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Explained | India's diabetes epidemic is making India's TB epidemic worse

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6–7 minutes

A volunteer healthcare worker checks a resident of Sithalapakkam, Chennai, for diabetes. | Photo Credit: B. Jothi Ramalingam/The Hindu

Long before [COVID-19 devastated us](#), India has been experiencing the double burden of two debilitating and severe epidemics – type 2 diabetes (a.k.a. diabetes mellitus, DM) and tuberculosis (TB). The figures for both are staggering. Currently, India has around 74.2 million people living with diabetes while TB affects 2.6 million Indians every year. Yet few know how deeply these diseases are interlinked.

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The evidence is clear: DM increases the risk of developing respiratory infections. We also know DM is a major risk factor that increases the incidence and severity of TB. Also, DM and TB co-infections adversely affect TB treatment outcomes in a patient. The worry is that among people with TB, the prevalence of DM was [found to be](#) 25.3% while 24.5% were pre-diabetic, in a 2012 study in tuberculosis units in Chennai.

How do DM and TB 'work' together?

It's important to understand how these diseases work together. DM not only increases the risk of TB, it also delays the sputum smear and culture conversion of an individual affected by both diseases. In other words, reducing the number of TB bacteria to below the threshold required to claim they have 'healed' will take longer than usual.

DM impairs cell-mediated immunity; uncontrolled DM affects the cytokine response and alters the defences in the alveolar macrophages. The altered functions of small blood vessels in the lung (due to hyperglycaemia) along with poor nutritional status may facilitate the invasion and establishment of TB. As people with diabetes have already compromised immune function, the risk of TB infection is high. They will also have a higher bacterial load.

The coexistence of TB and DM in patients may also modify TB symptoms, radiological findings, treatment, final outcomes, and prognosis. Individuals with TB and DM are more likely to have cavitory lesions in lower lung fields. Our [2016 study](#) revealed that the TB-DM group showed reduced lung functioning after TB treatment completion compared to the TB non-DM group. There was a greater improvement in radiographic scores among people with TB non-DM compared to DM

Our [older study](#), from 2012, showed that the average number of days taken for smear conversion (from 'positive' to 'negative') for people with TB and DM (64.5 days) was higher than that for people with TB only (61.5 days).

DM also increases the likelihood of unfavourable TB treatment outcomes, such as treatment failure, relapse/reinfection, and even death. So people with DM and TB suffer more severely and must fight harder to survive – illustrating the greater impact of the twin burden of DM and TB not just on patients but also on the healthcare system, their families, and their communities.

How does DM affect people with TB?

In individuals affected by both diseases, the lungs are severely affected (in studies, researchers have observed multiple and large lung cavities). Persistent inflammation [has also been seen](#) in people with DM and TB – even after they have completed their TB treatment, speaking to the combined impact of these diseases even after a 'cure'. Experts have reported that TB-related respiratory complications have been a common cause of death among people with TB and DM, but which wasn't the case with people with TB only.

DM directly affects the outcomes of those affected by both diseases. However, a [recent study](#) reported that a higher fraction of unfavourable TB treatment outcomes occurred among people with low body-mass indices and with low glycated haemoglobin levels (better known as HbA1c) compared to people with low BMI and high HbA1c. This indicates that one's nutritional status is important for favourable TB treatment outcomes.

In effect, the study extended the evidence of association of undernutrition with TB.

Another [similar study](#) in Pune found that DM is an independent risk factor for early mortality of people with both TB and DM. It also showed that the most common cause of deaths were respiratory complications (50%) followed by events related to cardiovascular disease (32%) in those affected with TB DM as compared to TB only (27% and 15%).

What should we do?

Given how pervasive TB and DM both are in India, it must take urgent action to tackle both on a war-footing.

For starters, we need to provide integrated and patient-centred (i.e.

more individualised) care for people suffering from both TB and DM, as well as other comorbidities. It is time to turn to evidence from studies to establish mechanisms to coordinate DM and TB diagnosis and treatment, including bidirectional screening of TB and DM, patient education and support, and DM treatment in new TB cases. An important part of this is to improve the nutritional status of people with TB as well as DM, as this can help increase the chances of favourable TB-treatment outcomes.

For another, it is important to intensify high-quality care for TB, DM and other associated comorbidities as part of holistic treatment plans, and to strengthen individual programmes for TB and DM as a priority.

Third, we need to build and scale up resilient and integrated health systems. This will require increased commitment from stakeholders, develop stronger policy guidance as well as the mobilisation of additional resources to be able to support the development of such systems.

Finally, we need to build on the TB-DM research literature, since better decision-making will require access to better data. Studying the nature of interactions between the two diseases and developing appropriate response strategies must be a priority for health professionals, and will benefit patients suffering from both diseases as well as help make communities at large more aware of the impact of their interrelated impact.

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