact that the viruses were comparable. In all cases from Singapore and all but one of the first recognised encephalitis cases from Malaysia, virus isolation or serologic testing demonstrated the presence of the Nipah virus. Asymptomatic infection to deadly encephalitis can manifest clinically. While in Bangladesh and India the outbreak is linked to consumption of tainted date palm sap and human-to-human transmission, in Malaysia-Singapore the disease was predominantly spread through contact with pigs. This virus, which can infect both humans and animals, is primarily found in bats.

➢ *Nipah Virus Taxonomy:*

It is classified as a bio safety level-4(BSL-4) agent.

- *Nipah virus belongs to:*

✓ **Group:** Group V((-ve) ss (RNA)
✓ **Order:** Mononegavirales
✓ **Family:** Paramyxoviridae
✓ **Genus:** Henipavirus
✓ **Type Species:** Hendra Nipavirus

- ***Species:*** Cedar Henipavirus, Ganaian Bat Henipavirus, Mojiang Henipavirus, Nipah Henipavirus, Hendrahenipa virus.

➢ *Aetiology*

The Nipah virus belongs to the family Paramyxoviridae in the genus Henipavirus. The Hendra virus, Cedar virus, and other unidentified henipa viruses are all members of this genus. Cedar virus was discovered in Australian bats and appears to be nonpathogenic. The Nipah virus appears to have several different strains. The variants that cause human illnesses in Bangladesh and India are different from the epidemic strains found in Malaysia, where at least two significant strains were obtained from pigs. Based on the outcomes of RT-PCR, it is also believed that the henipavirus that recently caused an outbreak in the Philippines is the Nipah virus. The viruses from Malaysia seem to be its closest relatives.

➢ *Natural Reservoirs and Virus's Intermediate Hosts*

- *Natural Water Storage*

Previous outbreaks (in Malaysia, India, Bangladesh, and the Philippines) have revealed that the virus's natural reservoir is the Pteropodidae family's Pteropus genus of fruit bats.

- *In-Between Hosts:*

Pigs were the intermediary hosts in the outbreak in Malaysia, when pigs contracted the disease after eating fruits that had been partially consumed by bats. In the Philippines, horses served as the intermediary host.

There was no intermediate host in India or Bangladesh, and human infection resulted from ingesting raw date palm sap contaminated by infected bats.

✓ The first global outbreak occurred in malaysia and singapore between september 1998 and june 1999. It was recorded 276 instances. A 39% mortality rate.
✓ India (West Bengal): In Siliguri and Nadia, deaths occurred in 2001 and 2007.
✓ Bangladesh: There were 260 confirmed cases during 11 outbreaks between 2001 and 2015, of which 197 deaths (or a mortality rate of 76%) were reported.
✓ Philippine Islands: from March 3 to May 24, 2014. 11 instances. (The mortality rate was 82%)
✓ India: Malappuram and Kozhikode districts, Kerala: 19 cases were reported; 17 of these resulted in fatalities. (89% mortality rate).

Most frequently, outbreaks seem to occur between December and May during the same months or seasons.

➢ *Transmission:*

Three different channels have been found:

- From a natural reservoir (fruit bats) to natural hosts (horses, pigs, and other domestic animals), and finally from natural hosts to people. (By way of contact)
- From a natural source to people (eating fruits that have been partially consumed by bats)
- From people to people. (via fomites, droplet infection, or close physical contact, particularly through coming into contact with bodily fluids.)

➢ *Pathogenesis:*

Necrotizing vasculitis was seen in the pathologic findings in the brains of Nipah encephalitis cases. Direct neural invasion may possibly be a substantial factor in the encephalitis' pathophysiology, however the main pathology appeared to be extensive ischemia and infarction brought on by vasculitis-induced thrombosis. The lungs frequently displayed aspiration pneumonia, pulmonary edoema, and alveolar haemorrhage. In the end, this could cause pneumonia and acute respiratory distress syndrome (ARDS). Because of its accessibility, ease of manufacture and spread, and high virulence in terms of high mortality and health impact, the CDC considers it as a critical hazardous biological warfare.

