

Acute respiratory infection in children: a rising concern, effort, challenges, and future recommendations

Abstract

Acute respiratory infections in children have emerged as a growing concern in recent years, prompting intensified efforts in understanding, prevention, and management. This commentary delves into the challenges posed by these infections, the efforts undertaken to address them, and potential future recommendations to mitigate their impact on pediatric health. With an emphasis on early detection, vaccination, and hygiene practices, the discourse highlights the need for a comprehensive and multi-faceted approach to safeguard the well-being of the young population.

Volume 7 Issue 4 - 2023

Majani Edward,¹ Emele Arthur Hayford,²
Antonio Yayrator Korkuvi³

¹St. Francis University College of Health and Allied Sciences, Tanzania

²Accra Technical University, Ghana

³University of Ghana, Ghana

Correspondence: Majani Edward, St. Francis University College of Health and Allied Sciences, Tanzania, Email majanimedwar@gmail.com

Received: June 30, 2023 | **Published:** August 21, 2023

Introduction

Acute respiratory infection in children is an acute infection of the airway that is the passage from the ears, nose, throat, and airway to the lung. It's among the leading cause of hospitalization and death in young children especially children under 5 years and it's a common disease, children may present with a cough which may or may not be accompanied by fever for less than 30 days, a sore throat, runny nose, stuffy nose, and wheezing.¹

Epidemiological profile of acute respiratory infections (ARIs)

The study of the patterns and elements of ARIs, affecting the human population as well as tracking certain recurrent dependency factors is crucial in eliminating disease conditions. The prevalence of ARIs, one of the top five childhood killer diseases is determined individually or collectively by a host of factors which are either determined by the host or the environment.²

The World Health Organization places respiratory infectious diseases at the top of the list for disease burden as assessed by the number of years lost to illness or impairment. Lower Respiratory Tract infections are the third largest cause of death globally in children even though it occasionally ranks first in Low and Middle-Income countries. Many estimates both internationally and nationally have cited acute respiratory infections as a primary cause of ambulatory consultations, hospitalizations, and mortalities and they constitute the bulk of cases of morbidity and mortality among children under the age of 5 years in developing countries. Mortality in developing countries is 2-6 times higher in these less developed countries than in developed countries. The paucity of information as regards ARIs exists due to the low economic status of African countries.³

The seasonal manifestation and high infectivity of viruses rank these pathogens (viruses) as the major cause of acute respiratory infections accounting for 20% of neonatal deaths. Estimates from studies of infants under 5 years reveal that one-third of the mortalities, 30-40% of the attendance in the outpatient units, and 20-30% of hospital admissions are ARIs. Respiratory Syncytial Virus (RSV) and influenza virus are the most common viruses accounting for 9.5% of

these neonatal mortalities. The involvement of viruses in pediatric respiratory pathology has been confirmed by advancements in viral diagnosis, with frequencies ranging from 50% to 90% depending on the site of infectivity.^{2,3}

Determinants and risk factors of acute respiratory infection (ARI) in children

Globally, undernutrition is regarded to be the most common cause of the immune deficiency. Due to an inadequate diet, some immune system elements in children are not working effectively. It is impossible to completely prevent disease-causing microbes, viruses, and parasites from entering the body through the skin and digestive tract. Other immune system organs begin to malfunction, and the thymus, a gland in the neck that helps in the formation of T cells that fight disease, decreases. Undernourished children are therefore more susceptible to developing illnesses that they are exposed to in their environment and would otherwise be able to defend themselves against. Malnutrition can therefore be said to be a major determinant and risk factor of Acute Respiratory Infection among children. Of the risk factors identified in a study among children under five years attending the Bamenda Regional Hospital in Cameroon, malnutrition was found to be significant with an odds ratio of 3.01.⁴

Socio-demographic factors such as age are also known to be a risk factor for ARI in children. In a study to conduct Analysis of risk factors associated with acute respiratory infections among under-five children in Uganda, children younger than 1 year old showed a higher risk of having ARI disease symptoms than children aged 48-59 months.⁵

The risk of an ARI was higher in children from mothers with only an elementary education or no education than in children from mothers with higher levels of education (secondary education and above) in a study of Social, economic, and environmental risk factors for acute lower respiratory infections among children under five years of age in Rwanda.⁶ This is most likely a result of the fact that kids spend more time with their mothers and that the mother's educational background will have an impact on the child's quality of care as well as a range of social and environmental factors.

Ways in mitigating the burden of acute respiratory infection

The World Health Organization (WHO) has recognized reducing the morbidity and mortality brought on by ARI, especially ALRTI (Acute Lower Respiratory Tract Infection), as one of its top priorities. The most significant risk factor for ARI mortality, poverty, cannot be treated with medical procedures. Antimicrobials (typically a brief course of trimethoprim-sulfamethoxazole) are given to children in many developing countries who have ALRTIs based on the presence of tachypnea and retractions. This strategy has somewhat reduced ALRTI mortality rates in some areas. The creation of vaccinations against the substances that cause respiratory infections, however, represents the best chance for successful medical interventions. The polysaccharide-protein conjugate vaccines against Hib are effective in developing nations as well. In developed nations that routinely immunize children with these vaccines, Hib has been all but eradicated. The WHO intends to sponsor a clinical trial of the effectiveness of one of these multivalent polysaccharide-protein conjugate vaccines against *S. pneumoniae* in a developing nation. Similar vaccines that are effective against *S. pneumoniae* are being developed.⁷

