DOT THERAPY IN TUBERCULOSIS

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ABSTRACT

Directly Observed Therapy (DOT) is a critical strategy in the management of tuberculosis (TB), aimed at ensuring adherence to prescribed treatment regimens. This approach involves healthcare providers observing patients as they take their medications, which significantly reduces the risk of treatment failure and the development of drug-resistant TB strains. The implementation of DOT has been shown to improve treatment outcomes, enhance patient accountability, and foster a supportive environment for individuals undergoing TB therapy. This paper reviews the effectiveness of DOT in various settings, discusses challenges in its implementation, and highlights best practices for optimizing adherence to TB treatment. Tuberculosis is one of the major communicable diseases and chronic conditions, it requires continuous medical care. The TB problem in India was first recognized through a resolution passed in the All-India Sanitary Conference, held at Madras in 1912. The first open-air institution for isolation and treatment of TB patients was started in 1906 in Tilaunia near Ajmer and Almora in the Himalayas in 1908. The anti-TB movement in the country gained momentum with the TB Association of India was established in 1939.

Keywords: *Directly Observed Therapy, tuberculosis, treatment adherence, drug resistance, patient outcomes, healthcare strategies, TB management.*

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INTRODUCTION

Tuberculosis is one of the major communicable diseases and chronic conditions, it requires continuous medical care. This condition's environmental and socio-economic risks are severe in developing countries like India. Unawareness, poverty, undernutrition, poor housing, large families, and occupation have a measured influence on disease prevalence. The suffering due to pulmonary tuberculosis is increasing despite the excellent treatment available. (Gulani KK. 2007)

WHAT IS DOTS

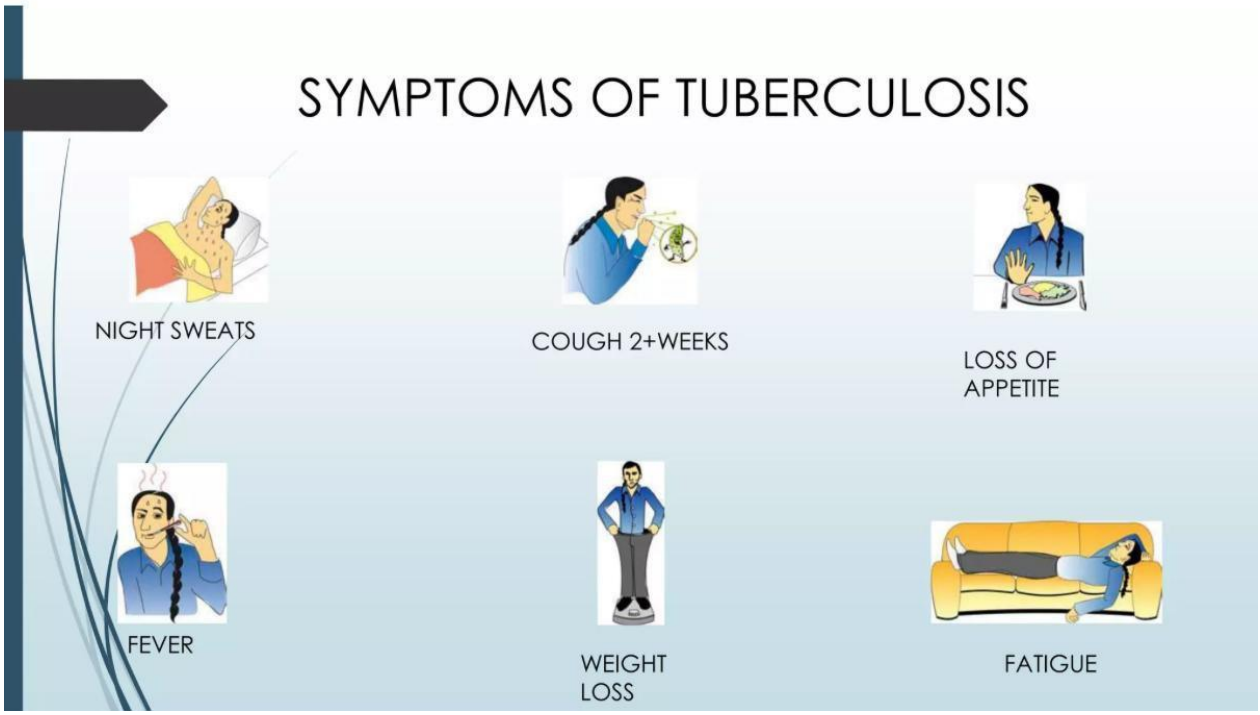
- Directly observed therapy short course a program to help cure TB
- A DOT lay worker meets with clients to help with TB Medication and provide support and education
- DOT by definition means watching clients swallow each dose of anti-TB medication