➢ *Incubation Duration:*

The median incubation period for main cases in Bangladesh outbreaks was seven days (two to twelve days), and it was nine days (six to eleven days) for secondary cases who had only one exposure to a Nipah case. However, the time between exposure and the start of illness can range

from two to twenty-one days. Rarely, an incubation period of up to 45 days has been documented.

➢ *The Disease's Infectious Phase:*

Although the precise infective time of the illness is unknown, when case histories from the latest outbreak in Kerala are analysed, it appears that the infectious phase begins on the second day after the beginning of the first symptoms. The majority of the second-level victims of the outbreaks were family members who looked after undiagnosed case-patients in their homes, patients and bystanders who unintentionally came into contact with the undiagnosed case-patients at the hospital, and medical personnel who wore bare-minimum PPE while attending to undiagnosed cases.

III. COURSE OF THE ILLNESS

The illness lasts between three and fourteen days, according to an analysis of the case histories from the most recent outbreak in Kerala. Most patients began experiencing CNS symptoms on the second or third day of their sickness.

➢ *Clinical Characteristics:*

Clinical manifestations might range from an infection with no symptoms to deadly encephalitis. Flu-like symptoms like fever, headaches, muscle soreness, vomiting, and sore throat appear suddenly in those who are infected. These symptoms are quickly followed by disorientation, sleepiness, altered consciousness (partial or complete loss of consciousness), and focal neurological indications indicative of acute encephalitis. Seizures and encephalitis can occur in extreme cases. Within 24-48 hours, a coma develops from this. Atypical pneumonia with fever, cough, and headache can also appear in some patients whose respiratory functions were compromised. Acute respiratory distress and other severe respiratory symptoms, such as nipah, have been seen more frequently in epidemics after the Malaysian outbreak. Fever, a change in mental state, extreme weakness, a headache, respiratory distress, coughing, vomiting, muscle discomfort, jerking of the muscles, convulsion, and diarrhoea are some of the symptoms.

➢ *Signs:*

- Decreased Glasgow Coma Score
- Increasing temperature
- A higher than normal respiratory rate (adults: 25/min; infants under 12 months: 40/min)
- An elevated heartbeat (adults: 100/min; infants under 12 months: 140/min)
- Lung crepitations
- High blood pressure/hypotension

➢ *Neurological Symptoms*

Oculoparesis, abnormalities of the pupillary, Lumbar weakness, limb weakness, and facial weakness deep tendon reflexes are lessened, Plantar-absent/extensor

➢ *Case Definitions:*

Suspected case: In a region where there has been a history of the Nipah epidemic, a fever case with respiratory symptoms (such as shortness of breath and cough) and signs of encephalitis (such as sudden onset of fever with altered sensorium or seizure) should be taken into consideration.

Any case during a Nipah epidemic with a history of contact with a Nipah patient should be taken into consideration as a possible case.

➢ *Verified Case:*

Testing for IgM antibodies to the Nipah virus (ELISA in serum or cerebrospinal fluid) or Nipah viral RNA identification (PCR from respiratory secretions, urine, or cerebrospinal fluid) should be done in certain situations to rule out Nipah infection.

Clinically, Nipah infection differs from JBE by having greater segmental myoclonus (more so in NiVM) and respiratory symptoms in addition to encephalitogenic characteristics.

➢ *Investigations:*

- Leucopenia, lymphocytosis, and thrombocytopenia in the general CBC
- Chest X-ray: Consolidation and diffuse infiltrates
- CSF analysis: moderate pleocytosis. Protein and sugar levels should be normal or slightly elevated.

➢ *Confirmatory*

Nipah virus RNA identification using real-time polymerase chain reaction using respiratory secretions, urine, or cerebrospinal fluid. IgM antibody against Nipah virus (ELISA in serum or cerebrospinal fluid).

➢ *Prevention:*

- *Broad:* By personal care, I mean: Isolating cases (ideally in a different unit); providing barrier nursing, such as wearing masks, gloves, or gowns; and washing hands with an alcohol-based disinfectant or soap and water before and after handling or seeing patients.

