ZOONOTIC THREATS UNITING ONE HEALTH FOR A SAFER TOMORROW

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ABSTRACT

The One Health approach needs joint action across sectors to detect, prevent, and respond to diseases that can pass between animals and people. Zoonotic diseases remind us that the well-being of humans, animals, and the environment are inseparably linked. Despite medical advances, recent outbreaks have shown how unprepared the world can be for new zoonotic threats. Rapid urban growth, deforestation, poor farming practices, and misuse of antibiotics are making these risks more frequent and severe. Tackling this challenge needs strong wildlife monitoring, safer animal farming, smart use of medicines, clear policies, and better collaboration among experts in health, veterinary science, and ecology. Limited resources, weak governance, and lack of coordination remain major obstacles. Building public awareness and training skilled professionals are equally vital. By embracing the One Health vision, countries can better protect people, animals, and nature reducing the chance of the next major outbreak and creating a healthier future for all.

KEYWORDS: Disease surveillance, antimicrobial resistance, wildlife conservation, emerging diseases, ecology

INTRODUCTION

One Health is the unified approach to the health and well-being of humans, animals, and the environment together. The foundation of the one health principle lies in the fact that health is an outcome of a complex interplay between humans animals and the state of the environment. Zoonotic diseases under appropriate environmental conditions, have wreaked devastation on human civilization, health, economics, and livelihood, from outbreaks of plague and influenza to COVID-19. This fact has been hammered down on us by Nature since the dawn of mankind through diseases like plague and rabies. However, we have exhibited significant complacency in executing the comprehensive One Health approach.

AN OVERVIEW OF ZOONOTIC THREATS

With the advent of anti-microbials and improving healthcare infrastructure the global burden of diseases has shifted from communicable to non-communicable diseases with ischemic heart diseases taking the largest share of deaths worldwide. However, it was temporary dethroned from its position by covid-19 in the year 2020 and 2021. Covid-19 is a viral disease originating from bats that is hypothesised to have been transmitted through an intermediate host to humans and the entire human civilization was caught off guard. This reinforces the complex interplay between humans animals and the environment and leaving us uncertain about the next similar pandemic. The following factors have exponentially amplified zoonotic hazards.

Shrinking wildlife habitat

From the Amazon rainforest to the Arctic, humans are encroaching into animal habitats. Climate change has further shrunk the habitat of animals. This increases the risk of human-wildlife contact and pathogen transmission.

Rapid urbanization

Urban areas are usually densely populated and become a suitable environment for transmission of these communicable diseases.

Globalization

Global trade and travel facilitate the spread of these communicable diseases beyond natural geographical barriers.

Inadequate agricultural and livestock management practices

Avian and swine influenza are bright examples of zoonotic threats that can cause outbreak in the absence of appropriate control measures. Additionally illegal harvesting of wild species increases risk of wild pathogens entering humans.

Antimicrobial resistance

The majority of zoonotic diseases are viral in nature. However, with the unhinged use of anti-microbials, particularly in animal husbandry, may result in the next resistant bacterial disease around the corner.

ONE HEALTH ENCOUNTERING ZOONOTIC THREATS

Occasionally threats posed by Nipah, monkeypox, influenza, and many others to a full-blown pandemic like COVID-19, we are appallingly unprepared for dealing with zoonotic diseases. Thus, a holistic strategy at the environmental level is essential to predict and tackle future occurrences. The following are some One Health approaches that can help us be better prepared.

1. The National One Health Programme for Prevention and Control of Zoonoses (NOHP-PCZ) is designed to connect human, animal, and environmental health sectors. Its goal is to strengthen surveillance, boost research, and build capacity to better detect, prevent, and manage zoonotic diseases through a coordinated, integrated approach.
2. The National One Health Mission works to link human, animal, and environmental health through joint efforts. It focuses on early detection, better prevention, and quick response to zoonotic diseases by encouraging collaboration across sectors.
3. Surveillance of wildlife populations and their movements: This can assist in identifying areas of human-animal interaction and potential epidemic locations for emerging zoonotic diseases. This can also assist in identifying reservoirs of known zoonotic diseases such as birds harbouring influenza, tracking their migration, and formulating strategies to prevent an outbreak.
4. Research: Research involving disease dynamics, pathogen evolution, virulence, and transmissibility are essential to understand zoonotic pathogens. In-depth research on environmental factors influencing animal populations, as well as their interactions with pathogens and their environment is essential.
5. Improving animal husbandry practices. This requires addressing the problem with widespread use of antimicrobials in animal feed for growth enhancement. A healthier living environment for food-producing animals will mitigate foodborne diseases. Isolating domestic animals from wildlife is necessary to prevent domestic animals from being affected by virulent wild strains.
6. Monitoring environmental parameters and human habits to predict animal movement, human animal interactions and changing dietary and lifestyle risk factors to evaluate zoonotic risks.
7. Legislation. Formulation of policies like protected animal habitats, anti-poaching laws, conservation projects, antimicrobials use guidelines and support for improved animal husbandry practices will further secure domesticated herds.
8. Resource allocation: Judicious allocation of resources is essential for policy implementation, research, farmer assistance and animal conservation to maintain a heathier human and animal population.
9. Teamwork. All the aforementioned criteria rely on an active interdisciplinary approach including a diverse array of specialists, including physicians, veterinarians, environmentalists, engineers, and statisticians. This methodology will enhance the system's vitality, productivity, efficiency, and cost-effectiveness.

FUTURE CHALLENGES

The One Health approach appears to be a successful approach in combating zoonotic threats although it also presents numerous shortcomings and challenges.

Inertia of existing practices

Established habits are difficult to relinquish. Constructing new systems is challenging. Consequently, the design of the foundational framework for One Health programs, as well as the establishment and organization of institutions centered on this idea and its implementation, will be tedious and time-intensive.

Governance and interoperability barriers

The current ways of operating in silos require a comprehensive reformation. Current practices exhibit significant data gaps, interoperability challenges between data and policy, a lack of data-sharing mechanisms, and various obstacles in legal and policy development and execution.

Resource constraints

A significant portion of the world, including India, is classified as middle to low income country, where basic human necessities are considered a luxury. In this context, resources encompass more than just financial assets. We must surmount challenges related to scientific expertise, skilled professionals, data acquisition, analysis, and the establishment of institutions.

The intrinsic challenge of non-invasively observing wildlife within their natural habitats and ecological systems.

CONCLUSION

Zoonotic diseases highlight the vital link between the health of people, animals, and the ecosystems they share. The One Health approach is vital to predict, prevent, and manage these threats through collaboration across sectors. To move ahead, we must strengthen wildlife surveillance, improve farming practices, invest in research, and enforce effective policies. Public awareness, skilled professionals, and shared data will be key to success. Working collectively under One Health, we can build a safer, healthier future for everyone.

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