

Neonatal Sepsis

A Major Global Public Health Challenge

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Neonatal mortality is increasingly recognized as an important global public health challenge that must be addressed if we are to reduce child health disparities between rich and poor countries.¹ Most of the estimated 4 million neonatal deaths per year occur in low and middle income countries.¹ Three conditions: infection, birth asphyxia, and consequences of premature birth/low birth weight, are responsible for majority of these deaths. More than one-third are estimated to be due to severe infections, and a quarter are due to the clinical syndrome of neonatal sepsis/pneumonia. Case fatality rates for neonatal infections remain high among both hospitalized newborns and those in the community.^{1,2} In general, the identification and treatment of newborns with infection is unsatisfactory in many developing country settings. Because sick newborns present with nonspecific signs and symptoms, a clinical diagnosis of neonatal sepsis is difficult in even the most sophisticated settings. Many factors contribute to the high mortality due to infections, including under-recognition of illness, delay in care seeking at the household level, and lack of access to both appropriately trained health workers and to high quality services to manage sepsis. Even if quality services are available, the cost of treatment is beyond the reach of many families. It is particularly poignant that many neonatal deaths occur in the community, without the newborn ever having contact with the appropriate health services.

At the turn of this new century, leaders throughout the world committed to working together to meet Eight Millennium Development Goals related to poverty reduction, expanded educational opportunities, gender equality, environmental sustainability, and improved health. Without addressing the causes of neonatal mortality and developing improved strategies for prevention, diagnosis and treatment, it will be impossible to meet Millennium Development Goal 4—to reduce child mortality by two-thirds between 1990 and 2015. Over the past several years, attempts have been made to raise awareness of the contribution of neonatal problems to overall infant mortality^{3,4} and to promote strategies to reduce mortality at the country level. Sixteen evidence-based cost-effective interventions have been identified to reduce neonatal mortality, during the preconception, antenatal, intrapartum and postnatal periods.⁵ Included among these is community-based case management of pneumonia. The evidence for effectiveness of community-based interventions for management of neonatal sepsis is less widely accepted.^{6,7}

The purpose of this supplement is to evaluate available evidence on the burden of disease, etiology, antimicrobial resistance, and potential options for management of neonatal sepsis at the community level. The first 3 papers in this supplement resulted from a comprehensive review of the literature on neonatal sepsis commissioned by the Department of Child and Adolescent Health and Development, World Health Organization (WHO). Thaver and Zaidi⁸ report the findings from a review of community-based studies from developing countries to estimate rates of infections and infection-specific mortality. It is clear from this review that data from developing countries are limited in both quality and quantity. Zaidi et al⁹ review information about pathogens associated with neonatal sepsis in developing countries. Community-based data are almost completely lacking for the early neonatal period (ie, newborns in the first week of life). Most published data are from hospitals where *Klebsiella* species, *E. coli*, and *Staphylococcus aureus* are the most common causes of infection. Antimicrobial resistance patterns of neonatal pathogens are reported in another paper by Thaver et al¹⁰ These authors cite concerns about the emerging resistance of *Klebsiella* and *E. coli* to commonly used antibiotics. Although community-based data were scarce, lower antimicrobial resistance levels in the community are encouraging. Bhutta et al¹¹ reviewed case management approaches for neonatal sepsis in the community settings of low resource countries. Despite limitations, these approaches hold promise for reducing neonatal mortality in such settings. In 2 papers, Darmstadt et al^{12,13} describe available data on use of oral and injectable antibiotics for the management of neonatal sepsis. They present advantages and disadvantages of various antibiotics

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and discuss some potential choices for simplified antibiotic regimens for the management of neonatal sepsis. Finally, Bahl et al¹⁴ using the Child and Nutrition Research Initiative (CHNRI) process for identifying priority areas for neonatal sepsis, report that management of neonatal infections in community settings is identified as a priority. Of note however, most top ranked priorities are related to health systems and policy research, perhaps due to limited progress in reducing neonatal mortality.

It is no longer possible to overlook the important contribution of neonatal mortality to overall infant survival. To reduce neonatal mortality caused by infections, we must make a strong case for investment in expanded surveillance activities and in further research on diagnosis, etiology, and optimal management of neonatal sepsis at all levels of the health system, particularly at the community level. High quality data are needed to make policy decisions that can help reduce neonatal mortality. National and international donors must be convinced to invest in research and improved health service delivery at country and global levels. The papers presented in this supplement provide a good basis for initiating this process.

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