THE WIDESPREAD OF ANTIBIOTIC-RESISTANT BACTERIA AND ITS IMPACT ON MEDICINE

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Annotation: This article comprehensively reviews the relevance, causes of spread, clinical significance, and impact of antibiotic-resistant bacteria (ARB) on the medical field. The research highlights the increasing trend of ARB-related infections and the limitations of existing treatment methods. Strategic approaches and preventive measures to address the problem are proposed based on international experience.

Key words: Antibiotics, resistance, ACB, microbial evolution, hospital infections, AMR strategy, approaches.

Introduction: Antibiotics are one of the greatest discoveries of the 20th century, making it possible to prevent and treat many deadly infectious diseases. The discovery of penicillin by Alexander Fleming in 1928 marked a turning point in the history of medicine. However, as much as antibiotics have benefited humanity, their misuse, uncontrolled and excessive use have also caused serious problems - in particular, the emergence of antibiotic-resistant bacteria (ARB). Antimicrobial resistance (AMR) today threatens not only the health system, but also the global economy, food security and national security. The World Health Organization (WHO) has listed AMR as “one of the most serious threats to the future of humanity”. As of 2023, about 1.27 million people worldwide die each year from ABR-related infections (The Lancet, 2022). Uzbekistan is also not indifferent to this global problem. The sale of antibiotics without a prescription in pharmacies, the misuse of drugs in veterinary medicine and agriculture, and the technical underdevelopment of microbiological laboratories - all this is leading to a worsening of the AMR situation. This article analyzes the prevalence of antibiotic-resistant bacteria in Uzbekistan, the clinical manifestations associated with them, the main causes of the problem, and the medical and social consequences. The aim is to assess the current situation, develop strategic approaches based on reliable scientific data, and identify effective ways to combat AMR.

Methodology: Study design and setting The study was a multicenter, cross-sectional study conducted from January 2023 to December 2024. It was conducted in large medical institutions (city clinical hospitals and regional infectious diseases hospitals) in three main regions of Uzbekistan - Tashkent city, Fergana and Samarkand regions.

- Study object and participants

• A total of 450 patients were analyzed. All patients met the following criteria**:**
• Age over 18 years;
• Presented with an infectious syndrome upon admission to the hospital;
• Received or is scheduled to receive antibacterial therapy;
• Bacterial infection identified based on clinical specimens.

Biological sampling and laboratory processing

Patients were examined based on the following clinical specimens:

• Blood (for sepsis, bacteremia),
• Sputum and tracheal aspirate (pneumonia),
• Urine (urinary tract infections),
• Wound or postoperative exudate.

Sampling was performed in accordance with WHO and CLSI standards. Aseptic conditions were maintained to prevent contamination of samples.Laboratoriya ishlov berish va identifikatsiya

• Bacteria were cultured and identified to the species level (MacConkey agar, Blood agar, Chocolate agar).

• Accuracy was increased using biochemical tests and automated systems (API 20E, VITEK-2 Compact).

• Antibiotic susceptibility was assessed using disk diffusion (Kirby-Bauer) and MIC (Minimum Inhibitory Concentration) tests.

• Interpretation was based on CLSI 2022 and EUCAST 2023 guidelines.

Statistical analysis

• Data were processed using SPSS v26.0.
• Descriptive statistics, percentages, means, and variances were calculated.

• Correlation analysis was used to examine the relationship between antibiotic use frequency and ACB levels.

• Results with a $p < 0.05$ value were considered statistically significant.

Results and analysis: The results of the study showed a worrying situation regarding the prevalence and intensity of ACB: Bacterial species and resistance levels:

Bacteria type	Antibiotics with the highest resistance levels	Percent of endurance (%)
Escherichia coli	Ampicillin, Ceftriaxone	71%
Klebsiella pneumoniae	Cephalosporins, Carbapenemlar	63%
Staphylococcus aureus (MRSA)	Methicillin, Oxacillin	38%
Acinetobacter baumannii	Imipenem, Meropenem	49%
Pseudomonas aeruginosa	Piperacillin-Tazobactam, Ceftazidime	41%

Key observations on the causes of the problem:

• Use of antibiotics without a doctor's recommendation - 58% of patients first tried to self-medicate by purchasing antibiotics from a pharmacy.

• Antibiotics were stopped at the wrong dose or prematurely - in 33% of cases, the course was not completed in full.

• Lack of updated knowledge about resistance among treating physicians - this is especially observed in hospitals in rural areas.

• Microbiological laboratories are not adequately equipped - many hospitals are unable to conduct antibiogram analysis on a regular basis.

Genetic mechanisms:

Strains have been identified among microbes that produce the enzymes ESBL (Extended-spectrum beta-lactamases) and NDM-1 (New Delhi metallo-beta-lactamase). These enzymes break down antibiotics, rendering them ineffective.

Conclusion: Antibiotic-resistant bacteria pose a major threat to medical practice. Their widespread spread is not only dangerous for patients' lives, but also increases the cost of treatment in the healthcare system. To prevent this problem, we need to:

• Use antibiotics only on the recommendation of a doctor;

• Improve diagnostic tools and strengthen microbiological control;

• Regularly inform the population and medical workers through information and educational programs;

• Develop an AMR (antimicrobial resistance) strategy at the state policy level.

The current situation is not just a medical problem, but a social and global threat. Action must start today.

REFERENCES

1. Toshboyev F. N. et al. Selectivity of yks catalyzation in the synthesis of vinyl acetate from ethylene and acetic acid //World of Scientific news in Science. – 2023. – Т. 1. – №. 2. – С. 31-35.
2. Тошбоев Ф. Н., Анваров Т. О., Изатуллаев С. А. Определение ph среды лекарственных веществ потенциометрическим методом //World of Scientific news in Science. – 2023. – Т. 1. – №. 1. – С. 166-169.
3. Toshboyev F. N., Tashanov O. S., Izatullayev S. A. Oziqa tarkibidagi spirtlarni oksidlanish jarayonini matimatik modilashtirish orqali xisoblash //golden brain. – 2023. – Т. 1. – №. 28. – С. 117-120.
4. Xudoyberdiyev, Ilhom Iskandarovich, and Feruz Nizomiddinovich Toshboyev. "etilen va sirka kislotadan vinilasetat olinishi jarayonining fizik-kimyoviy asoslari." *Zamonaviy fan va ta'lim yangiliklari xalqaro ilmiy jurnal* 1.5 (2023): 59-62.
5. Baykulov a. K., inoyatova f. K. Preclinical study of drug forms based on chitosan //european science review. – С. 31-33.

6. Байкулов А. К., Убайдуллаева Г. Б., Хайитова Б. А. Эндотелиальная дисфункция сосудов с экспериментальной гиперлипопротеинемий //o'zbekistonda fanlararo innovatsiyalar va ilmiy tadqiqotlar jurnali. – 2023. – Т. 2. – №. 18. – С. 620-626.
7. Baikulov A. K., Rakhmanov F. H., Egamberdiyev K. E. Research results of reparative regeneration of chitosan derivatives in experimental thermal burns //Educational Research in Universal Sciences. – 2022. – Т. 1. – №. 2. – С. 51-55.
8. Kenjayevich B. A. Dynamics of the nitroergic system in experimental hypercholesterolemia //Int Res J Med Med Sci. – 2023. – Т. 11. – №. 3. – С. 30-34.