REASONS FOR THE INCREASE IN ANTIBIOTIC RESISTANCE OF MICROORGANISMS

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Relevance:
According to the World Health Organization (WHO), more than 700,000 people die each year due to antibiotic-resistant infections. It is estimated that by 2050, this figure could reach 10 million. This poses a massive threat to the global community, not only medically but also socio-economically. Antibiotic resistance negatively impacts the reliability of healthcare systems, the duration of disease treatment, and overall healthcare costs.

Objective:
The objective of this scientific work is to identify the mechanisms of antibiotic resistance in microorganisms, analyze the reasons for their widespread prevalence, evaluate their impact on the global healthcare system, and examine international approaches to addressing this issue.

Materials and Methods:
The analysis involved studying articles and statistical data (2020–2024) from leading scientific databases such as WHO, CDC (USA), UpToDate, PubMed, Elsevier, and Scopus. Additionally, statistical indicators of bacterial infections observed at the clinical base of TMA (Tashkent Medical Academy) during 2023–2024 were examined. Biological processes related to bacterial resistance mechanisms were analyzed, specifically: the production of beta-lactamase enzymes, efflux pump activity, changes in target protein structures, biofilm formation, and horizontal gene transfer via plasmids.

Results:
Research results indicate that microorganisms such as *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* show

high levels of antibiotic resistance. The highest resistance is observed in the groups of beta-lactams, carbapenems, fluoroquinolones, and aminoglycosides. Observations conducted at the TMA clinical base in 2023–2024 showed that bacterial infections were identified in 38% of patients, with resistance to at least one antibiotic recorded in 52% of those cases. Treatment approaches based on sensitivity (antibiograms) and combined antibiotic use were widely implemented. In some cases, prolonged microbial infections, relapses, and treatment difficulties were found to be directly linked to antibiotic resistance.

Conclusion:

Based on the results obtained, the following conclusions can be drawn: antibiotics should be taken only under a doctor's prescription and for the full course; prevention, sanitation, and hygiene must be strictly followed; scientific research on the development of new antimicrobial drugs should be intensified; microbiological monitoring and control systems must be strengthened; and public medical literacy should be increased.