



Securing the borders: preventive measures against Nipah virus outbreak in Pakistan

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We are writing to express deep concerns regarding the significant looming threat of a Nipah virus outbreak in Pakistan, potentially originating from several South Asian countries, including Bangladesh, Malaysia, Singapore, and particularly from our neighboring country of India^[1]. The virus first emerged in 1998 among pig farmers in the Northern Peninsular region of Malaysia. Since then, it has resulted in widespread zoonotic diseases and has frequently led to epidemics in the region^[1,2]. Recent reports indicate a surge in Nipah virus cases, which calls for immediate action to fortify defenses against this highly contagious zoonotic pathogen. The WHO has recognized the Nipah virus as a priority disease due to its potential for major outbreaks and high fatality rates. Furthermore, the global health community has been cautioned about the potential of the virus to overcome species barriers and adapt to new hosts, which exaggerates its risk^[3,4]. The complex predisposing combination of weather conditions, environmental factors, and behavioral patterns can further exacerbate disease spread^[4,5]. Thus it is imperative to focus on preventive measures to mitigate the risk of an outbreak within our country.

The Nipah virus, recognized for its high case-fatality rate ranging from 40 to 75%, and potential for widespread outbreaks, highlights the urgency for robust preventive strategies^[3,6]. The virus has a propensity to spread from person-to-person transmission or through contact with infected animals such as bats, pigs, and cattle. On 30 August 2023, the largest outbreak occurred in Kerala, India, involving 30 cases, and was characterized by a very high case-fatality rate. Nearly half of the involved individuals had human-to-human transmission of the disease^[1,2]. The strain particularly reported in India has been reported to be potentially more virulent in its spread, causing lethal encephalitis and pulmonary symptoms^[7] (Fig. 1). Given the geographical proximity and continuous cross-border movement

between India and Pakistan, the risk of transmission is significantly heightened. To prevent any potential crisis, we must prioritize public awareness and education concerning the symptoms, transmission routes, and preventive actions related to the Nipah virus^[8].

Preventive efforts should be made at the national healthcare system level. Rigorous screening protocols, especially at airports, border crossings, and seaports, are essential for promptly identifying and isolating potential cases. Strengthening the capabilities of our laboratory to diagnose the virus accurately is crucial. Furthermore, national policies should be established to ensure a coordinated response to outbreaks and facilitate resource allocation for preventive measures.

At the regional and provincial healthcare system levels, the main focus should be on developing efficient surveillance systems that actively detect the disease at an early stage and respond promptly to positive cases. It is also imperative to improve the equipment and methods used in regional laboratories for efficient detection and management of the disease.

Individual doctors play a significant role in this effort by receiving training to quickly recognize symptoms and follow standardized and appropriate treatment protocols. Doctors should be encouraged to promptly report suspected cases and work closely with public health authorities to contain the spread effectively.

Public awareness campaigns should disseminate accurate information regarding the virus and the preventive strategies. Educating communities about avoiding direct contact with sick animals, refraining from consuming raw date palm sap, and promoting good hygiene can significantly reduce the risk of disease transmission^[6]. Community engagement initiatives must intensify, ensuring that every citizen is well-informed and understands their role in preventing the spread of the virus.

In addition to the above points, strengthening research collaborations and information sharing with international health organizations and neighboring countries is of paramount importance. By learning from successful strategies implemented elsewhere, such as vaccinations, we can enhance our preventive efforts and effectively respond to potential outbreaks. For example, innovative mRNA vaccine technology, which is known for its rapid development and efficiency against pathogens such as SARS-CoV-2, has the potential to be a game changer in the prevention and mitigation of viruses such as Nipah. Coupled with advancements in nanotechnology, nanovaccines offer targeted delivery and enhanced immune responses, with fewer side effects. The combination of mRNA and nano-vaccine technology shows great promise for rapidly producing effective vaccines, making them powerful instruments in the battle against emerging infectious diseases such as the Nipah virus^[9,10]. Some strategies that

