Mini Review
Volume 7:3, 2023

Virology: Current Research

ISSN: 2736-657X

Open Access

Airborne Pathogens: Assessing Risks and Mitigating Spread in Indoor Environments

Zuned Beng*

Department of Clinical Virology, University of Dhaka, Dhaka, Bangladesh

Abstract

Airborne pathogens are microorganisms, such as bacteria, viruses, and fungi, that can be transmitted through the air and cause diseases in humans and other animals. These pathogens are typically carried in respiratory droplets, aerosols, or dust particles and can remain suspended in the air for varying periods, depending on factors like particle size, humidity, and ventilation. Influenza, or the flu, is caused by various strains of the influenza virus. It spreads through respiratory droplets when an infected person coughs, sneezes, or talks. Influenza viruses can also become airborne in aerosol form.

Keywords: COVID-19 • Airborne pathogens • Mutations

Introduction

Mycobacterium tuberculosis, the bacteria responsible for TB, can remain suspended in the air for extended periods. TB is primarily transmitted through the inhalation of airborne respiratory droplets containing the bacteria. The SARS-CoV-2 virus, responsible for the COVID-19 pandemic, can be transmitted through respiratory droplets and aerosols when an infected person breathes, talks, coughs, or sneezes. Several viruses, including rhinoviruses, adenoviruses, and coronaviruses, can cause the common cold. They are typically spread through respiratory droplets. Fungi like Aspergillus and Histoplasma can produce spores that become airborne and may cause respiratory infections when inhaled. Measles is a highly contagious viral infection transmitted through respiratory droplets and aerosols produced by an infected person. Vaccines can provide immunity against several airborne pathogens, reducing the risk of infection and transmission. Frequent handwashing can prevent the transfer of pathogens from contaminated surfaces to the face, where they can enter the respiratory tract. Covering your mouth and nose when coughing or sneezing and using tissues or the inside of your elbow can help reduce the release of infectious respiratory droplets [1-3].

Literature Review

Proper ventilation in indoor spaces can dilute and disperse airborne pathogens, reducing the risk of transmission. Air purification systems can also help. Healthcare workers and those in high-risk environments may use PPE such as masks, gloves, and gowns to protect against airborne pathogens. Isolating infected individuals and quarantining those exposed to the pathogen can prevent its spread. Public health agencies may implement measures such as travel restrictions, lockdowns, and social distancing to curb the spread of airborne diseases during outbreaks. Influenza viruses are indeed among the most common and highly infectious viruses worldwide, and they are primarily spread through the respiratory route, particularly through coughing and sneezing, which generates aerosols containing the virus. Among the influenza strains, Influenza A/H1N1 is one of the most prominent and can lead to millions of cases each year in the United States. Influenza viruses can be present in respiratory droplets and aerosols, allowing for easy transmission when infected individuals cough, sneeze, or even talk. These tiny airborne particles can be inhaled by individuals in close proximity to an infected person. The incubation period for influenza is relatively short, with an average of about 2 days. This means that an individual can become infected and contagious shortly after exposure to the virus, often before symptoms appear [4].

Monitoring and reporting influenza cases on global scale

Avian influenza, including subtypes H5N1, H5N2, H3N2, and H7N9, indeed poses a significant threat to both poultry industries and public health. Avian influenza viruses, especially highly pathogenic strains like H5N1, have caused substantial economic losses to the poultry and livestock industries in many countries. When outbreaks occur, infected birds must be culled to prevent further spread, resulting in massive financial losses. These avian influenza viruses have the potential to infect humans, making them zoonotic. While the primary reservoir is poultry, transmission to humans can occur through direct contact with infected birds or their environment. This poses a significant public health concern. As mentioned, since 2013, there have been numerous reported cases of humans infected with avian influenza viruses, leading to a substantial number of deaths. These cases often occur in regions where close contact between humans and poultry is common, such as in backyard farming or live poultry markets. Avian influenza viruses can undergo genetic mutations, potentially leading to the emergence of panzootic strains that can rapidly spread among birds and potentially threaten human populations. This has raised concerns among health care industries globally [5,6].

