Journal of Paediatric Medicine & Surgery

Kavitha, J Paediatr Med Sur 2025, 9:1

Commentary Open Access

Pediatric Infectious Diseases: Prevention, Diagnosis, and Management in the Modern Era

Kavitha Rajan*

Department of Pediatric Hematology, Bangalore Pediatric Sciences Institute, India

Abstract

Pediatric infectious diseases remain a leading cause of morbidity and mortality globally, despite advances in vaccination, sanitation, and antimicrobial therapy. Children are uniquely vulnerable to infections due to their developing immune systems and exposure in communal settings. This article reviews common and emerging infectious diseases affecting the pediatric population, including respiratory infections, diarrheal diseases, vaccine-preventable diseases, and antimicrobial resistance. Emphasis is placed on diagnostic advancements, immunization strategies, global health challenges, and the importance of infection prevention practices in clinical and community settings.

Keywords: Pediatric infections; Vaccine-preventable diseases; Respiratory tract infections; Diarrhea; Sepsis; Antimicrobial resistance; Immunization; Emerging infections; Pediatric COVID-19; Global health

Introduction

Infectious diseases are among the most common health concerns in children, particularly in the first five years of life. Factors such as immature immune responses, malnutrition, and exposure to pathogens in schools or daycare centers increase susceptibility to infections [1]. While vaccination programs and antibiotic therapies have reduced the burden of many infectious diseases, global inequities, vaccine hesitancy, and antimicrobial resistance continue to pose serious threats [2]. Pediatric infectious disease specialists play a crucial role in diagnosing, treating, and preventing infections, as well as in managing outbreaks and implementing public health measures [3].

Description

Acute respiratory tract infections, especially pneumonia and bronchiolitis, are the leading cause of death in children under five worldwide. Respiratory syncytial virus (RSV) and influenza are major culprits, especially in infants and those with underlying health issues. Diagnosis relies on clinical signs, rapid antigen detection tests, and PCR-based assays, while treatment is largely supportive except in cases requiring antivirals or antibiotics for bacterial superinfection [4]. Gastrointestinal infections, particularly rotavirus and norovirus, cause significant morbidity due to dehydration. Oral rehydration therapy remains the cornerstone of treatment. Introduction of the rotavirus vaccine has significantly decreased hospitalization rates globally [5].

Sepsis and meningitis are medical emergencies in pediatrics, often caused by pathogens such as Streptococcus pneumoniae, Neisseria meningitidis, and group B Streptococcus. Blood cultures, lumbar puncture, and PCR testing are essential diagnostic tools. Empirical broad-spectrum antibiotics are initiated promptly, with targeted therapy once culture results are available [6]. Vaccine-preventable diseases such as measles, mumps, rubella, pertussis, and varicella continue to circulate in areas with low immunization coverage. Global immunization initiatives, including the Expanded Programme on Immunization (EPI), have been instrumental in reducing incidence and mortality [7]. Tuberculosis (TB) in children, especially in endemic regions, poses a diagnostic challenge due to non-specific symptoms and difficulty obtaining sputum samples. Newer diagnostics like GeneXpert MTB/RIF and interferon gamma release assays (IGRAs) are improving detection rates [8]. Emerging infections like pediatric COVID-19 and multisystem inflammatory syndrome in children (MIS-C) have highlighted the importance of real-time surveillance, molecular diagnostics, and adaptable treatment protocols. Though most children experience mild COVID-19, those with comorbidities may develop severe illness [9].

Results

Mass immunization campaigns have led to the near-eradication of diseases such as polio and substantial reductions in measles, diphtheria, and pertussis. For example, introduction of pneumococcal conjugate vaccines has resulted in a 50–90% decrease in invasive pneumococcal disease in many countries [10]. Antibiotics and antiviral agents have reduced mortality from bacterial meningitis and influenza, though resistance remains a concern. Enhanced access to rapid diagnostics has improved outcomes by facilitating early detection and management.