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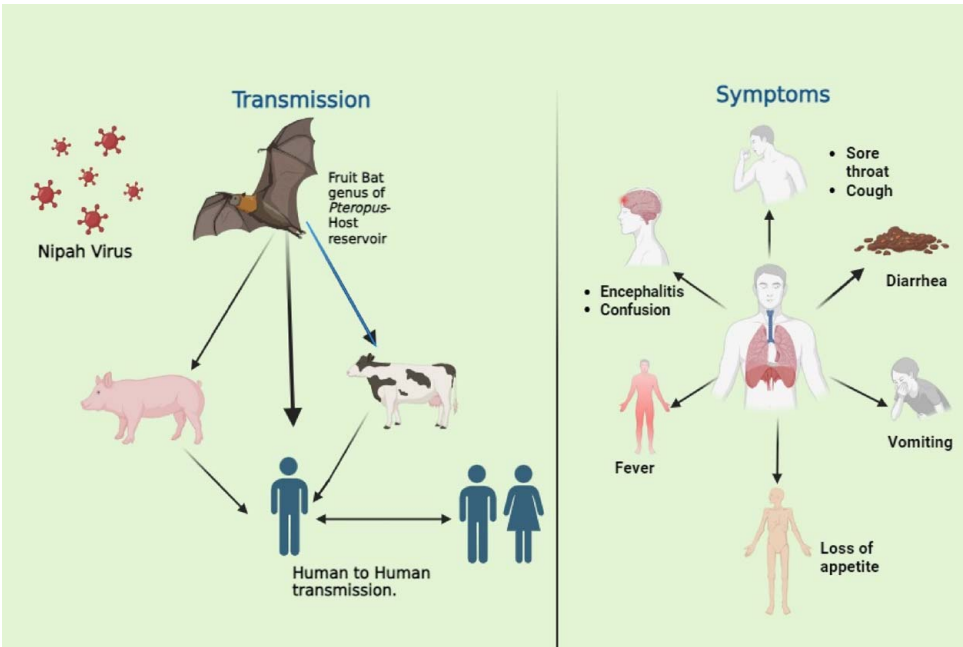


Figure 1. **Left side of the image:** Illustration of the transmission of Nipah Virus particles from the Fruit Bat genus *Pteropus*, which serves as the host reservoir, to pigs, cows, and humans. **Right side of the image:** Description of the signs and symptoms observed in individuals infected with the Nipah Virus.

Table 1	
Preventive strategies to mitigate current and future outbreaks of Nipah Virus	
Preventive strategies	Description
National healthcare system	Rigorous screening protocols at airports, border crossings, and seaports; strengthening laboratory capabilities for accurate diagnosis; establishing coordinated national policies for resource allocation
Regional/Provincial healthcare system	Developing active surveillance systems for early disease detection; improving regional laboratory equipment and methods for better disease management
Individual physicians	Providing training for healthcare professionals to recognize symptoms early and implement appropriate treatment protocols; encouraging prompt reporting of suspected cases and coordination with public health authorities
General public	Conducting public awareness campaigns to disseminate accurate information about the virus and its prevention strategies; educating communities about avoiding contact with sick animals, refraining from consuming raw date palm sap, and promoting good hygiene

can be implemented to mitigate the current and future risks of this sinister disease in Pakistan are mentioned in (Table 1).

In conclusion, Pakistan must employ a multifaceted approach to address the risk of Nipah virus infection. This includes both immediate preventive measures and strong healthcare responses, as well as long-term tactics, including ongoing public education and international collaboration. Our current preparedness will define our ability to defend public health in the future, ensuring that we are not just reactive but also proactive in our fight against this fatal disease. Collective efforts from all sectors of society are needed to protect our country’s health and avert potential Nipah virus outbreaks.

Ethical approval

Ethics approval was not required as this was a letter to the editor.

Consent

Consent was not taken/required as our article is ‘Editorial’.

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Author contribution

S.S.S.: idea conceptualization, background research, editing and proofreading, and approving the finalized version; I.A.: conceptualization, writing – original draft, and final approval; A.B.S.: writing – original draft, editing, and proofreading; M. Z.K.: finalizing and editing the original draft, referencing the manuscript, and forming the Nipah Virus transmission pictorial image.

Conflicts of interest disclosure

The authors declared no potential conflict of interest.

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