➢ *Medicinal:*

Through homoeopathic preventative care.

- *Every Outbreak or Pandemic has Two Potential Homoeopathic Prophylactic Strategies.*

✓ Choosing a 'Genus Epidemicus' based on the signs of the epidemic disease in question. The preventive medication is chosen since it has been demonstrated that it can cause symptoms and disease pathology that are similar in humans. There are two ways to think about symptomatology. a list of the disease's common symptoms from earlier epidemics. This strategy is typically used to treat well-known diseases, particularly epidemics of acute infections, whose general symptoms are nearly same in all afflicted people.(Acute fixed

miasmatic illnesses, such as the measles, chickenpox, and hepatitis A.)

- ✓ If the range of symptoms from earlier outbreaks of the disease are known, this might also be used to other epidemic diseases with varying symptoms. Without having to wait for the disease to start spreading, we may in this case recommend a likely GE based on the basic symptoms that are currently available. (For instance, belladonna for scarlatina, Pulsatilla or Rhus toxic for chickenpox, nux vom for hepatitis, camphor or c. met. for cholera, etc.) Gathering of the disease's general symptoms from the first instances of the particular outbreak of the acute infectious disease under consideration for an illness whose cause is unknown or for a condition whose total number of symptoms varies depending on the affected person. (Acute varied migrainous illnesses)
- ✓ In this circumstance, it is necessary to examine the symptomatology of a small number of people who have the condition and to synthesise a totality by adding all the common symptoms in those cases. The GE that is chosen should encompass nearly all of the symptoms gathered under the synthetic totality.
- ✓ The most crucial thing to keep in mind is that we are searching for generic symptoms in those situations rather than peculiar, uncommon, special symptoms in each individual case. Using a nosode made from the disease-causing agent's or material's causative agent as a preventative treatment is known as Homoeopathic vaccination. Leptospira potentized preparation for Leptospirosis, for instance, or Diphtherinum for diphtheria.(This technique was applied to prevent Cuban leptospirosis)

- *Homoeopathic Approach Refers to*

Homoeopathy, which has its roots in Germany, is a mild, safe, and efficient form of medicine. It is based on the Law of Similia or the principle "like cures like." According to official pharmacopoeia norms, the drugs employed in homoeopathy are serially diluted or potentized, which enhances their healing properties. Human Pathogenetic Trials (HPT) on healthy humans demonstrate the efficacy of Homoeopathic medications. Three strategies are described in Homoeopathic books for controlling an ongoing pandemic.

These include prescribing nosodes, genus epidemicus, and constitutional medications. The first strategy is to administer constitutional medication. After evaluating the patient's constitution, diathesis, temperament, and predispositions, constitutional treatment is administered. Therefore, providing a constitutional medicine is an individualised strategy that reduces the patient's vulnerability to being impacted by noxious environmental influences or acute miasms. Therefore, the constitutional strategy may serve as a broad immunity booster during an epidemic. Genus epidemicus is the second strategy.

Homoeopathy holds that no two outbreaks are identical in nature. Even if the same disease is responsible for two separate epidemic outbreaks, each outbreak presents differently at different points in a period of time and as a result, each epidemic's diagnostic symptoms for prescription reasons also vary. Homoeopathy required a detailed examination of each epidemic's clinical presentation. As a result, to identify the genus epidemicus of an epidemic disease, the totality of signs and symptoms of multiple patients are carefully examined, and the defining features of the current epidemic are developed, as stated by Dr. Hahnemann in aphorisms 101 and 102 of the Organon of Medicine. Prescribe Nosodes is the third strategy.

The Greek word "nosos," which meaning "disease," is the source of this word. Nosodes are Homoeopathic medicines produced from disease-related substances in accordance with Homoeopathic principles. Ambra grisea was first discovered and proven by Dr. Hahnemann; Psorinum was then proven by Dr. Constantine Hering, who also came up with the name "nosode." Nosodes have the potential to stop epidemics because they can be utilised as preventative treatments for both infectious and non-infectious disorders.

