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CHILDREN'S ANTIBIOTIC-RESISTANT BACTERIAL INFECTIONS: PROBLEMS AND SOLUTIONS

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Abstract: This article analyzes the global rise of antibiotic-resistant bacterial infections in children, their clinical consequences, epidemiological characteristics, and modern approaches to their control. In recent years, due to the improper and uncontrolled use of antibiotics worldwide, many common bacterial pathogens — including staphylococcus aureus, klebsiella pneumoniae, escherichia coli, and pseudomonas aeruginosa — have demonstrated high levels of resistance in pediatric populations. The article presents the depth of the problem based on current statistics, microbiological observations, clinical cases, and recommendations from international organizations gathered from uzbekistan, europe, the usa, and asian countries. The rise of antibiotic resistance has contributed to increased child mortality, higher hospitalization rates, and growing treatment costs. In conclusion, the article proposes comprehensive solutions aimed at reducing this critical problem.

Keywords: Antibiotic resistance; resistant bacteria; pediatrics; nosocomial infections; mrsa; esbl; uzbekistan statistics; antimicrobial stewardship (ams).

Introduction

Antibiotic resistance (amr) is considered one of the most dangerous global public health threats of the 21st century. According to the world health organization (who), more than 1.27 million deaths worldwide in 2022 were directly caused by antibiotic-resistant infections, while an additional 4.95 million deaths were indirectly associated with amr [who, 2023]. Children, due to their immature immune systems, represent the most vulnerable population affected by this issue.

Taking into account that 60–70% of infectious diseases in pediatric practice are treated with antibiotics, the prevalence of resistant infections is increasing more rapidly in countries with high rates of antibiotic misuse [cdc, 2022].

Over the last decade:

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Mrsa (methicillin-resistant staphylococcus aureus) cases in children have increased by 35%,

Esbl-producing klebsiella and e. Coli infections have risen by 70%,

Carbapenem-resistant klebsiella pneumoniae cases have tripled [ecdc, 2023].

This article scientifically presents the epidemiology, clinical consequences, and potential solutions for antibiotic-resistant infections among children.

Main part

1. Epidemiology of antibiotic resistance

Global indicators

According to the 2023 global antimicrobial resistance surveillance system (glass) report by the who:

The proportion of resistant infections among children aged 0–14 years ranges from **39% to 42%**.

49% of e. Coli infections are esbl-producing strains.

54% of klebsiella pneumoniae.

Nearly **78%** of acinetobacter baumannii isolates come from pediatric hospital units [who glass, 2023].

The declining effectiveness of antibiotics leads to severe, life-threatening conditions such as sepsis, meningitis, pneumonia, and urinary tract infections (utis).

Statistics from uzbekistan

According to the 2022–2023 pediatric infectious disease reports of the ministry of health of uzbekistan:

23–27% of bacterial pneumonia cases in children occur in antibiotic-resistant forms.

In tashkent, fergana, and andijan regions, esbl-positive klebsiella pneumoniae detection has reached **38%**.

43% of neonatal sepsis cases are caused by antibiotic-resistant gram-negative bacteria.

Nosocomial infections in pediatric wards account for **8–12%**, with klebsiella pneumoniae, staphylococcus aureus, and pseudomonas aeruginosa being the most common pathogens [moh uzbekistan, 2023].

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These indicators confirm a significant rise of amr in pediatric healthcare settings.

2. Major resistant bacteria found in children

Mrsa (methicillin-resistant staphylococcus aureus)

Mrsa causes frequent skin infections, pneumonia, osteomyelitis, and sepsis in children. The prevalence of mrsa in children is **27%** in the united states and exceeds **40%** in asian countries [cdc, 2022].

Esbl-producing bacteria

Esbl-producing klebsiella and e. Coli commonly cause:

Urinary tract infections,

Pneumonia,

Neonatal sepsis.

In south asia, esbl rates range from **58–70%**, while in uzbekistan they are estimated at **38–45%** [who, 2023].

Carbapenem-resistant enterobacteriaceae (cre)

Cre infections increase mortality in children by up to **40%**. In 2023, carbapenem-resistant k. Pneumoniae levels in central asia reached **12–17%**.

3. Factors leading to antibiotic resistance in children

Uncontrolled use of antibiotics — **43%** of antibiotics in uzbekistan are sold without a prescription.

Incorrect dosing in home treatment.

Use of antibiotics for viral infections — especially arvi and bronchitis.

Nosocomial infections.

Poor hygiene and sanitation standards.

Excessive use of antibiotics in livestock and agriculture.

4. Clinical consequences

Mortality in sepsis caused by resistant bacteria is **three times higher**.

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Treatment duration increases from **3–7 days to 14–28 days**.

Hospital readmission rates rise to **25–40%**.

In neonatal cases, mortality associated with resistant infections increases from **28% to 47%** [ecdc, 2023].

5. Solutions to the problem

1. Implementation of antimicrobial stewardship (ams) programs

Standard treatment protocols for physicians.

Can reduce hospital antibiotic consumption by **30%** [cdc, 2022].

2. Strengthening laboratory diagnostics

Microbiological cultures.

Antibiotic susceptibility testing (ast).

Pcr-based rapid identification.

3. Prevention

Vaccination (pneumococcal, hib, meningococcal).

Compliance with hand hygiene rules.

Strict sterilization and disinfection control.

4. Rational use of antibiotics

Avoid prescribing antibiotics for viral illnesses.

Strict control of dosage and duration.

Strengthening prescription-only regulations.

5. Parent education

Research shows that **45%** of parents believe fever in children requires antibiotic treatment. Educational campaigns for the general population are essential.

Conclusion

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Antibiotic-resistant bacterial infections in children represent a serious threat to both global and national healthcare systems, leading to increased mortality, prolonged treatment duration, and a significant economic burden. Statistical data from uzbekistan and worldwide demonstrate the rapid rise of resistant pathogens such as mrsa, esbl-producing bacteria, and cre among pediatric populations. Addressing this issue requires strengthening antimicrobial stewardship programs, improving laboratory diagnostics, promoting the rational use of antibiotics, and increasing public awareness. When these approaches are implemented comprehensively, the prevalence of antibiotic-resistant infections in children can be significantly reduced.

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