

REVIEW ARTICLE - PUBLIC HEALTH

TUBERCULOSIS AND TOBACCO SMOKING – INDIA'S
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Abstract

Background: Doll and Peto established the link between smoking and lung injury in their renowned 'British Doctor's Study' in 1976, but the link between smoking and tuberculosis (TB) was investigated as early as 1918. Various studies have proven beyond doubt that active and passive tobacco smoke exposure increases the risk of developing TB disease and leads to faster and more rapid progression of TB, with higher rates of relapse and death. Nonetheless, this pandemic has received far too little attention. This lack of focus has the potential to derail India's goal of eliminating tuberculosis by 2025. Healthcare workers must be aware of the heinous effects of smoking and its impact on the outcome of tuberculosis. It is also essential for the public health community to disseminate this knowledge to patients to achieve better treatment outcomes.

Keywords: Tuberculosis, Tobacco, Syndemic, Smoking, TB.

MAIN CONTENT

COVID-19 has stolen the limelight in the perspective of public health and a vast majority of clinicians across the globe have been concentrating on the pandemic for the past two years. While it is still uncertain if another wave of the pandemic would strike us down the lane, the fight against India's much older syndemics, tuberculosis (TB), and tobacco smoking are being overlooked.

Tuberculosis has long been an important cause of illness and death around the world, and until the COVID-19 pandemic, it was the leading cause of mortality from a single infectious agent. India is the world's most high-burden country for tuberculosis, accounting for 26% of global incidence, 38% of global TB deaths amongst HIV-negative individuals, and 34% of the overall number of TB deaths among HIV-positive and HIV-negative people.¹

Tobacco is the world's largest preventable cause of morbidity and mortality. Tobacco use alone is accountable for far more than six million fatalities every year worldwide, with more than eight million fatalities anticipated by 2030.² India is the world's second-largest producer and user of tobacco. According to the 2nd Global Adult Tobacco Survey (GATS2), there are 266.8 million adult tobacco users in India, and tobacco-related mortality is estimated to be over 1.3 million, with one million ascribed to tobacco smoking and the remainder to smokeless tobacco use.³

Tuberculosis and tobacco smoking are two key public health issues that each have a significant health and economic impact on our country, let alone the adverse association that they share. Since 1918, TB has been linked to tobacco

use,⁴ their association, on the other hand, has just recently received widespread attention.⁵ There is currently enough data to establish that smoking is substantially linked to the development of tuberculosis disease.^{6,7} The substantial amount of carcinogens and toxic chemicals inhaled during tobacco smoking predisposes smokers to risk for malignant and non-malignant diseases, involving the respiratory tract. Smoking directly impacts both the innate and adaptive immunity and plays a role in aggravating pathogenic immune responses or attenuating defensive immunity⁸ which paves way for a breakdown of TB infection or predisposes to TB disease. Regular smoking doubles the risk of TB recurrence and is also known to increase TB mortality by three to four-fold. If the patients were not smokers, one out of every five TB deaths may well be avoided.⁹ Tobacco smoke exposure, both active and passive, increases the risk of tuberculosis,¹⁰ and smoking hastens the progression of the disease.¹¹ Smoking is associated with isoniazid resistance¹² and 'alcoholism with smoking' is associated with acquired MDR-TB,¹³ in addition to being an independent predictor of relapse.¹⁴ Awaisu et al. established that at the end of the six months post smoking-cessation intervention given along with the DOTS regimen, the intervention group had significantly higher sputum smear conversion, radiological resolution of lung lesions than the DOTS alone group along, with a lesser loss to



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follow-up rate and higher cure rates.⁵

According to the GATS2, the large number of tobacco users in our nation harmed the sustainability of TB case management due to the TB-Tobacco syndemic. Since tobacco use and tuberculosis (TB) are both widespread illnesses in the general population, even a marginal increase in the relative risk of TB due to tobacco use, particularly smoking, results in a high attributable risk of TB infection. In India, the TB and tobacco control measures were implemented through the Revised National Tuberculosis Control Programme (RNTCP) [currently National Tuberculosis Elimination Programme (NTEP)] and the National Tobacco Control Programme (NTCP) respectively. Realizing the adverse association that these two public health issues share in our country, the 'Tuberculosis-Tobacco Collaborative Framework' was constituted by the Ministry of Health and Family Welfare (MoH&FW) of the Government of India¹⁵ to develop mechanisms for coordination between the two programs to combat TB-tobacco co-morbidity.

