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Review Article

Tuberculosis (TB) Silent Killer, Challenges and Stategies to Manage Tuberculosis during COVID -19 Pandemic: A Review

Ajaz Ahmed Wani[1*], Rahul Kait[1]

[1]Department of Zoology, Govt. Degree College Doda, Jammu and Kashmir, India

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***Corresponding author:** Ajaz Ahmed Wani

Abstract

Tuberculosis (TB) is an infectious diseases caused by an intracellular pathogen called *Mycobacterium tuberculi.* It is a disease prevalent worldwide for its vulnerability, magnitude and morbidity factors. With the advancement in the field of medical science, it is still a serious global public health problem and it is in the top 10 causes of mortality particularly in the underdeveloped countries. Besides the other deadly diseases, TB remains on the horizon of public health, mainly due to its persistence and high rates in communities living in poverty and on the margins of social exclusions. While assessing the challenges due to covid -19 pandemic, simultaneously management of tuberculosis and current strategies adopted to mitigate them.

Keywords: Tuberculosis, Covid-19 Pandemic, *Mycobacterium tuberculi* , mortality.

INTRODUCTION

Tuberclosis has existed since form immorial times. The oldest unambiguously detected the tuberculosis causing paliogen i.e *Mycobacetrium tuberculli* gives evidence of the disease in the remains of bison in Wyoming dated to around 17000 years ago [1]. However wheather tuberculosis originated in bovines, then transfered to human or wheather both bovine and human tuberculosis diverged from a common ancestor, remains unclear [2]. Skeltal remains show some prehistoric humans (4000 BC) had TB and researcher, have found tubercular decay in the spines of Egyptian mummies dating 3000 to 2400 BC [3]. Besides genetic studies also suggest the presence of TB in the Americans for about 100 AD [4].

Although Richard Mortan established the pulmonary from associated with tubercles as a pattulagy 1689 [5] due to the variety of its symptoms. TB was not identified as a single disease until the 1802s. In 1819 Reve Larnnec claimed that tubercles were the cause of pulmmary tuberculosis .It was J.L Schonlein frist published the name “tuberculosis”.

Robert Koch identified and described the bacillus causing tuberculosis. (*M.tuberclosis)* on 24 March 1882 [6]. He received the Nobal prize in physiology or Medicines in 1905 for the discovery. However Koch did not believe the cattle and humans tuberculosis disease were similar which delayed the recogination of infected milk as a source of infection. Koch announced a glycerine extract of the tubercle bacilli as a remedy for tuberculosis in 1890 calling it tuberculin. Although it was not effective it was later successfully adopted as a screening test for the presence of pre symptomatic tuberculosis [7].

Albert Calmette and Camille Guerin achieved the first genuine success in immunization against tuberculosis in 1906 using attenuated bovine strain tuberculosis. It was called as bacille Calmette – Guerin (BCG) and this vaccine was first used on humans in 1921 in France , but achieved widespread acceptance in the US, Great Britain and Germany only after World War II [8]. Tuberculosis caused widendespread public concern in the 19th and 20th century and it is still a great concern in the underdeveloped countries. It is an infection disease caused by *Mycobacterium tuberculi* (MTB) bacteria. It generally affect the lungs but can also affect other parts of the body. Most infections shows no symptoms and at this stage it is called as latent tuberculosis [9]. About 10% of latent infection progress to active diseases which left untreated kills about half of those affected [9]. The typical symtpms of active TB are a chronic cough with blood containing mucos mild fever, night sweats, and weight loss [9]. It

was historically called consumption due to weight loss [10] and infection of other organs can cause a wide range of symptoms.

Tuberculosis spread from one person to the other through the air, when people who have active TB in their lungs cough spit, speak or sneeze [9].People with latent TB do not spread the disease [9]. Active infection occurs more often in people with the AIDS/HIV. Diagnosis of active Tb is based on chest x-rays, as well as microscopic examination and culture of body fluids [11], where as diagnosis of latent TB relies on the tuberculin skin test (TST) or blod test [11].

