World view

By Thekkumkara Surendran Anish

Smart policy changes can quell deadly Nipah virus

Repeated outbreaks increase the risk of a strain emerging that is better at spreading.

Nipah, a deadly RNA virus that can spill over from bats to humans, has infected six people and killed two in the Indian state of Kerala since August. The virus can cause encephalitis – inflammation of the brain – which manifests as fever, headaches, vomiting and respiratory distress. It has a fatality rate of 40–75%, depending on the strain.

This is the fourth Nipah spillover event in Kerala in the past six years. Before the 2023 outbreak, one in 2018 also spread between people and caused at least 17 deaths. The other two, in 2019 and 2021, were limited to single cases.

At present, Nipah spreads between humans through contact with bodily fluids, so it is unlikely to cause a pandemic. But the virus is poorly understood, and no approved vaccines or treatments are available. Each outbreak gives the virus the chance to adapt and produce a strain that could spread more effectively.

Based on my experience as one of the leaders of the Nipah surveillance team in Kerala during the 2018 and 2023 outbreaks, more scientific and policy work on Nipah is needed. As a key first step, all countries likely to have Nipah virus reservoirs should have early detection systems.

That starts with knowing better where the risks lie. The strain in Kerala's outbreaks originated from Bangladesh in 2001. Health systems have missed this strain because its mortality rate is so high that it often causes small outbreaks or single cases. Outbreaks in Bangladesh in 2001 and 2003 were only detected later, when antibodies against Nipah were found in stored samples.

To reach Kerala, the virus must have spread undetected over more than 2,000 kilometres, from Bangladesh or the neighbouring Indian state of West Bengal. It is highly probable that many places in southeast Asia have Nipah virus reservoirs and could experience spillovers: Myanmar, Thailand, Laos, southern China, Bhutan, Nepal, Sri Lanka and many Indian states all lie a similar distance from Bangladesh and are home to fruit bats. Bat populations in many Indian states harbour serological evidence of exposure to Nipah virus (M. Gokhale *et al. Comp. Immunol. Microbiol. Infect. Dis.* **85**, 101800; 2022).

In Kerala's 2018 outbreak, the virus spread mainly in hospitals simply because people were most likely to be there when they were highly infectious. In areas with endemic Nipah, hospitals should screen anyone with sudden symptoms of encephalitis or respiratory distress for the virus, unless there is a clear alternative diagnosis. They should also follow strict infection-control protocols, including proper room ventilation, mask wearing for health-care workers, and isolation of patients. In India, it is common for friends and family members to accompany people to the hospital, but these bystanders were affected the most in both the larger outbreaks.

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Lack of treatments for Nipah is another concern. Drug trials are difficult, because outbreaks typically last for only a few days. Kerala's experience is that using antivirals not specific to Nipah might have helped some people infected near the end of the outbreaks in 2018 (R. Chandni *et al. Clin. Infect. Dis.* **71**, 152–157; 2020) and 2023. More research is needed, as is wider distribution of general antivirals.

The development of monoclonal antibodies from Nipah survivors in Kerala is also a priority. These will be specific to the local variant and could be given to people with early symptoms and to high-risk contacts, such as frontline health-care workers, potentially saving lives. The International Centre for Diarrhoeal Disease Research, Bangladesh, in Dhaka is already studying about 50 survivors of Nipah.

According to Gavi, the vaccine alliance, several candidate vaccines for Nipah are in clinical trials, including one based on messenger RNA, one based on a viral vector and one containing the protein subunit of Hendra virus, which closely resembles Nipah.

Because Nipah is an RNA virus that is prone to mutate, studying the virological factors contributing to severity is important for monitoring its pandemic potential. It is also crucial to study variation in immunological mechanisms known to affect people's susceptibility to Nipah. Hospital camera footage in Kerala revealed that some individuals were not infected despite close, unprotected contact with someone who was.

But prevention is always better than treatment. Public-awareness campaigns are a first step to preventing the spillover of Nipah from bats to humans. These should happen wherever fruit bats could serve as natural viral reservoirs. In Kerala, we are teaching people not to eat bat meat, fallen fruits or the nectar of banana flowers, which could contain bat saliva. In Bangladesh, spillover was attributed to people eating date-palm sap contaminated with bat secretions, but this was not the case for the 2023 outbreak in Kerala. People also need to be made aware that destroying bat habitats during a Nipah outbreak can cause infected animals to migrate to human-populated locations and increase the chance of human–bat interactions.

After the 2018 outbreak, the Keralan government developed a system to detect infections early, by analysing samples from people suspected to have Nipah; to contain outbreaks; and to save lives by treating symptoms. It is also establishing a research centre to investigate spillover mechanisms. But the wider world must take note. The past few years have made it clear that bolstering countries' defences against viral diseases benefits us all.

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The author declares competing interests; see go.nature.com/3kpq1zv

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