To ensure smooth coordination between these two national programs, a 5-step implementation strategy was developed under this framework, which included the establishment of joint coordination mechanisms at the national, state, district, and sub-district levels, screening for active TB symptoms complex (that includes cough and/or fever for more than two weeks, significant weight loss, and night sweats) among registered tobacco users in the NTCP, and training program staff in TB-Tobacco activities and to create joint public awareness campaigns. All healthcare personnel is responsible for administering Directly Observed Treatment Shortcourse (DOTS) were briefed and educated as part of this framework on the various processes and procedures that needed to be followed to help patients quit smoking and be tested for TB promptly. The adoption of 'Brief Advice' for tobacco cessation in RNTCP was the most important tactic within this framework.

The MoH&FW conducted a pilot study in Vadodra, Gujarat, based on the model proposed by the World Health Organization (WHO) and The Union, in which tobacco cessation services were delivered as 'Brief Advice' to TB patients registered for DOTS. 67.3% of patients who received 'Brief Advice' were able to quit smoking at the end of the pilot.¹⁶ In a comparable pilot study conducted by the Central Tuberculosis Division in Jaipur, Rajasthan, 75% of TB patients who were counseled with the 'Brief Advice' by the DOTS provider quit smoking.¹⁷ These pilots led to a logical conclusion of including tobacco cessation as an integral part of all TB control programs. Smokers with tuberculosis need

to receive repeated counseling programs to quit smoking^{18,19} and it is possible to set up cessation counseling programs that do not require any advanced or expensive training.¹⁸ The National Institute for Research in Tuberculosis found that enhanced counseling by DOTS providers to TB patients attending NTEP centers for TB treatment, as well as the use of sustained-release formulation of Bupropion in conjunction with standard counseling, were both effective smoking cessation strategies among TB patients treated in the TB program.¹⁹ However, many healthcare personnel who work with tuberculosis patients are unaware of or not involved in the provision of smoking cessation services.²⁰ This strongly suggests a dearth of knowledge regarding the link between cigarette smoking and tuberculosis. Healthcare practitioners must urge tuberculosis patients to quit smoking and avoid passive smoke exposure, as they are crucial steps in tuberculosis control.

All UN Member States have pledged to stop the worldwide tuberculosis scourge by 2030, whilst India aspires to accomplish this target by 2025, five years before the WHO's target to 'End TB'. The National Strategic Plan For Tuberculosis Elimination 2017–2025 outlines 'Detect-Treat-Prevent-Build' as the four strategic pillars to achieve the feat of TB elimination. Prolonged cough often misinterpreted as 'smoker's cough' is known to delay the detection of TB.²¹ In a dose-dependent manner, smoking was observed to impede culture conversion during pulmonary tuberculosis treatment. At 60 days of typical first-line treatment, Renee et al. discovered a robust and independent link between current smoking and positive sputum culture. In addition, the number of cigarettes smoked each day had a significant dose-response association²² and Visser et al. reported a 2 months delay in sputum conversion among smokers.²³ According to Leung et al., smokers with TB had a severe clinical and radiological presentation, frequent sputum positivity at presentation and after 2 months of treatment, a lower likelihood of success, and a higher risk of relapse if successfully cured.²⁴ In a group of patients with TB and HIV infection, Vanden et al. found that smokers had a worse treatment outcome than nonsmokers. This was attributed to smokers having a higher rate of loss to follow-up.²⁵

One can sense that tobacco usage has a role to play in three out of four strategic pillars for TB elimination. COVID-19 has had an unprecedented global impact and the works done by the TB control front were no exception to this strife. The pandemic has set back the fight against TB by several years. Yet, the hard work of public health professionals.

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