ABSTRACTS FROM CURRENT LITERATURE

Antibiotic-Resistant bacteremia in young children hospitalized with pneumonia in Bangladesh is associated with a high mortality rate

Chisti MJ, Harris JB, Carroll RW, Shahunja KM, Shahid ASMSB, Moschovis PP, et al. Open Forum Infect Dis 2021;**8**:ofab260.

Background: Pneumonia is a leading cause of sepsis and mortality in children under 5 years. However, our understanding of the causes of bacteremia in children with pneumonia is limited.

Methods: We characterized risk factors for bacteremia and death in a cohort of children admitted to the Dhaka Hospital of the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) between 2014 and 2017 with radiographically confirmed pneumonia.

Results: A total of 4007 young children were hospitalized with pneumonia over the study period. A total of 1814 (45%) had blood cultures obtained. Of those, 108 (6%) were positive. Gram-negative pathogens predominated, accounting for 83 (77%) of positive cultures. These included *Pseudomonas* (N = 22), *Escherichia coli* (N = 17), *Salmonella enterica* (N = 14, including 11 *Salmonella* Typhi), and *Klebsiella pneumoniae* (N = 11). Gram-positive pathogens included Pneumococcus (N = 7) and *Staphylococcus aureus* (N = 6). Resistance to all routinely used empiric antibiotics (ampicillin, gentamicin, ciprofloxacin, and ceftriaxone) for children with pneumonia at the icddr,b was observed in 20 of the 108 isolates. Thirty-one of 108 (29%) children with bacteremia died, compared to 124 of 1706 (7%) who underwent culture without bacteremia (odds ratio [OR], 5.1; 95% confidence interval [CI], 3.3-8.1; $P < .001$). Children infected with bacteria resistant to all routinely used empiric antibiotics were at greater risk of death compared to children without bacteremia (OR, 17.3; 95% CI, 7.0-43.1; $P < .001$).

Conclusions: Antibiotic-resistant Gram-negative bacteremia in young children with pneumonia in Dhaka, Bangladesh was associated with a high mortality rate. The pandemic of antibiotic resistance is shortening the lives of young children in Bangladesh, and new approaches to prevent and treat these infections are desperately needed.

Antibiotic use for acute respiratory infections among under-5 children in Bangladesh: a population-based survey

Hassan MZ, Monjur MR, Biswas MAAJ, Chowdhury F, Braithwaite J, et al. BMJ Global Health 2021;6:e004010.

Introduction: Despite acute respiratory infections (ARIs) being the single largest reason for antibiotic use in under-5 children in Bangladesh, the prevalence of antibiotic use in the community for an ARI episode and factors associated with antibiotic use in this age group are unknown.

Methods: We analysed nationally representative, population-based, household survey data from the Bangladesh Demographic and Health Survey 2014 to determine the prevalence of antibiotic use in the community for ARI in under-5 children. Using a causal graph and multivariable logistical regression, we then identified and determined the sociodemographic and antibiotic source factors significantly associated with the use of antibiotics for an episode of ARI.

Results: We analysed data for 2 144 children aged <5 years with symptoms of ARI from 17 300 households. In our sample, 829 children (39%) received antibiotics for their ARI episode (95% CI 35.4% to 42.0%). Under-5 children from rural households were 60% (adjusted OR (aOR): 1.6; 95% CI 1.2 to 2.1) more likely to receive antibiotics compared with those from urban households, largely driven by prescriptions from unqualified or traditional practitioners. Private health facilities were 50% (aOR: 0.5; 95% CI 0.3 to 0.7) less likely to be sources of antibiotics compared with public health facilities and non-governmental organisations. Age of children, sex of children or household wealth had no impact on use of antibiotics.

Conclusion: In this first nationally representative analysis of antibiotic use in under-5 children in Bangladesh, we found almost 40% of children received antibiotics for an ARI episode. The significant prevalence of antibiotic exposure in under-5 children supports the need for coordinated policy interventions and implementation of clinical practice guidelines at point of care to minimise the adverse effects attributed to antibiotic overuse.

Antimicrobial resistance in shigellosis: A surveillance study among urban and rural children over 20 years in Bangladesh

Nuzhat S, Das R, Das S, Islam SB, Palit P, Haque MA, et al. PLoS ONE 17(11): e0277574.

Antimicrobial resistance against shigellosis is increasingly alarming. However, evidence-based knowledge gaps regarding the changing trends of shigellosis in Bangladesh exist due to the scarcity of longitudinal data on antimicrobial resistance. Our study evaluated the last 20 years antimicrobial resistance patterns against shigellosis among under-5 children in the urban and rural sites of Bangladesh. Data were extracted from the Diarrheal Disease Surveillance System (DDSS) of Dhaka Hospital (urban site) and Matlab Hospital (rural site) of the International Centre for Diarrheal Disease Research, Bangladesh (icddr,b) between January 2001 and December 2020. We studied culture-confirmed shigellosis cases from urban Dhaka Hospital (n = 883) and rural Matlab Hospital (n = 1263). Since 2001, a declining percentage of shigellosis in children observed in urban and rural sites. Moreover, higher isolation rates of *Shigella* were found in the rural site [1263/15684 (8.1%)] compared to the urban site [883/26804 (3.3%)] in the last 20 years. In both areas, *S. flexneri* was the predominant species. The upward trend of *S. sonnei* in both the study sites was statistically significant after adjusting for age and sex. WHO-recommended 1st line antibiotic ciprofloxacin resistance gradually reached more than 70% in both the urban and rural site by 2020. In multiple logistic regression after adjusting for age and sex, ciprofloxacin, azithromycin, mecillinam, ceftriaxone, and multidrug resistance (resistance to any two of these four drugs) among under-5 children were found to be increasing significantly ($p<0.01$) in the last 20 years in both sites. The study results underscore the importance of therapeutic interventions for shigellosis by appropriate drugs based on their current antibiogram for under-5 children. These observations may help policymakers in formulating better case management strategies for shigellosis.

Antibiotic Use for Febrile Illness among Under-5 Children in Bangladesh: A Nationally Representative Sample Survey

Nora Samir N, Hassan MZ, Biswas MAAJ, Chowdhury F, Akhtar Z, Lingam R, et al. *Antibiotics* 2021;*10*:1153.

Fever in children under five years of age is a common and predominantly self-limiting sign of illness. However, in low- and middle-income countries, antibiotics are frequently used in febrile children, although these children may not benefit from antibiotics. In this study, we explored the prevalence of, and factors associated with, antibiotic use in children under five years old with febrile illness in Bangladesh. We analysed data from the 2017–2018 Bangladesh Demographic and Health Survey to determine the prevalence of antibiotic use in children under five years of age with a febrile illness. We used a causal graph and performed a multivariable logistical regression to identify the factors associated with antibiotic use in children under five years old with febrile illness in Bangladesh. Of the 2784 children aged less than five years with fever included in our analysis, 478 (17%, 95% CI 15% to 19%) received antibiotics. Unqualified sources, including unqualified providers and pharmacies, contributed to 60% of antibiotic prescriptions in children with fever, followed by the private medical sector (29%) and the public sector (23%). The highest use of antibiotics was found in children under six months of age (25%). Children with parents who completed secondary or higher education were more likely to receive antibiotics (adjusted OR (aOR): 2.61 (95% CI 1.63 to 4.16)) than children whose parents did not complete primary education. Educational interventions promoting rational use of antibiotics and improved regulations governing over the counter purchase of antibiotics in Bangladesh may improve antibiotic dispensing practices.