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Scarred to Death

Confronting India's Silent Killer

By: Arkaprabha Sau

The persistence of silicosis puts at risk India's aims to eliminate tuberculosis this year. The great tragedy is that it is easily preventable.

Sitting on his haunches in the midst of a massive pile of red sandstone blocks, 45-year-old Hemraj Kishore (name changed) strikes hard hammer blows on the chisel. The rhythmic pounding of the hammer releases a fine mist of dust – so minuscule that it is almost invisible. And seemingly harmless.

By the time his 10-hour shift ends, a thick layer of red dust coats his clothes and hair and lines the creases of his ageing face. Kishore wipes away the dust with calloused hands and heads home to a village in Karauli district in east Rajasthan. He is unaware that with each breath his lungs carry more than just fatigue. They are lined with the inhaled red dust from which springs a slow, silent disease – silicosis.

Silicosis is not new. It has lingered in India's mines, quarries and stone-cutting factories in at least three east Rajasthan districts and in Gujarat for decades. But, like the dust itself, it often goes unnoticed until it is too late. A few months ago, the Supreme Court directed the National Green Tribunal to “oversee” the impact of silicosis in India and take steps to financially compensate the affected mine workers.

Rajasthan, known for its sandstone quarries, reports alarming numbers of silicosis cases each year, reflecting the broader national burden of the disease. Globally, silicosis affected [2.65 million people and caused 12,900 deaths](#) in 2019, with low and middle-income countries such as India accounting for most cases due to underreporting and inadequate surveillance.

The number of silica-exposed workers in India is projected to grow [to 52 million by 2025–26 from 11.5 million in 2015–16](#), with prevalence rates reaching as high as 79% in Rajasthan's stone mining sector and 69% in Gujarat's agate industry. This rising burden highlights the urgent need for stronger occupational health policies and improved worker protections to mitigate the impact of silicosis.

Silicosis often invites an [unwelcome companion](#) – tuberculosis – compounding the health challenges faced by workers in India's mining, construction and manufacturing sectors. The scarred lungs of silicosis patients create an ideal ground for tuberculosis (TB) bacteria to thrive, resulting in silico-tuberculosis, a condition that worsens treatment outcomes and increases mortality.

Burden of silico-tuberculosis

In India, where TB remains a significant public health issue, the intersection of these two diseases poses a severe dual burden. [Studies](#) show that patients with silico-tuberculosis stand two-and-a-half times greater risk of developing drug-resistant TB and are four times more likely to require retreatment compared to TB patients without silicosis.

Mortality rates are also significantly higher, with silico-tuberculosis patients exhibiting a two-fold increased risk of death and a [median survival time](#) of just 16 months, compared with 44 months for TB-only patients. Healthcare workers frequently encounter TB treatment failures, often unaware that undiagnosed silicosis is the underlying cause.

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Without addressing silicosis, these patients face recurrent TB episodes, perpetuating a cycle of illness and retreatment. To meet [India's goal](#) of eliminating TB by 2025, it is crucial to integrate silicosis screening into TB programmes, strengthen occupational health initiatives and provide targeted care for high-risk workers.

Silicosis’ tragedy lies in its preventability. Unlike diseases without known cures, silicosis can be effectively stopped at its source by implementing straightforward dust control measures. Simple practices such as [wetting worksites](#) to prevent dust from rising, ensuring proper ventilation, providing workers with masks and protective gear, and conducting regular health check-ups and lung screenings can significantly reduce the risk of exposure.

However, despite the simplicity and effectiveness of these interventions, they are often overlooked. In many industries, economic pressures take precedence over worker safety, with protective equipment perceived as an unnecessary cost and enforcement of regulations remaining weak.

Nevertheless, progress is being made in certain regions. In Rajasthan, where the [major mining areas](#) are in Jodhpur, Bundi, Alwar, Bharatpur, Karauli, Dholpur, and Bhilwara districts, successive state governments have introduced compensation schemes and rehabilitation programmes for silicosis patients.

The state government’s policy, outlined in its [notification](#), provides financial assistance to affected workers, although navigating bureaucratic hurdles to access these benefits can be challenging. Similarly, West Bengal has implemented measures to support workers diagnosed with silicosis, as detailed in a [June 2023 directive](#). Encouragingly, other states are beginning to adopt similar initiatives.

However, to achieve lasting and widespread change, a comprehensive nationwide framework is essential – one that prioritises worker safety, enforces regulations consistently and ensures that preventive measures are not treated as optional, but as fundamental to workplace health and safety.

Deploying AI-based technology

Addressing silicosis demands a holistic approach that integrates technology, public health and sustainable livelihood solutions. Reskilling programmes can reduce reliance on hazardous industries, while educational campaigns empower workers to advocate safer conditions. However, the greatest potential lies in leveraging artificial intelligence (AI) and smart surveillance systems.

[AI-powered chest X-ray analysis](#) can detect early signs of silicosis, allowing for faster diagnosis and intervention, even in remote areas. By embedding smart sensors at high-risk worksites, dust levels can be monitored in real-time, triggering automated misting systems or alerting supervisors to unsafe environments.

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Machine learning models can analyse data from worksites, predicting high-risk zones and guiding preventive measures. Personal exposure monitors can track dust inhalation, providing real-time alerts to workers and management. On a broader scale, [AI-driven public health models](#) can map silicosis hotspots, helping governments allocate resources and prioritise interventions effectively.

Integrating occupational health data with national health systems ensures early detection and timely treatment. Public health initiatives must bridge the gap between occupational health and mainstream healthcare by equipping primary health centres with AI chest X-ray tools and lung screening capabilities.

Mobile health units equipped with these technologies can extend services to remote mining and construction sites. Incorporating [silicosis detection](#) into existing tuberculosis programmes further strengthens efforts to address the dual burden of silico-tuberculosis. This synergy between AI, public health and workplace safety can significantly reduce silicosis cases and improve long-term health outcomes for vulnerable workers.

However, technology alone cannot solve this problem. It demands the commitment of governments to enforce stronger regulations and enforcement, industries to prioritise worker safety and society to acknowledge the hidden human cost behind our everyday conveniences. Ethical sourcing, sustainable practices and amplifying the voices of affected workers can drive meaningful change.

The workers are not alone in their suffering. Families lose their breadwinners, plunging deeper into poverty. Entire communities are affected, forming pockets of illness across mining belts. The cost of silicosis goes beyond health – it weighs heavily on social and economic structures.

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