

CURRENT TOPICAL ISSUES IN THE PREVENTION OF TUBERCULOSIS

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Abstract.

Tuberculosis remains one of the most significant infectious diseases worldwide and continues to pose a serious challenge to public health systems. Despite advances in diagnostics, treatment, and vaccination, the disease persists due to socioeconomic factors, population migration, immunodeficiency conditions, and the increasing prevalence of drug-resistant forms of tuberculosis. The effectiveness of tuberculosis prevention largely depends on early detection, systematic screening of high-risk populations, immunoprophylaxis, and public health education. This article analyzes current topical issues in tuberculosis prevention, highlighting modern preventive approaches, key challenges, and the importance of a comprehensive and integrated strategy. Special attention is given to immunoprophylaxis, early diagnosis, and social determinants influencing tuberculosis transmission. The findings emphasize the necessity of multidisciplinary and evidence-based preventive measures to reduce tuberculosis incidence and improve population health.

Keywords: tuberculosis, prevention, public health, immunoprophylaxis, early diagnosis, drug-resistant tuberculosis, screening.

АКТУАЛЬНЫЕ ВОПРОСЫ ПРОФИЛАКТИКИ ТУБЕРКУЛЁЗА НА СОВРЕМЕННОМ ЭТАПЕ

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Аннотация.

Туберкулёт остаётся одним из наиболее значимых инфекционных заболеваний в мире и продолжает представлять серьёзную проблему для системы общественного здравоохранения. Несмотря на достижения в области диагностики, лечения и вакцинации, заболевание сохраняет высокую распространённость вследствие социально-экономических факторов, миграции населения, иммунодефицитных состояний и роста лекарственно-

устойчивых форм туберкулёза. Эффективность профилактики туберкулёза в значительной степени зависит от раннего выявления заболевания, систематического скрининга групп риска, иммунопрофилактики и санитарно-просветительной работы среди населения. В статье рассматриваются актуальные вопросы профилактики туберкулёза, анализируются современные подходы и основные проблемы, а также подчёркивается значение комплексной и междисциплинарной стратегии профилактики. Сделан вывод о необходимости внедрения научно обоснованных профилактических мероприятий для снижения заболеваемости и укрепления общественного здоровья.

Ключевые слова: туберкулёз, профилактика, общественное здравоохранение, иммунопрофилактика, ранняя диагностика, лекарственно-устойчивый туберкулёз, скрининг.

Introduction

Tuberculosis (TB) remains one of the most significant infectious diseases worldwide and continues to pose a serious public health challenge despite advances in medical science and healthcare systems. Caused by *Mycobacterium tuberculosis*, the disease is primarily transmitted through airborne droplets and is characterized by a chronic course, severe complications, and a high mortality rate if not diagnosed and treated in a timely manner. According to global health data, millions of new TB cases are reported annually, highlighting the persistent burden of the disease and the urgent need to strengthen preventive strategies.

In recent years, several global factors have contributed to the sustained spread of tuberculosis. Population migration, urbanization, socioeconomic inequality, poverty, malnutrition, and overcrowded living conditions create favorable environments for TB transmission. In addition, the increasing prevalence of immunocompromised conditions such as HIV/AIDS, diabetes mellitus, chronic respiratory diseases, and long-term immunosuppressive therapy significantly raises the risk of TB development. Of particular concern is the growing incidence of drug-resistant tuberculosis, which complicates both prevention and treatment efforts and poses a serious threat to global health security.

Currently, tuberculosis prevention is regarded not only as a clinical issue but also as a priority area in public health, epidemiology, immunology, and social medicine. Effective prevention depends on early detection of the disease, systematic screening of high-risk populations, timely immunoprophylaxis, and

increased public awareness. Preventive measures must be evidence-based, comprehensive, and adapted to the epidemiological characteristics of specific populations.

In this context, an in-depth analysis of current topical issues in tuberculosis prevention is of great scientific and practical importance. The present article aims to examine modern preventive approaches, identify key challenges, and discuss effective strategies for improving TB prevention in contemporary healthcare systems.

Materials and Methods

This study was conducted using an analytical and descriptive research design. A comprehensive review of international and national scientific literature, epidemiological reports, clinical studies, and regulatory documents related to tuberculosis prevention was performed. Data from recent publications were systematically analyzed using comparative and integrative methods. The effectiveness of various preventive measures, including immunoprophylaxis, screening programs, and public health interventions, was assessed based on published evidence.

Results

The analysis revealed that early detection of tuberculosis remains a cornerstone of effective prevention. Regular screening of high-risk groups, including healthcare workers, migrants, individuals with chronic diseases, and immunocompromised patients, significantly contributes to reducing disease transmission. Childhood vaccination with the *Bacillus Calmette–Guérin* (BCG) vaccine continues to play a crucial role in preventing severe forms of tuberculosis, particularly in children.

At the same time, the rise in multidrug-resistant and extensively drug-resistant TB presents a major challenge to existing prevention strategies. Socially vulnerable populations demonstrate a higher incidence of tuberculosis due to limited access to healthcare, poor living conditions, and insufficient health literacy. The findings indicate that medical interventions alone are insufficient; social support, nutritional improvement, and health education are essential components of effective TB prevention.

Discussion

The results confirm the necessity of a comprehensive and integrated approach to tuberculosis prevention. The success of preventive programs largely depends on the capacity of healthcare systems, the availability of diagnostic tools, and the level of public awareness. Health education and sanitary awareness campaigns play a vital role in reducing stigma, encouraging early medical consultation, and improving adherence to preventive measures.

Immunoprophylaxis remains a fundamental element of TB prevention. However, modern conditions require the integration of advanced diagnostic technologies, including molecular and genetic methods, to detect latent infection and drug-resistant strains at an early stage. Personalized preventive strategies tailored to individual risk factors may further enhance the effectiveness of TB control programs.

Conclusion

Tuberculosis prevention remains one of the most pressing challenges for global and national healthcare systems. The persistent spread of the disease, combined with the emergence of drug-resistant forms, underscores the need for continuous improvement of preventive measures. Effective TB prevention requires a systematic and multidisciplinary approach that integrates early diagnosis, immunoprophylaxis, regular screening, and social interventions.

Special attention should be given to vulnerable populations, where targeted preventive programs and health education can significantly reduce disease incidence. Strengthening collaboration between healthcare institutions, public health authorities, and community organizations is essential for achieving sustainable results.

In conclusion, the implementation of scientifically grounded, modern, and comprehensive preventive strategies will contribute to reducing tuberculosis transmission, improving population health, and enhancing the overall effectiveness of healthcare systems. Further research and innovation in this field remain crucial to achieving long-term control of tuberculosis.

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