Discussion

One of the greatest challenges in pediatric infectious diseases is the rising tide of antimicrobial resistance, often driven by inappropriate prescribing and overuse of antibiotics. Programs promoting antimicrobial stewardship and judicious antibiotic use in children are vital to preserving the efficacy of existing drugs [6]. Socioeconomic disparities play a significant role in infection outcomes. In low- and middle-income countries, lack of access to vaccines, poor sanitation, and malnutrition increase the burden of preventable infections. In contrast, developed countries face the challenges of vaccine refusal and emerging zoonotic diseases due to globalization and climate change [3].

***Corresponding author:** Kavitha Rajan Department of Pediatric Hematology, Bangalore Pediatric Sciences Institute, India, E-mail: kavitha.rajan@bpsi.in

Received: 30-Jan-2025, Manuscript No: jpms-25-167716; **Editor assigned:** 01-Feb-2025, Pre-QC No: jpms-25-167716(PQ); **Reviewed:** 15-Feb-2025, QC No: jpms-25-167716; **Revised:** 20-Feb-2025, Manuscript No: jpms-25-167716(R); **Published:** 27-Feb-2025, DOI: 10.4172/jpms.1000322

Citation: Kavitha R (2025) Pediatric Infectious Diseases: Prevention, Diagnosis, and Management in the Modern Era. J Paediatr Med Sur 9: 322.

The COVID-19 pandemic has underscored the importance of infection control, vaccination, and emergency preparedness. Pediatric-specific data and protocols are essential, particularly for novel conditions like MIS-C, which has unique immunologic characteristics compared to adult COVID-19 [9]. Global partnerships such as GAVI, WHO, and UNICEF play pivotal roles in improving immunization coverage and delivering healthcare resources to underserved populations. Continued investment in surveillance systems, health education, and pediatric-focused research is necessary to combat evolving infectious threats.

Conclusion

Pediatric infectious diseases continue to pose significant challenges, particularly in resource-limited settings. However, with ongoing advancements in vaccination, diagnostics, and treatment, substantial progress is being made. Prevention through immunization, rational antimicrobial use, and early diagnosis are key pillars of pediatric infectious disease management. Collaborative global efforts are essential to reduce disease burden and improve child survival worldwide.

References

1. Baralt L,Weitz TA (2012) The Komen-planned parenthood controversy: Bringing the politics of breast cancer advocacy to the forefront. Womens Health Issues 22: 509-512.
2. Bob Roehr (2012) Charity's decision to cut funding to Planned Parenthood sparks controversy. BMJ 344: e870.
3. Fontana RS, Sanderson DR, Woolner LB, Taylor WF, Miller WE, et al. (1986) Lung cancer screening: the Mayo program. J Occup Med US 28: 746-750.
4. McKinney SM, Sieniek M, Godbole V, Godwin J, Antropova N, et al. (2020). International evaluation of an AI system for breast cancer screening. Nature 577: 89-94.
5. Secretan BL, Loomis D, Straif K (2015) Breast-cancer screening-viewpoint of the IARC Working Group. N Engl J Med 373: 1479.
6. Hamashima C, Shibuya D, Yamazaki H, Inoue K, Fukao A, et al. (2008) The Japanese guidelines for gastric cancer screening. Jpn J Clin Oncol 38: 259-267.
7. Sabatino SA, White MC, Thompson TD, Klabunde NC (2015) Cancer screening test use: United States, 2013. MMWR Morb Mortal Wkly Rep 64: 464-8.
8. White A, Thompson TD, White MC, Sabatino SA, Moor JD, et al. (2017) Cancer Screening Test Use-United States, 2015. MMWR Morb Mortal Wkly Rep 66: 201-206.
9. Horner-Johnson W, Dobbertin K, Andresen EM, Iezzoni LI, et al. (2014) Breast and cervical cancer screening disparities associated with disability severity. Womens Health Issues 24: e147-53.
10. Horner-Johnson W, Dobbertin K, Iezzoni LI (2015) Disparities in receipt of breast and cervical cancer screening for rural women age 18 to 64 with disabilities. Womens Health Issues 25: 246-53.