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Extensively Drug-Resistant Tuberculosis (XDR-TB): Epidemiological, Microbiological, and Clinical Aspects

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ABSTRACT

Extensively drug-resistant tuberculosis (XDR-TB) represents a serious threat to global public health, especially in resource-limited countries. This paper reviews current data on the prevalence, mechanisms of resistance, and clinical-epidemiological features of XDR-TB, as well as strategies for improving diagnosis and treatment outcomes.

KEYWORDS: tuberculosis, XDR-TB, Mycobacterium tuberculosis, drug resistance, epidemiology, treatment.

Introduction

Tuberculosis (TB) remains one of the leading causes of infectious mortality worldwide. The emergence of multidrug-resistant (MDR-TB) and particularly extensively drug-resistant tuberculosis (XDR-TB) caused by Mycobacterium tuberculosis has significantly complicated TB control efforts. According to WHO data (2024), XDR-TB has been reported in over 110 countries, accounting for approximately 4.5% of new TB cases and up to 19% among previously treated patients. The aim of this study is to analyze current trends in the spread of XDR-TB and identify the main factors influencing diagnostic and treatment effectiveness.

Materials and Methods

The study is based on analysis of data from the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and national surveillance data from the Republic of Uzbekistan between 2019 and 2024. Epidemiological indicators, resistance patterns, diagnostic methods, and treatment outcomes were evaluated using comparative and retrospective analysis. Statistical data processing was performed using Microsoft Excel 2023.

Inclusion criteria included:

- confirmed diagnosis of pulmonary tuberculosis;
- confirmed resistance to isoniazid, rifampicin, any fluoroquinolone, and at least one injectable second-line drug (capreomycin, amikacin, or kanamycin).

Results

Analysis showed that the rate of XDR-TB among all TB cases in Uzbekistan increased from 1.8% in 2019 to 3.6% in 2024. Most cases occurred among males aged 25–50 years. Major risk factors included premature treatment interruption, self-medication, HIV co-infection, and poor medical awareness.

Molecular diagnostic tools (GeneXpert MTB/RIF and LPA tests) reduced diagnostic time from 8–12 weeks to 2–3 days. However, treatment success rates remain low — approximately 58% in 2024 — with mortality reaching 14%.

Conclusion

XDR-TB remains a major public health challenge. Reducing its spread and mortality requires a comprehensive approach — early diagnosis, individualized treatment, adherence monitoring, and prevention of transmission. Development of new anti-TB drugs and strengthening of national TB control programs are critical for stabilizing the epidemiological situation.