

Emerging and Re-emerging Viral Zoonoses: A Significant Challenge for the Near Future

Shabir Ahmad Bhat^{1*}, Pervaiz A Dar²

¹Department of Animal Husbandry, University of Kashmir, Jammu and Kashmir, India; ²Department of Animal Husbandry, University of Agricultural Sciences and Technology of Kashmir, Jammu and Kashmir, India

DESCRIPTION

In the twentieth century, tremendous ecological change along with a remarkable increase in human and domestic animal populations created favorable conditions for pathogens to cross the species barrier. Generally, the spillover of virulent pathogens from animal to human hosts involves a complex interaction between the pathogen, the environment, and the host. Emerging zoonotic diseases have been on the rise worldwide, with viruses being the primary etiological agents. In human beings, zoonotic diseases account for approximately 60% of all known infectious diseases and 75% of all emerging infectious diseases.

According to various epidemiological studies, the majority of emerging infectious diseases agents are thought to originate from animals, with wildlife being the most important source of disease outbreaks in humans [1,2] and their emergence frequently involves dynamic interactions among wildlife, livestock, and human populations within rapidly changing environments [3-5]. Also, the growing demand for animal-derived food has prompted the intensification and industrialization of animal production, wherein a huge number of genetically similar animals are bred for higher productivity rather than disease resistance. Intensive farm settings cause them to be raised in close proximity to each other, in less ideal conditions with limited biosecurity and poor waste management. As a result, they are more vulnerable to infections, which can further lead to the emergence of zoonotic diseases. Although many of these zoonotic agents originate in wildlife, livestock especially intensively reared often serves as an epidemiological link between wildlife and humans. The case of avian influenza pathogens, which initially circulated in wild birds, then infected domestic poultry, and eventually spread to humans, is a fine example of livestock acting as a "disease bridge." The emergence or re-emergence of zoonotic pathogens has been expedited by the human impact of changes in ecology and climate, as well as faster mobility between countries and regions. Examples of some past emerging viral disease outbreaks are SARS [6], MERS [7], Avian Influenza [8], Ebola [9], and Zika virus [10] and the ongoing SARS-CoV-2. 'Emergence' means

either the appearance of a newly evolved or a newly recognized pathogen, or the appearance of a known existing pathogen in a geographic area where it has never been found before. 'Re-emergence' is used to refer to pathogens whose presence is already recognized in a given area but which have increased in incidence (locally or globally, as for pandemics) or for pathogens which have seen their potential to cause severe infections in humans increase due to a shift in their ecology allowing, for example, the crossing of barriers from wildlife to domestic animals (as in the case of avian influenza) [11]. Furthermore, wild animals sold in wet markets provide an ideal habitat for pathogen transmission across species as well as dissemination in other places where these animals are taken.

Overall, pandemics have a terrible impact on our lives and economies and the poorest and most vulnerable people are the ones that suffer the most. The ongoing COVID-19 pandemic is the most recent example of the global threat that animal viruses pose to humans. Also, in the 1970s, the Ebola virus was transmitted from bats to monkeys to humans, causing an incredibly deadly hemorrhagic fever and still causing major outbreaks today.

Post-emergency outbreak control, quarantine, medication, and vaccine development are all major components of global efforts to mitigate the effects of these emerging diseases [12]. While vaccine development is important, pathogens can jump from animals to humans faster than vaccines and therapies can be developed. As a result, it is critical to rapidly diagnose and respond to an emerging or re-emerging disease. Further, it's important to remember that the fight against zoonoses begins with eradicating the pathogen at its animal source. Controlling and eradicating zoonotic diseases in animals is more compelling than in humans, and it is far less expensive to put resources into the prevention of infectious disease outbreaks than to manage the consequences of a pandemic. This fact provides the veterinary Services, veterinarians, farmers, managers of wildlife and the OIE with a leading role at both the national and international levels. The strengthening of veterinary services in

Correspondence to: Shabir Ahmad Bhat, Department of Animal Husbandry, University of Kashmir, Jammu and Kashmir, India, E-mail: drshabir655@gmail.com

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terms of surveillance, rural network of veterinarians, early detection, warning and response, improved diagnostic capabilities and other resources, as well as the adoption of new legislation giving appropriate capacities to veterinary administrations and their partners will form the basis for better prevention of emerging and re-emerging zoonoses.

CONCLUSION

Even though prevention activities are challenging to implement, because events causing the emergence or re-emergence of zoonotic diseases are complex and affected by multiple factors, such as genetic evolution, demographic changes, environmental conditions, or climate change affecting the ecosystem. Also, the unpredictable onset and rapid dissemination of zoonotic outbreaks means public health systems need to be able to quickly identify early signs of such threats and respond promptly. As indicated by the tripartite (WHO, FAO, and OIE) zoonotic guide, it is now time to embrace 'One Health' as a framework for public health action against zoonoses. Although the concept was introduced towards the start of the 2000s, it summarizes the idea that human health, animal health and environmental health are all intertwined. This necessitates the development of well-planned global strategies for the prevention and control of these emerging zoonotic pathogens. These strategies should be well coordinated at the human animal ecosystems interface through the implementation of appropriate policies at the national, regional, and international levels. Governments must prioritise plans to introduce the One Health approach in education and training programmes as well as in public health systems, both at the national and global levels. The timely identification of the interconnections between human, animal, and environmental health, which is inherent in the 'One Health concept', is a vital prerequisite for understanding and addressing the future of global health concerns.

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