GUEST EDITORIAL

Childhood pneumonia in the context of COVID-19: Updated South African guidelines

The SARS-CoV-2 pandemic has highlighted the importance of viral respiratory infections as a cause of mortality and morbidity. Fortunately, children across the world have lower rates of COVID-19 (disease caused by SARS-CoV-2) than adults, developing predominantly asymptomatic or mild disease.[1-3] In South Africa (SA), <5% of COVID-19 cases have been diagnosed in children, with few requiring hospitalisation and even fewer requiring intensive care.[4] Even in children with underlying comorbidities, COVID-19 does not seem to be especially severe, similar to the global experience. Although children in low- and middle-income countries have a higher burden of pneumonia and severe disease from viral and bacterial pathogens, this pattern is not apparent with SARS-CoV-2.

In contrast, childhood pneumonia from other pathogens remains the most common cause of death in children aged <5 years outside the neonatal period, with almost 800 000 deaths in 2018.[5,6] With improved socioeconomic and living conditions, strengthened strategies to prevent or manage paediatric HIV and immunisation with pneumococcal conjugate vaccine (PCV) and *Haemophilus influenzae* type b conjugate vaccine (Hib), the incidence of pneumonia has declined substantially, and there has been a change in the relative contribution of different pathogens in the pathogenesis of pneumonia. Nevertheless, even among HIV-negative children, pneumonia remains common, although the case fatality risk is declining. Further, pneumonia, particularly recurrent during early childhood, can lead to lung function impairment, setting children on a trajectory for the development of chronic respiratory disease through the life course.[7]

In SA, pneumonia accounts for ~320 000 cases and >4 000 deaths in children aged <5 years annually, and continues to be a major cause of childhood morbidity and mortality.[5] Since 2000, the incidence of childhood pneumonia has declined by ~50%, with even larger reductions in HIV-associated pneumonia.[6] Improved immunisation regimens, strengthening of HIV programmes with reductions in perinatal HIV transmission (but increasing prevalence of HIV-exposed uninfected (HEU) children), better socioeconomic conditions and new preventive strategies have contributed to the changes in epidemiology of childhood pneumonia. In addition, improved diagnostic methods and better sampling strategies have enabled more accurate characterisation of the pathogenesis and aetiology of childhood pneumonia, including the role of co-infections, especially in severe disease. Non-typable *H. influenzae* and *Staphylococcus aureus* are now the most important bacterial pathogens, while respiratory syncytial virus (RSV) is the major viral cause of childhood pneumonia.[8,9] *Mycobacterium tuberculosis* is common in the pathogenesis of acute pneumonia in SA, and its role is largely under-recognised.[8]

Given these changes, the SA guidelines for pneumonia in children aged <5 years have been revised to provide updated recommendations on management and prevention. Seven expert subgroups revised the 2005 SA guideline, focusing on: (*i*) epidemiology; (*ii*) aetiology; (*iii*) diagnosis; (*iv*) antibiotic management and supportive therapy; (*v*) management in intensive care; (*vi*) prevention; and (*vii*) considerations in children living with HIV, or HEU children. Each subgroup reviewed and graded the published evidence using the British Thoracic Society grading system. This edition of *SAMJ* contains CME articles summarising the key revisions in epidemiology and aetiology,[10] and diagnosis;[11] CME articles on management and prevention will follow.

A key issue is distinguishing children who have bacterial pneumonia from those with viral illness. Pneumonia comprises a spectrum of lower respiratory tract infection, with clinical features dependent on the aetiological pathogen/s, host response and underlying susceptibility to illness. Distinguishing bacterial from viral infection is difficult, especially in the context of co-infections.[12] It should be remembered that in young infants with cough and fast breathing, and wheezing or chest hyperinflation, this condition is commonly acute viral bronchiolitis and seldom requires antibiotic therapy. There is no definitive laboratory test that reliably distinguishes bacterial pneumonia, although C-reactive protein (CRP) concentrations ≥40 mg/L with radiological confirmation of pneumonia are suggestive of bacterial pneumonia.[13] Given the changes in aetiology in SA,[8,9] with expanded immunisation programmes, new recommendations for empirical antibiotic treatment of severe pneumonia now include co-amoxicillin-clavulanate. For ambulatory illness, high-dose amoxicillin remains the antibiotic of choice.

Pneumonia deaths are largely preventable with available interventions. Key risk factors for pneumonia or for severe disease encompass child, maternal, environmental and health-system factors, many of which can be ameliorated. Malnutrition, prematurity, lack of breastfeeding, HIV infection or exposure, crowded living conditions, poverty, tobacco smoke or air pollution exposure are important determinants. Health-system factors include lack of timely access to effective preventive (such as immunisation) or management strategies. Indeed, many childhood pneumonia deaths still occur outside a health facility. New preventive interventions for RSV in young infants are promising, predominantly maternal immunisation in pregnancy or new long-acting monoclonal antibody formulations given prior to the RSV season.[14]

While much progress has been made in SA to reduce the burden of childhood pneumonia, further strengthening of effective prevention, promotion and disease control strategies is needed to attain the global targets for pneumonia mortality among children, i.e. 3 deaths per 1 000 live births, and HiB3, diphtheria-tetanus-pertussis (DPT3) or PCV3 uptake of 90% by 2025.[15] The revised SA guidelines provide updated guidance for improved management and prevention of childhood pneumonia, in the context of COVID-19 and beyond.

Heather J Zar
Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital and Faculty of Health Sciences, University of Cape Town; and South African Medical Research Council Unit on Child and Adolescent Health, University of Cape Town, South Africa
heather.zar@uct.ac.za

Robin J Green
Department of Paediatrics and Child Health, Faculty of Health Sciences, University of Pretoria, South Africa

Shabir A Madhi
South African Medical Research Council Vaccine and Infectious Diseases Analytics Unit, University of the Witwatersrand, Johannesburg; and Department of Science and Technology/National Research Foundation: South African Research Chair in Vaccine Preventable Diseases, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

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