The TB problem in India was first recognized through a resolution passed in the All-India Sanitary Conference, held at Madras in 1912. The TB picture started becoming clear with the introduction of tuberculin testing. The Bhore committee report issued in 1946 estimated that about 2.5 million patients required treatment in the country with only 6,000 beds available. The first open-air institution for isolation and treatment of TB patients was started in 1906 in Tilaunia near Ajmer and Almora in the Himalayas in 1908. The anti-TB movement in the country gained momentum with the TB Association of India was established in 1939. WHO and UNICEF took a keen interest in assisting in introducing mass BCG vaccination at a low cost in 1951. In the 1940s streptomycin and PAS were introduced in the West followed by thiocetazone and INH in the 1950s. (Mahadev B, Kumar P. History of tuberculosis control in India)

Tuberculosis (TB) is a major cause of debility and instability. It is estimated that from 2002 to 2020, approximately 1000 million people will be newly infected [J. Jonsson *et al,2013*]. As per the Global TB report, 24 percent of world tuberculosis cases (approximately 28, 00,000), has been reported in India in 2017 [C.R. Driver *et al,2005*]. Specific measures are being taken within the Revised National Tuberculosis Control Programme (RNTCP) to address the MDR-TB problem through appropriate management of patients and strategies to prevent the propagation and dissemination of MDR-TB. Traditionally, DOTS-Plus refers to DOTS programs that add components for MDR-TB diagnosis, management, and treatment. These guidelines promote full integration of DOTS and DOTS-Plus activities under the RNTCP so that patients with MDR-TB are both correctly identified and properly managed under the recommendations set out in this document. With a population of 1.35 billion, India has the highest burden of TB and drug-resistant TB (DR-TB) in the world. We have suggested potential diagnostics and therapeutic strategies to combat the drug resistance to TB [S.K. Sharma *et al,2004;* D. Sharma *et al,2017*].

Population size and annual number of incident TB cases remained unrelated in 2016 from under 10 per 100,000 populations in most high-income countries to 150–300 in most of the 30 high TB burden countries, and above 500 in a few countries including the Democratic People's Republic of Korea, Lesotho, Mozambique, the Philippines and South Africa [D. Sharma *et al,2018.*]. Tuberculosis (TB) is among the top 10 causes of death worldwide. In 1993, the WHO (World Health Organization) declared TB a global health emergency.[WHO 2018] Tuberculosis (TB) is a communicable disease requiring prolonged treatment, and poor adherence to a prescribed treatment increases the risk of morbidity, mortality, and spread of disease in the community. (Jagga Rajamma K, Sudha G, Chandrasekaran V, Nirupa C, Thomas A, Santha T, et al.2007). The World Health Organization (WHO) declared TB a global public health emergency in 1993 and since then intensified its efforts to control the disease worldwide.(TB - A Global Emergence. Geneva: World Health Organization; 1994.) Tuberculosis control has been accorded a high priority within the health sector as it is a major public health problem. (Dhuria M, Sharma N, Ingle GK. 2008) The therapeutic regimens given under direct observation as recommended by WHO are highly effective for both preventing and treating TB but poor adherence to antituberculosis medication is a major barrier to its global control.(Addington WW. 1979) Revised National Tuberculosis Control Program (RNTCP) with Directly Observed Treatment Short course (DOTS) is the internationally recommended strategy, to ensure cure of tuberculosis; it has become the standard for the diagnosis, treatment, and monitoring of tuberculosis worldwide and has been implemented in 187 out of 211 countries, covering more than 89% of world's population In South Africa, tuberculosis is now the leading cause of death, fuelled by a burgeoning HIV epidemic. Unlike HIV programs, TB control efforts have not enjoyed a similar focus on key populations, and a detailed understanding of local disease epidemiology has been substituted for a uniform public health strategy. However, there has been renewed interest in deepening our understanding of the disease epidemiology, especially about sex differences. [Africa SS 2015] tuberculosis is a preventable and curable disease like other diseases. The disease primarily affects the lungs and causes pulmonary tuberculosis. BCG is a gift to the world given by the scientist Bacilli Calmette Gwerin in 1927. Widely used like bacteria vaccine. It helps to prevent children from tuberculosis. The incidence of TB is now increasing again in most of the developing countries. Particularly in young adults and in low economic groups. TB remains a worldwide public health problem even though the causative organism

was discovered more than 100 years ago and highly effective drugs and vaccines are available making TB preventable and curable, disease since 1950 anti-TB treatment has been available, making TB 100% curable. (James E et al.2003)\



CAUSES OF TUBERCULOSIS

Primary Cause:

Mycobacterium tuberculosis: TB is caused by the bacterium Mycobacterium tuberculosis, which is usually spread through the air when an infected person coughs, sneezes, or talks. Mycobacterium tuberculosis is a slow-growing, acid-fast bacterium that causes tuberculosis (TB). It primarily infects the lungs, but can also affect other organs. M. tuberculosis has a complex cell envelope and can survive in a dormant state, making it challenging to treat.

