Overview

Pneumonia is a form of acute respiratory infection that affects the lungs. The lungs are made up of small sacs called alveoli, which fill with air when a healthy person breathes. When an individual has pneumonia, the alveoli are filled with pus and fluid, which makes breathing painful and limits oxygen intake.

Pneumonia is the single largest infectious cause of death in children worldwide. Pneumonia killed 740 180 children under the age of 5 in 2019, accounting for 14% of all deaths of children under 5 years old but 22% of all deaths in children aged 1 to 5 years. Pneumonia affects children and families everywhere, but deaths are highest in southern Asia and sub-Saharan Africa. Children can be protected from pneumonia, it can be prevented with simple interventions, and it can be treated with low-cost, low-tech medication and care.

Causes

Pneumonia is caused by several infectious agents, including viruses, bacteria and fungi. The most common are the following.

- *Streptococcus pneumoniae* is the most common cause of bacterial pneumonia in children.
- *Haemophilus influenzae* type b (Hib) is the second most common cause of bacterial pneumonia.
- Respiratory syncytial virus is the most common viral cause of pneumonia.
- In infants infected with HIV, *Pneumocystis jiroveci* is one of the most common causes of pneumonia, responsible for at least one quarter of all pneumonia deaths in HIV-infected infants.

Transmission

Pneumonia can be spread in several ways. The viruses and bacteria that are commonly found in a child's nose or throat can infect the lungs if they are inhaled. They may also spread via air-borne droplets from a cough or sneeze. In addition, pneumonia may spread through blood, especially during and shortly after birth. More research needs to be done on the different pathogens causing pneumonia and the

ways they are transmitted, as this is of critical importance for treatment and prevention.

Presenting features

The presenting features of viral and bacterial pneumonia are similar. However, the symptoms of viral pneumonia may be more numerous than the symptoms of bacterial pneumonia. In children under 5 years of age who have cough and/or difficult breathing, with or without fever, pneumonia is diagnosed by the presence of either fast breathing or lower chest wall indrawing where their chest moves in or retracts during inhalation (in a healthy person, the chest expands during inhalation). Wheezing is more common in viral infections.

Very severely ill infants may be unable to feed or drink and may also experience unconsciousness, hypothermia and convulsions.

Risk factors

While most healthy children can fight the infection with their natural defences, children whose immune systems are compromised are at higher risk of developing pneumonia. A child's immune system may be weakened by malnutrition or undernourishment, especially in infants who are not exclusively breastfed.

Pre-existing illnesses, such as symptomatic HIV infections and measles, also increase a child's risk of contracting pneumonia.

The following environmental factors also increase a child's susceptibility to pneumonia:

- indoor air pollution caused by cooking and heating with biomass fuels (such as wood or dung)
- living in crowded homes
- parental smoking.

Treatment

Pneumonia should be treated with antibiotics. The antibiotic of choice for first line treatment is amoxicillin dispersible tablets. Most cases of pneumonia require oral antibiotics, which are often prescribed at a health centre. These cases can also be diagnosed and treated with inexpensive oral antibiotics at the community level by trained community health workers. Hospitalization is recommended only for severe cases of pneumonia.

Prevention

Preventing pneumonia in children is an essential component of a strategy to reduce child mortality. Immunization against Hib, pneumococcus, measles and whooping cough (pertussis) is the most effective way to prevent pneumonia.

Adequate nutrition is key to improving children's natural defences, starting with exclusive breastfeeding for the first 6 months of life. In addition to being effective in preventing pneumonia, it also helps to reduce the length of the illness if a child does become ill.

Addressing environmental factors such as indoor air pollution (by providing affordable clean indoor stoves, for example) and encouraging good hygiene in crowded homes also reduces the number of children who fall ill with pneumonia.

In children infected with HIV, the antibiotic cotrimoxazole is given daily to decrease the risk of contracting pneumonia.

WHO response

The WHO and UNICEF integrated Global Action Plan for Pneumonia and Diarrhoea (GAPPD) aims to accelerate pneumonia control with a combination of interventions to protect, prevent and treat pneumonia in children with actions to:

- **protect** children from pneumonia, including promoting exclusive breastfeeding and adequate complementary feeding;
- **prevent** pneumonia with vaccinations, hand washing with soap, reducing household air pollution, HIV prevention and cotrimoxazole prophylaxis for HIV-infected and exposed children;

- **treat** pneumonia focusing on making sure that every sick child has access to the right kind of care – either from a community-based health worker, or in a health facility if the disease is severe – and can get the antibiotics and oxygen they need to get well.

Several countries including Bangladesh, India, Kenya, Uganda and Zambia have developed district, state and national plans to intensify actions for the control of pneumonia and diarrhoea. Many more have integrated diarrhoea and pneumonia specific action into their national child health and child survival strategies.

Effective diagnosis and treatment of pneumonia is critical to improve child survival. To meet the Sustainable Development Goal targets for SDG 3.2.1 (reducing child mortality), ending preventable diarrhoea- and pneumonia-related deaths is an urgent priority.