Tuberculosis may infect any part of the body but favorite organs are lungs which is known as pulmonary tuberculosis [12]. When tuberculosis develops outside the lungs is called as extrapulmonary tuberculosis, although extrapulmonary signs and symptoms include fever, chills weight loss, sweats, loss of appitite, weight loss and fatigue and significant nail clubbing may also occurred [12].

In case of pulmonary tuberculosis (commonly involve 90% cases). Symptoms may include chest pain and prolonged cough producing sputum. About 25% of people are asymptomatic [13]. Occassionally people may cough up blood in small amount and in very rare case the infection may erode into pulmonary artery result in massive bleeding [12]. Thus tuberculosis may become a chronic disease and cause estensive scarring up in the lobes of the lungs. The upper lung lubes are more frequently affected by tuberculosis than the lower ones [12]. The reasons is not clear but it may be due to either better air flow [14] or poor lymph drainage within the upper lungs. Where as extra pulmonary infection accounts for 15-20% (outside the lungs), such type of tuberculosis occur more commonly in people with a weekened immune system and young children but persons with HIV occur in more than 50% of cases [15].The notable extrapulmonary infection sites include the pleura (in tuberculosis pleurisy) the central nervous system (Mennigits tuberculosis) the lymphatic system (in scrofula of the neck) The genitourinary system (in unigenital tuberculosis) and the bones and joints (in pott disease of spine) There is another potential more serious widespread form of TB is called as dessimminated tuberculosis it is also called as miliary tuberculosis. It is tuberculosis that occur when a large number of the bacteria travel the through the blood stream and spread through out the body. This type of tuberculosis makes up almost 10% of extrapulmonary cases [16].

Tuberculosis and Covid-19 pandemic

Covid-19 pendimic due to the novel coronavirus (SARS-COV-2) is a respiratory illness from common cold to more severe disease including pneumonia. The virus enter the human body via droplet infection or entered the human body by touching the infected surfaces. Where as tuberculosis also shows similar symptoms but rate of incubation is more in tuberculosis and is a bacterial diseases

Indian accounts for more than one fourth of the world's Tuberculosis (TB) cases. This amounts to about 2.6 million cases out of 10 million cases worldwide. The disease has been the death of nearly 0.44 million people in India [17]. where as one third of the global drug resistant TB cases are in India, (WHO) [18].

Covid -19 pandemic has become a global health crisis. Holwever to combat TB, National programmes need to be actively engaged ensuring an effective, rapid response to COVID-19 while providing TB services. Though the mode of transmission differs slightly, both i.e. TB and COVID-19 are contigious. But TB remains a significant communicable disease in India, surveillance, clinical assessment, contact tracing, testing confirmation of diagnosis with supervised or insupervised treatment regimens should still remain a publih health priority in presence of COVID-19 pandemic. Where during the pandemic significant restrictions were made on face to face assessment and movement of people due to national lockdown and infection control strategies [19].

Challenges and strategies to manage TB during COVID-19 Pandemic:

1. **COVID-19 testing and TB**:- The testing of TB patients for the COVID-19 and vice versa is discussed largely by the experts. As both COVID-19 and TB have similar clinical features and symptoms like fever, shortness of breath and coughing. There exist subtle difference between two disease processes, but COVID-19 infection tends to develop over a short period than TB. A positive result for COVID-19 infection does not eliminates the likelihood of concomitant TB, particularly in a TB endemic country like India. Recently Indian Council of Medical Research (ICMR) also has approved the use of Truenat TM beta COV test on Truelab TM work station which were used for testing drug resistant tuberculosis as a screening test for COVID-19 [20].