The vaccines that will be tested will be different from those that are being tested in wealthy nations due to the differences in the serotypes that frequently cause infections in developing countries. Additionally, there is interest in a strategy to protect young infants by immunizing their mothers with vaccines against *S. pneumoniae* and/or Hib during pregnancy because the highest case-fatality rates from bacterial ALRTI occur in young infants (and primary immunization, even with the new vaccines, cannot be completed until at least 4 to 6 months of age). As a result, the antibodies from the mothers would be transferred across the placenta, giving the infants immunity. Another top priority is the creation of vaccinations against some of the viruses that frequently cause severe ARI. Unfortunately, a lack of financial resources and inadequate infrastructure for vaccine delivery makes it difficult for impoverished nations to undertake vaccination programs. Vaccines against the measles and influenza virus, two of the main causes of acute ARI, are currently available, but they are not frequently utilized in many underdeveloped nations due to a lack of funding.

Pneumonia is the most common infectious disease that kills children under the age of five worldwide, accounting for 15% of all under-five fatalities. Around 800,000 kids under the age of five pass away from pneumonia each year, but many of these deaths may be avoided with prompt diagnosis and treatment. Pneumonia is frequently misdiagnosed for other febrile illnesses like malaria or tuberculosis, which delays life-saving treatment. Accurate diagnosis is difficult to achieve. The World Health Organization (WHO) recommends counting the respiratory rate (RR) for diagnosing pneumonia in places without access to sophisticated hospital equipment. It can be challenging to count breaths in children, though. The RR can change based on the setting and counting procedure, which gives room for human mistake, which frequently results in incorrect diagnosis. In addition, there is no agreed-upon definition of a breath, making it impossible to confirm whether a breath has been appropriately counted. Counting frequently does not take place. A tool to facilitate the assessment of children with pneumonia could standardize and simplify the work of frontline community health professionals. Providing them with an enhanced diagnostic tool can enable them to deliver prompt, effective therapy.⁸

Conclusion

In conclusion, the gravity of acute respiratory infections in children demands not only immediate attention but also sustained and holistic

efforts. The vulnerability of the pediatric population, coupled with the evolving nature of infectious agents, requires a dynamic response that adapts to changing circumstances. To achieve this, healthcare systems must prioritize early detection and timely intervention. Pediatricians and healthcare providers should receive specialized training to recognize subtle signs of respiratory infections in children, ensuring that appropriate measures are taken promptly. This proactive approach can significantly reduce the severity of illnesses and prevent complications.

Equally important is the collaboration between governments, non-governmental organizations, and global health bodies. Policies that support vaccination campaigns, promote hygiene education, and enhance healthcare infrastructure are essential. By fostering a sense of shared responsibility, the collective efforts can create a resilient defense against the increasing burden of respiratory infections in children. Furthermore, researchers must continue to explore innovative solutions. Advances in diagnostics, such as rapid and accurate point-of-care tests, can aid in quick identification of infections, allowing for timely isolation and treatment. The development of broad-spectrum antiviral medications and next-generation vaccines that provide cross-protection against multiple respiratory pathogens holds promise in reducing the impact of these infections.

In the face of these challenges, we must embrace a proactive and forward-looking approach. By staying informed, supporting research, advocating for policy changes, and prioritizing the health of our children, we can effectively address the rising concern of acute respiratory infections. Ultimately, the future recommendations underscore the need to create a resilient and adaptable healthcare ecosystem that safeguards the well-being of our most precious asset.

Acknowledgments

None.

Conflicts of interest

The author declares there is no conflict of interest.

References

1. *What is acute respiratory infection in children?* | VINMEC.
2. Chen J, Hu P, Zhou T, et al. Epidemiology and clinical characteristics of acute respiratory tract infections among hospitalized infants and young children in Chengdu, West China, 2009–2014. *BMC Pediatrics*. 2018;18(1):216.
3. Avendaño Carvajal L, Perret Pérez C. Epidemiology of Respiratory Infections. *Pediatric Respiratory Diseases*. 2020;263–272.
4. Tazinya AA, Halle-Ekane GE, Mbuagbaw LT, et al. Risk factors for acute respiratory infections in children under five years attending the Bamenda Regional Hospital in Cameroon. *BMC Pulm Med*. 2018;18(1):7.
5. Nshimiyimana Y, Zhou Y. Analysis of risk factors associated with acute respiratory infections among under-five children in Uganda. *BMC Public Health*. 2022;22(1):1209.
6. Harerimana JM, Nyirazinyoye L, Thomson DR, et al. Social, Economic and environmental risk factors for acute lower respiratory infections among children under five years of age in Rwanda. *Archives of Public Health*. 2016;74(1):19.
7. MD Eugene D Shapiro. Epidemiology of Acute Respiratory infections. *Seminars in Pediatric Infectious Diseases*. 1998;9(1):31–36.
8. Arida (Acute Respiratory Infection diagnostic aid) (no date) UNICEF Office of Innovation & nbsp.