

Influenza: A Unique Disease

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Dear Editor-in-Chief,

Influenza, commonly known as the flu, is an infectious disease caused by an influenza virus (1). Symptoms can be mild to severe (2). The most common symptoms include: high fever, runny nose, sore throat, muscle pains, headache, coughing, sneezing, and feeling tired (1). Three of the four types of influenza viruses affect people, Type A, Type B, and Type C (3, 4). Type D has not been known to infect people, but is believed to have the potential to do so (4, 5). Usually, the virus is spread through the air from coughs or sneezes (1).

Influenza spreads around the world in yearly outbreaks, resulting in about three to five million cases of severe illness and about 250,000 to 500,000 deaths (1). About 20% of unvaccinated children, and 10% of unvaccinated adults are infected each year (6). In the northern and southern parts of the world, outbreaks occur mainly in the winter, while around the Equator, outbreaks may occur at any time of the year (1). Death occurs mostly in the young, the old, and those with other health problems (1). Larger outbreaks known as pandemics are less frequent (3).

In the 20th century, three influenza pandemics occurred: Spanish influenza in 1918 (~50 million deaths), Asian influenza in 1957 (two million deaths), and Hong Kong influenza in 1968 (one million deaths) (7). The World Health Organization (WHO) declared an outbreak of a new type of influenza A (H1N1) to be a pandemic in June 2009 (8). Influenza may also affect other animals, including pigs, horses, and birds (9).

Key Words: Children, Death, Influenza, Pregnant women, Vaccine, World.

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The pathogen

There are 4 types of seasonal influenza viruses, types A, B, C and D. Influenza A and B viruses circulate and cause seasonal epidemics of disease.

- Influenza A viruses are further classified into subtypes according to the combinations of the hemagglutinin (HA), and the neuraminidase (NA), the proteins on the surface of the virus. Currently circulating in humans are subtype A(H1N1), and A(H3N2) influenza viruses. The A(H1N1) is also written as A(H1N1)pdm09 as it caused the pandemic in 2009, and subsequently replaced the seasonal influenza A(H1N1) virus which had circulated prior to 2009. Only influenza type A viruses are known to have caused pandemics.

- Influenza B viruses are not classified into subtypes, but can be broken down into lineages. Currently circulating influenza type B viruses belong to either B/Yamagata or B/Victoria lineage.

- Influenza C virus is detected less frequently and usually causes mild infections, thus does not present public health importance.

- Influenza D viruses primarily affect cattle and are not known to infect or cause illness in people.

These viruses are only distantly related to the human parainfluenza viruses, which are RNA viruses belonging to the paramyxovirus family that are a common cause of respiratory infections in children such as croup (10), but can also cause a disease similar to influenza in adults (11).

Signs and symptoms

Seasonal influenza is characterized by a sudden onset of fever, cough (usually dry), headache, muscle and joint pain, severe malaise (feeling unwell), sore throat and a runny nose. The cough can be severe and

can last 2 or more weeks. Most people recover from fever and other symptoms within a week without requiring medical attention. But influenza can cause severe illness or death especially in people at high risk. Illnesses range from mild to severe and even death. Hospitalization and death occur mainly among high risk groups. Worldwide, these annual epidemics are estimated to result in about 3 to 5 million cases of severe illness, and about 290 000 to 650 000 respiratory deaths.

In industrialized countries most deaths associated with influenza occur among people age 65 or older (12). Epidemics can result in high levels of worker/school absenteeism and productivity losses. Clinics and hospitals can be overwhelmed during peak illness periods. The effects of seasonal influenza epidemics in developing countries are not fully known, but research estimates that 99% of deaths in children under 5 years of age with influenza related lower respiratory tract infections are found in developing countries (13).



Prevention

The most effective way to prevent the disease is vaccination. Safe and effective vaccines are available and have been used for more than 60 years. Immunity from vaccination wanes over time so annual vaccination is recommended to protect against influenza. Injected inactivated influenza vaccines are most commonly used throughout the world. Among healthy adults, influenza vaccine provides protection, even when circulating viruses do not exactly match the vaccine

viruses. However, among the elderly, influenza vaccination may be less effective in preventing illness but reduces severity of disease and incidence of complications and deaths. Vaccination is especially important for people at high risk of influenza complications, and for people who live with or care for the people at high risk.

WHO recommends annual vaccination for:

- Pregnant women at any stage of pregnancy
- Children aged between 6 months to 5 years
- Elderly individuals (aged more than 65 years)
- Individuals with chronic medical conditions
- Health-care workers.