➢ *Management:*

The Nipah virus disease has not been currently suggested for medical treatment. The basic method of managing the infection is intensive supportive care combined with symptomatic therapy. But in accordance with Homoeopathic principles, it is possible to offer potential medications for Nipah patients according to the available symptomatology, i.e., a number of drugs that have been shown to cause a variety of symptoms and pathogenesis in healthy people. One should never try to treat it in the OPD because it is an extremely aggressive viral disease with a high possibility of spreading from person to person and a very high mortality rate.

- *General: Depending on the symptoms, supportive care.*
- *Medicinal: A few potential medicines.*

- *Belladonna:*

Belladonna is a symbol of attack violence and abrupt onset. marked effect on the vascular system and CNS. quick start of a high temperature. a brain infection prior to nervous fever. during a fever, pupils dilate. eyesight impairment when cold. visionary delusions. delirium while ill. Head sinks into pillow, pulling back and rolling from side to side. throat and mouth are dry, and it seems that they don't like drinking water. Fever without thirst. vomiting that is uncontrollable. Quick, uneven, and under-respiration. Cheyne-Stokes breathing. body throbbing all throughout. A quick yet feeble pulse. urinary retention and cerebral congestion. stumbling pace while feverish. limbs jerking.

- *Ars alb:*

A severe case of fever and weakness. a brain infection prior to nervous fever. weakness unrelated to the illness. vision and smell hallucinations. more delirium after midnight. anxiety and a fear of dying. Cold relieves the headache, but other symptoms get worse. after eating or drinking, nausea, retching, or vomiting. diarrhoea with

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black, bloody stools. an oppressive catarrh. breathing that is laboured. Sepsis. Palpitation. tachycardia when feeling cold.

- *Opium:*

Stupor, eyes half closed, pupils unresponsive. depression in the cerebellum. Brain paralysis and coma. vomiting along with colic and fits. diarrhoea when ill with a fever. breathing that is stertorous. bradycardia with fever. extreme sleepiness when sick. stumbling pace while feverish. Insomnia, snoring breathing, jerking limbs, extreme thirst, and tiredness are all symptoms of fever. retention of urine when sick with a fever. Low general temperature with a inclination for stupor. no complaints are made.

- *Helleborus:*

Depression of the senses. imperfectly hears, tastes, and sees. Dropsical effusions and generalised muscle weakness that may progress to total paralysis are present. a serious illness. In encephalitis, delirium. Coma. rolling of eye. meningitis encephalitis. enlarged eyes, breathing irregularly. chest tightened. gasps for air. Spasms. Myoclonus.

- *Zincum met:*

Encephalitis in an epidemic. depression in the cerebellum. imminent brain paralysis and fever. Seizures. Myoclonus. rolling of eyes. Vomiting. extremities cold while feverish. painful spasmodic cough.

- *Hyoscyamus:*

Vigilant coma, trembling weakness, and tendon twitching. a brain infection prior to nervous fever. pupils that are constricted or dilated while sick. delirium accompanied with attempts to flee. convulsive stupor in a deep state.

- *Gelsemium:*

Eyesight impairment when cold. pupil constriction due to fever. Ptosis. decreased thirst. In encephalitis, coma. Slow, full, soft, and compressible pulse.

- *Apis:*

During a fever, pupils dilate. encephalitis-related convulsions. brain inflammation accompanied by oedema and puffiness in several areas. Fever makes it difficult to breathe. Fever causes a rapid heartbeat. screams while unconscious.

- *Stramonium:*

A brain inflamation prior to nervous fever. unsteady pace while feverish. an encephalitis followed by delirium. feeling dizzy and wanting to get away. severe fever. excessive sweating that doesn't improve.

- *Bryonia:*

Delirium with a need to leave and return home. aggravated by the smallest movement. vertigo while ill. unsteady pace while feverish. Patient is peacefully lying down and does not want to be disturbed. during a fever, coma.