Discussion

The possibility of highly pathogenic avian influenza viruses being intentionally engineered for bioterrorism is a legitimate concern. These viruses have the potential for mass disruption and harm if misused. Timely detection and reporting of avian influenza outbreaks in poultry and wild birds are crucial for implementing control measures. Vaccinating poultry against avian influenza can be an effective preventive measure in certain cases, although it may not always be feasible on a large scale. Strict biosecurity measures on farms and in live poultry markets are essential to prevent the introduction and spread of the virus. Health care systems must be prepared to respond to potential human cases of avian influenza, with appropriate diagnostic tools and antiviral medications. Continued research on avian influenza viruses, including their genetic diversity and potential for zoonotic transmission, is crucial. The development of vaccines for both poultry and humans is a priority. Avian influenza is a global issue that requires international cooperation. Sharing data, resources, and expertise can help mitigate the risks associated with these viruses.

***Address for Correspondence:** Zuned Beng, Department of Clinical Virology, University of Dhaka, Dhaka, Bangladesh, E-mail: bana53@edu.in*

Received: 27 April, 2023, Manuscript No. Vcrh-23-109153; **Editor assigned**: 29 April, 2023, Pre QC No. P-109153; **Reviewed:** 12 May, 2023, QC No. Q-109153; **Revised:** 19 May, 2023, Manuscript No. R-109153; **Published:** 24 May, 2023, DOI: 10.37421/2736-657X.2023.7.184

Conclusion

Efforts to control avian influenza should focus on both the animal and human aspects of the disease to reduce its impact on both agriculture and public health. Additionally, vigilance and preparedness are essential to address the evolving nature of these viruses and potential bioterrorism threats. The Authority for Working Conditions (ACT) has a publication with practical guidelines as an example that clarifies and specifies a set of situations that may be considered as a reference for the ACT's action, based on the United Kingdom law “Reporting of Injuries, Diseases, and Dangerous Occurrences Regulations” because the legislation in Portugal does not have a typification for serious accidents.

Acknowledgement

We thank the anonymous reviewers for their constructive criticisms of the manuscript. The support from ROMA (Research Optimization and recovery in the Manufacturing industry), of the Research Council of Norway is highly appreciated by the authors.

Conflict of Interest

The authors declare that there was no conflict of interest in the present study.

References

1. Qudiesat, K., K. Abu-Elteen, A. Elkarmi and M. Hamad, et al. "Assessment of airborne pathogens in healthcare settings." *Afr J Microbiology Res* 3 (2009): 066-76.
2. Fronczek, Christopher F. and Jeong-Yeol Yoon. "Biosensors for monitoring airborne pathogens." *J Lab Autom* 20 (2015): 390-410.
3. Bolashikov, Zhecho Dimitrov and Arsen Krikor Melikov. "Methods for air cleaning and protection of building occupants from airborne pathogens." *Build Environ* 44 (2009): 1378-1385.
4. Herfst, Sander, Michael Böhringer, Basel Karo and Philip Lawrence, et al. "Drivers of airborne human-to-human pathogen transmission." *Curr Opin Virol* 22 (2017): 22-29.
5. Nicas, Mark, William W. Nazaroff and Alan Hubbard. "Toward understanding the risk of secondary airborne infection: Emission of respirable pathogens." *J Occup Environ Hyg* 2 (2005): 143-154.
6. Nega, Jemberu, Solomon Taye, Yihenew Million and Chaturaka Rodrigo. "Antiretroviral treatment failure and associated factors among HIV patients on first-line antiretroviral treatment in Sekota, Northeast Ethiopia." *AIDS Res Ther* 17 (2020): 1-9.

How to cite this article: Beng, Zuned. “Airborne Pathogens: Assessing Risks and Mitigating Spread in Indoor Environments.” *Virol Curr Res* 7 (2023): 184.