Pre-exposure or post-exposure prophylaxis with antivirals is possible but depends on several factors e.g. individual factors, type of exposure, and risk associated with the exposure. Apart from vaccination and antiviral treatment, the public health management includes personal protective measures like:

- Regular hand washing with proper drying of the hands
- Good respiratory hygiene – covering mouth and nose when coughing or sneezing, using tissues and disposing of them correctly
- Early self-isolation of those feeling unwell, feverish and having other symptoms of influenza
- Avoiding close contact with sick people
- Avoiding touching one’s eyes, nose or mouth (14-17) (**Figure.1**).



Fig.1: Prevention Pictures to avoid getting flu (18).

Epidemiology

All age groups can be affected, but there are groups that are more at risk than others.

- People at greater risk of severe disease or complications when infected are: pregnant women, children under 59 months, the elderly, and individuals with chronic medical conditions (such as chronic cardiac, pulmonary, renal, metabolic, neurodevelopmental, liver or hematologic diseases), and individuals with immunosuppressive conditions (such as human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS), receiving chemotherapy or steroids, or malignancy).
- Health care workers are at high risk acquiring influenza virus infection due to increased exposure to the patients and risk further spread particularly to vulnerable individuals.

In terms of transmission, seasonal influenza spreads easily, with rapid transmission in crowded areas including schools and nursing homes. When an infected person coughs or sneezes, droplets containing viruses (infectious droplets) are dispersed into the air and can spread up to one meter, and infect persons in close proximity who breathe these droplets in. The virus can also be spread by hands contaminated with influenza viruses.

To prevent transmission, people should cover their mouth and nose with a tissue when coughing, and wash their hands regularly. In temperate climates, seasonal epidemics occur mainly during winter, while in tropical regions, influenza may occur throughout the year, causing outbreaks more irregularly. The time from infection to illness, known as the incubation period, is about 2 days, but ranges from one to four days (12, 13, 19, 20).

Diagnosis

The majority of cases of human influenza are clinically diagnosed. However, during periods of low influenza activity and outside of epidemics situations, the infection of other respiratory viruses e.g. rhinovirus, respiratory syncytial virus, parainfluenza and adenovirus can also present as Influenza-like Illness (ILI) which makes the clinical differentiation of influenza from other pathogens difficult. Collection of appropriate respiratory samples and the application of a laboratory diagnostic test is required to establish a definitive diagnosis. Proper collection, storage and transport of respiratory specimens is the essential first step for laboratory detection of influenza virus infections. Laboratory confirmation of influenza virus from throat, nasal and nasopharyngeal secretions or tracheal aspirate or washings is commonly performed using direct antigen detection, virus isolation, or detection of influenza-specific RNA by reverse transcriptase-polymerase chain reaction (RT-PCR). Various guidance on the laboratory techniques is published and updated by WHO. Rapid influenza diagnostic tests (RIDTs) are used in clinical settings, but they have lower sensitivity compared to RT-PCR methods and their reliability depends largely on the conditions under which they are used (21-24).

Treatment

People with the flu are advised to get plenty of rest, drink plenty of liquids, avoid using alcohol and tobacco and, if necessary, take medications such as acetaminophen (paracetamol) to relieve the fever and muscle aches associated with the flu. They are also advised to avoid close contact with others to prevent spread of infection (25, 26). Children and teenagers with flu symptoms (particularly fever) should avoid taking aspirin during an influenza infection (especially influenza type B), because doing so can lead

to Reye's syndrome, a rare but potentially fatal disease of the liver (27). Since influenza is caused by a virus, antibiotics have no effect on the infection; unless prescribed for secondary infections such as bacterial pneumonia. Antiviral medication may be effective, if given early (within 48 hours to first symptoms), but some strains of influenza can show resistance to the standard antiviral drugs and there is concern about the quality of the research (28). High-risk individuals such as young children, pregnant women, the elderly, and those with compromised immune systems should visit the doctor for antiviral drugs. Those with the emergency warning signs should visit the emergency room at once (29).

CONCLUSION

In the temperate zone of the northern hemisphere influenza activity continued to increase slowly. In North America influenza activity remained elevated overall with influenza A(H1N1)pdm09 predominating. In Europe, influenza activity continued to increase, with both A viruses circulating. In North Africa, influenza A (H3N2) detections continued to be reported in Egypt. In Western Asia, influenza activity continued to increase in some countries and appeared to decrease across countries of the Arabian Peninsula. In East Asia, influenza activity continued to increase, with influenza A (H1N1)pdm09 most frequently detected. In Southern Asia, influenza detections remained elevated overall. Influenza activity continued to increase in Iran (Islamic Republic of) with influenza A(H3N2) the predominant circulating virus. In the temperate zones of the southern hemisphere, influenza activity returned to interseasonal levels with exception of some parts in Australia. Worldwide, seasonal influenza A viruses accounted for the majority of detections (29-34).

CONFLICT OF INTEREST: None.

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