Depending on how the disease is manifesting in a particular case, one or more medications may be required. Belladonna itself may be the treatment in the early stages of the illness and may need to be repeated frequently at lower doses (3X) in order to be effective. Depending on the symptoms, ars alb or aconite may also be helpful in the early stages. The following herbal remedies are also likely to be used in cases of encephalitis that present with a variety of symptoms: Hyoscyamus, Gelsemium, Helleborus, Opium, Zincum met, Cuprum met, Apis, Cocculus, Stramonium, Baptisia, and Bryonia. Verat viride, Nux-vom, etc.

➢ *Nipah Virus Control in Domestic Animals:*

All field investigations should take the required precautions to prevent infection in light of the potential effects on human health. This includes quick and accurate veterinarian examinations of potential clinical cases, particularly those involving pigs. Any swine respiratory or neurological disorders in a region where pteropid bats are known to exist should rule out Nipah. If there are cases of human encephalitis or pigs with a strange barking cough, nipah should be suspected. Pigs suffering from other respiratory and neurological diseases do not exhibit significantly distinct symptoms. Differential diagnosis should be used in cases of sudden death in boars and sows, sudden death in suckling pigs and piglets, abortions and other reproductive dysfunction, respiratory diseases with harsh, ineffective coughing, and cases with encephalitic manifestations of trembling, muscle incoordination, and myoclonus causing lateral recumbency. Using screens at open-air access, contact with fruit bats and their secretions should be avoided in pig farms. It should also be guaranteed that no other wild or domestic animals have access to swine. Animal farms should regularly be cleaned and disinfected (with sodium hypochorite or other detergents) to prevent infection. The location where the animals are kept should be immediately isolated if an outbreak is suspected. To lessen the danger of transmission to humans, diseased animals may need to be killed, with the carcasses carefully buried or burned. The entire inventory of damaged farms' goods and machinery has to be cleansed and sanitised. The illness must be controlled by limiting or outlawing the movement of animals from contaminated farms to other locations.

➢ *Health Education and Promotion Instruction:*

- *Reducing the Danger of Bat-To-Human Transmission:*

The first step in preventing transmission should be to restrict bat access to date palm sap, according to public health educational messaging. Fruits should be carefully cleaned and peeled before eating, and freshly harvested date palm juice should also be cooked. ii) Reducing the chance of human-to-human transmission: Avoid close physical contact with those who have the Nipah virus. When caring for sick persons, masks, gloves, and other protective gear should be worn. After providing care or paying a sick person a visit, one should always wash their hands. iii) Reducing the chance of animal-to-human transmission: When handling sick animals or their tissues, as well as during slaughtering and culling procedures, masks, gloves, and other protective apparel should be worn.

IV. CONCLUSION

In conclusion, health services, veterinarians, farmers, and consumers should all receive better information about the condition. As with other zoonotic agents, the Nipah virus may be covered by monitoring strategies, especially for wild animals. Prioritisation might cause people to pay more attention to other infections, such those with larger incidences in the general population. Field research, however, may reveal abrupt and severe changes in the epidemiology. For instance, the finding of a novel ebolavirus-like filovirus in Spanish microbats proved that spillover events of this type are not just possible in Africa or Asia. By actively pursuing pre-emergence research, we can improve our readiness to thwart potential future introduction of exotic infections like henipaviruses in non-endemic locations. Monitoring the changing epidemiology of a risky infection like the Nipah virus is crucial for being able to swiftly modify control strategies in the event that it might turn into a new healthcare priority. Homoeopathy is a safe, gentle, and efficient form of medicine that has its roots in Germany. It is based on the Law of Similia or the principle "like cures like." According to official pharmacopoeia norms, the drugs employed in homoeopathy are serially diluted or potentized, which enhances their healing properties. Human Pathogenetic Trials (HPT) on healthy humans demonstrate the efficacy of homoeopathic medications. Three strategies are described in homoeopathic books for controlling an ongoing pandemic. These include prescription nosodes, genus epidemicus, and constitutional medications.

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