Risk Factors:

Close contact: Living or working near someone with TB increases the risk ofinfection. Close contact with an individual infected with tuberculosis (TB) is a significant risk factor for transmission. Close contact is defined as living or working near someone with TB, sharing a room or vehicle, or having direct contact with the patient's respiratory secretions. A study published in 2015 found that close contacts of TB patients had a 22.1% risk of developing TB disease (Keshavjee et al., 2015). This highlights the importance ofcontact tracing and screening in preventing TB transmission.

Weakened immune system: People with compromised immune systems, such as those with HIV/AIDS, cancer, or taking immunosuppressive drugs, are more susceptible to TB. A weakened immune system is a significant risk factor for tuberculosis (TB) infection. Individuals with compromised immune systems, such as those with HIV/AIDS, cancer, or taking immunosuppressive drugs, are more susceptible to TB. A study published in 2017 found that HIV-infected individuals had a 20-30 times higher risk of developing TB compared to HIV-uninfected individuals (Getahun et al., 2017). This highlights the importance of TB prevention and control measures among individuals with weakened immune systems.

Malnutrition: Poor nutrition can weaken the immune system, making it harder for the body to fight off TB infection**.** Malnutrition is a significant risk factor for tuberculosis (TB) infection. Malnourished individuals have impaired immune function, making them more susceptible to TB. A study published in 2018 found that malnourished patients with TB had a higher risk of treatment failure, relapse, and mortality compared to well-nourished patients (Bhargava et al., 2018). The study highlighted the importance of nutritional support and counselling as an integral part of TB treatment and prevention programs.

Chronic medical conditions: Certain conditions, such as diabetes, kidney disease, and lung disease, can increase the risk of developing TB. Chronic medical conditions, such as diabetes, kidney disease, and lung disease, increase the risk of tuberculosis (TB) infection. These conditions can weaken the immune system, making it harder for the body to fight off TB bacteria. A study published in 2012 found that individuals with diabetes had

a 3.1 times higher risk of developing TB compared to those without diabetes (Jeon & Murray, 2012).

Substance abuse: Injecting drugs or abusing alcohol can increase the risk of TB. Substance abuse is a significant risk factor for tuberculosis (TB) infection. Individuals who abuse substances, such as injecting drugs or excessive alcohol consumption, are more likely to have compromised immune systems, making them more susceptible to TB. A study published in 2013 found that individuals with a history of injecting drug use had a 28.3% prevalence of TB, compared to 4.5% in the general population (O'Connor et al., 2013).

Travel or living in areas with high TB prevalence: Traveling or living in areas with high TB prevalence increases the risk of tuberculosis (TB) infection. Areas with poor sanitation, overcrowding, and inadequate healthcare infrastructure are often hotspots for TB transmission. A study published in 2015 found that international travellers to high-TB- prevalence countries had a 2.4-fold increased risk of developing TB compared to non-travellers (Lönnroth et al., 2015). This highlights the importance of pre-travel counselling, TB screening, and preventive therapy for individuals traveling to or living in high-risk areas.

Working in healthcare: Working in healthcare is a significant risk factor for tuberculosis (TB) infection. Healthcare workers (HCWs) are at increased risk of exposure to TB due to their proximity to patients with TB. A study published in 2010 found that HCWs had a 2- to 4-fold increased risk of developing TB compared to the general population (Baussano et al., 2010). This highlights the importance of implementing effective TB infection control measures in healthcare settings to protect HCWs and prevent transmission.

CONCLUSION

In conclusion, Directly Observed Treatment, Short-Course (DOTS) therapy has revolutionized the management of tuberculosis (TB) worldwide. By ensuring that patients complete their full treatment regimen under direct observation, DOTS has significantly improved treatment outcomes, reduced default rates, and prevented the emergence of drug- resistant TB strains. The strategy has been widely adopted globally, with remarkable success in controlling TB epidemics. DOTS therapy has also been adapted for use in various settings, including communities, clinics, and hospitals. Overall, DOTS therapyhas been a game-changer in the fight against TB, saving millions of lives and paving the way for a TB-free world. Its implementation remains a crucial component of global TB control efforts. Directly Observed Treatment, Short-Course (DOTS) has had a profound impact on TB management globally. By ensuring that patients adhere to their treatment regimens through direct observation, DOTS has significantly reduced default rates, improved treatment outcomes, and curbed the spread of drug-resistant TB. While TB remains a global health emergency, the DOTS strategy continues to play a pivotal role in reducing the burden of the disease. For India, where TB remains endemic, sustained implementation of DOTS, along with better management of drug-resistant TB, improved nutritional support, and focused public health initiatives, will be essential in the fight against TB. The collaborative efforts of national and international organizations, along with local healthcare workers, are essential to moving towards a TB-free world.

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