2. **Outpatient setting challenges:** - As a precantuniory need to avoid the face to face consultations during the COVID-19 pandemic to reduce the risk of viral transmission has definitely impacted in the management of patients with TB, particularly in the outpatient setting. The clinics were kept open for TB patients do not avoid health facilities or delay their assessment due to COVID-19 pandemic must be balanced with health care risk. To redue the pressure on facility based health care system, virtual communication platforms such

as e-Sanjeevani, Government of India integrated telemedicines solution will be helpful in assisting patients [21]. Telemedicine is already playing an emerging role in remote management of chronic illness such as diabetes mellitus [22]. World Health Organisation (WHO) recommendation focused on the usage of technologies like electronic medication monitors and video supported therapy can help patients to complete their treatment [23].

3. **Covid-19 and TB relationship**:- As the knowledge and studies about Covid-19 and TB is emerging, early evidences suggests that patients with latent TB and established disease have an increased risk of the SARSCOV-2 infection predisposition towards developing severe COVID-19 pnemonia. [24]. The mathematical model based forecasting studies from New Delhi India emphasizes the importance of primary prevention measures especially in TB centres to prepare for concurrent infections [25].

4. **Covid-19 disease and its impact on TB disease care**:- There are reports suggesting that Covid-19 maybhave impact in TB control [26]. According to Adewole, O points out the significant impact of COVID-19 pandemic on TB treatment and has highlighted a marked reduction in number of presumptive and confirmed TB case detection in 2020 during the current pandemic compared to the same time in 2019 in Nigeria. Due to this pancdemic have restricted diagnosis, access to test and treatment centres in Nigeria. As per the Central TB Nikshay portal of Government of India [27] there is dramatic drop since the lockdown.

5. **TB immunization programme and COVID-19**:- As Bacille Calmette Guerin vaccine (BCG) has protective effect against tuberculosis. Due to the COVID-19 pandemic lockdown, suspension of immunization services has been observed; this may result in vaccine preventable disease related deaths and an increased burden on health system. Recently WHO recommends mandatory neonatal BCG vaccination in countries or setting with a high incidence of tuberculosis like India, China, Turkey, Indonesia, South Korea etc. to be continued during in COVID-19 pandemic [28]. But there has been rising debate about the role of BCG in reducing the impact of COVID-19 [29].

6. **COVID-19 pandemic and economic consequences**:- The social economic and biomedical consequences of the COVID-19 pandemic have created problem with respect to tuberculosis disease management [30].A recent study from United Nations advocate that the lung lasting social and economic impacts of the Covid-19 pandemic could threaten publish health programmes and disproportionately effect poor people in poor countries like Africa, Central and South America, South East Asia which are areas with high tuberculosis burden [31]. An increase in tuberculosis transmission and new cases is expected to be worsened by Covid-19 associated economic challenges. Impact on health due to undernutrition and constraints on funding of public welfare programme likely to increase susceptibility to tuberculosis and communicable disease [30].

7. **Community TB Challenges**:- With the lockdown restrictions and reduction in face to face appointments there has been increasing necessity of finding complementary ways of assisting TB patients. Telemedicine can help in community management of TB, and can held via video link or tele conferencing. In extreme cases where neither vedio nor teleconferencing is appropriate for managing the patient, such patients can be followed up with home visits ensuring that the appropriate personal protective equipment is worn by healthcare workers involved.

It is estimated that diabetes is 15% cause of active TB cases due to impaired host defences caused by diabetes. TB patients with concurrent diabetes have severe cavitating disease, adverse treatment outcomes, a higher rate of recurrence following anti tuberculosis treatment, and a higher risk of mortality from TB than patients with TB alone [33].

CONCLUSION

Covid -19 pandemic has a significant in the delivery of various tuberculosis prevention serveillence and treatment programmes.Lockdown and public health guidelines have resulted in tough challenges in traditional management of tuberculosis and has required reconfiguration of methods to support patients including wider use of remote consultations. Finding and treating patients with TB remains the fundamental pillars of TB prevention and care .There should be no break in the continuity of essential services for people affected with TB during the Covid -19 pandemic and should not be ignored or bulldozed by the Covid-19.

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