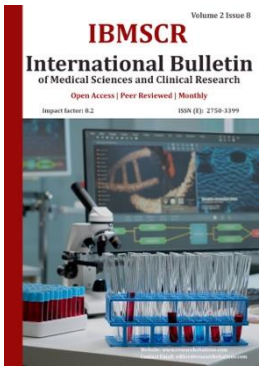

TUBERCULOSIS: CAUSES, SYMPTOMS, AND METHODS OF PREVENTION AND CONTROL

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Abstract

According to the World Health Organization (WHO), tuberculosis is currently one of the top ten leading causes of death worldwide. The best methods for early detection of tuberculosis infection include annual chest fluorography and the Mantoux tuberculin skin test.

Relevance of the Study

Tuberculosis remains one of the most widespread infectious diseases globally, posing a serious threat to millions of lives. Although large-scale anti-tuberculosis measures are being implemented in our country, the problem remains urgent due to latent forms of the disease, the increase in drug-resistant strains, and insufficient preventive measures.

Keywords: Tuberculosis, *Koch's bacillus*, HIV infection, immunity, BCG vaccine, hemoptysis

Introduction

Mycobacterium tuberculosis (Koch's bacillus) is a highly resistant microorganism capable of surviving at low temperatures and withstanding various environmental factors and high heat. The tuberculosis bacterium is Gram-positive, non-motile, non-spore-forming, and acid- and alcohol-fast. Its cell wall is rich in lipids, which provides high resistance to environmental conditions; therefore, the pathogen can remain viable for a long time outside the host.

Tuberculosis is mainly transmitted via airborne droplets. After entering the pulmonary alveoli, bacteria begin to multiply, and if the immune system is weak, chronic inflammatory foci develop. Tuberculosis can affect not only the lungs but also the bones, kidneys, meninges, lymph nodes, and other organs.

The development of tuberculosis is associated with unfavorable conditions (such as chronic stress) and individual characteristics of the human body (for example, blood group or age). Among infected individuals, the 18–26 age group is the most commonly affected.

Clinical Symptoms

Tuberculosis most commonly affects the respiratory system – lungs and bronchi – as well as the genitourinary system. In musculoskeletal tuberculosis, the spine and femur are most often involved. For this reason, two main forms are distinguished: pulmonary tuberculosis and extrapulmonary tuberculosis.

In pulmonary tuberculosis, once bacteria enter the alveoli, they are engulfed by macrophages, but the immune system is unable to completely eliminate them. As a result, inflammatory lesions develop, and tubercles form. Over time, these lesions undergo caseous necrosis (cheese-like tissue destruction).

Typical symptoms include a chronic cough, sputum production, sometimes blood-streaked sputum (hemoptysis), a slight increase in body temperature, weight loss, fatigue, and chest pain.

Stages of Tuberculosis

Physicians distinguish two main forms of tuberculosis: latent TB infection and active TB disease.

1. Latent Tuberculosis Infection (LTBI)

Not everyone infected with *M. tuberculosis* becomes ill. In many individuals, the immune system is strong enough to suppress bacterial activity. Although *Koch's bacillus* may be present in the body, the disease does not develop.

An estimated two billion people worldwide have latent TB. According to WHO, the risk of progression from latent to active tuberculosis is 5–15%, and this typically occurs when immunity declines abruptly — for example, during pregnancy, chronic liver or kidney diseases, diabetes mellitus, malnutrition, smoking, cancer, or HIV infection.

2. Active Tuberculosis

In this form, the immune system fails to control bacterial multiplication. Individuals with active TB not only harm their own health but also spread the infection to others.

Latent TB is asymptomatic and generally does not damage the person's health. Active TB develops gradually and presents with clear clinical symptoms.

Maintaining hygiene, preventing respiratory infections, and avoiding neglect of common colds or influenza are important because complications can lead to serious consequences.

Seven Early Warning Signs of Tuberculosis

1.A cough lasting three weeks or longer

Persistent, unexplained coughing requires medical consultation and chest fluorography. Although cough may be caused by allergies or chronic bronchitis, prolonged cough is a primary sign of TB.

2.Chest discomfort

Pain is not always present, but discomfort during coughing or breathing requires pulmonary evaluation.

3.Low-grade fever (subfebrile temperature)

A persistent temperature between 37–37.5°C may indicate underlying infection, including tuberculosis.

4.Unexplained weight loss

Weight loss without dieting or lifestyle changes may be a symptom of TB or other serious diseases such as malignancies, chronic inflammation, or parasitic infections.

5.Chills and night sweats

Recurrent cold sensations followed by excessive sweating — especially at night — are common TB symptoms.

6.Loss of appetite

As the body fights infection, it conserves energy by reducing appetite.

7.Fatigue and weakness

General weakness is common in many diseases, including heart conditions, cancer, metabolic disorders, depression, and tuberculosis. Persistent fatigue warrants immediate medical evaluation.

Conclusion

Tuberculosis remains a major global public health challenge. *Mycobacterium tuberculosis* most commonly affects lung tissue but can spread to various organs. The slow progression and late diagnosis of TB significantly increase the risk of severe complications.

Early detection, proper treatment, and continuous monitoring are essential to preventing TB. Strengthening preventive measures, ensuring full BCG vaccination coverage, and maintaining hygiene and sanitation practices are crucial in reducing transmission. Completing the full course of anti-tuberculosis treatment helps prevent the emergence of drug-resistant tuberculosis.

A successful fight against tuberculosis requires cooperation among healthcare workers, the government, and society as a whole. Only through comprehensive approaches, modern diagnostic tools (such as PCR), high-quality laboratory testing, and public awareness can TB be effectively controlled.

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