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Study unpacks factors driving high TB incidence and mortality rates in men

Men experience higher rates of tuberculosis (TB) than women, and multiple factors influence this. In a new study published in the June issue of *Scientific Reports* journal, a team of researchers from the University of Cape Town's Centre for Infectious Disease Epidemiology and Research assessed how sex disparities in TB could be explained by sex differences in the distribution of factors including HIV, antiretroviral treatment (ART) uptake, smoking, heavy alcohol use, undernutrition, diabetes, social contact rates, health-seeking patterns, and treatment discontinuation, over the period 1990-2019.

Using the recently developed Thembisa TB model, a mathematical model which simulates the South African adult TB epidemic, the team showed that throughout the period 1990-2019, South African men developed TB and died at higher rates than women.

Mmamapudi Kubjane, lead author and doctoral graduand, said: "We estimated that in 2019 there were 1.6 times more new TB incidences and 1.7 times more TB deaths in men than women. Our study suggests that lower HIV testing rates and ART initiations in men, lower TB testing rates in men, and the higher prevalence of smoking and alcohol use in men explain most of the higher TB incidence and mortality in men."

In South Africa, HIV, the most important TB risk factor and the main driver of the TB epidemic, is more prevalent in women than men. Using the Thembisa TB model, the team assessed the impact of the evolving HIV epidemic since the early 1990s and the introduction of ART in the mid-2000s on the distribution of TB incidence and mortality rates between sexes from 1990-2019.

The results showed that over time women experienced more substantial relative increases in HIV-associated TB incidence and mortality compared to men. In 2019, HIV was responsible for 55% of TB incidence and 66% of TB mortality among women, while in men, these numbers were 46% and 57%, respectively.

The analysis demonstrated that women benefited more from accessing HIV healthcare services. "Specifically, men have lower HIV testing and ART initiation rates than women," said Kubjane. "Consequently, we estimated that in 2019 women experienced 38% and 52% reductions in TB incidence and mortality due to ART, respectively. In contrast, the

reductions in TB incidence and mortality due to ART for men were 18% and 29%, respectively.”

The study also shed light on the impact of well-documented risk factors that increase the risk of developing TB disease – alcohol use, smoking, diabetes, and undernutrition. Due to the higher prevalence of heavy alcohol use, smoking, and undernutrition among men compared to women, the study estimated higher proportions of TB incidence attributable to these risk factors in males (51%, 30%, and 16%, respectively) compared to females (30%, 15%, and 11%, respectively). In contrast, the proportions of TB cases attributable to diabetes were higher in women than in men (23% compared to 18%).

Kubjane said: “We also estimated that lower health-seeking rates in men accounted for a 7% higher mortality rate, suggesting that delays to diagnosis and treatment in males may lead to greater tuberculosis disease severity and death.”

“Our findings underscore the importance of gender-sensitive approaches in TB prevention and care. Women remain at higher risk of HIV-associated TB. Therefore, sustained efforts in providing ART remain critical. Additionally, we hope these findings will strengthen the case for interventions that specifically allocate resources to target men and improve their access and engagement in TB and HIV healthcare services.”

Kubjane shared: “Although TB is widely recognised as a disease influenced by socioeconomic factors and some of the risk factors we examined, current TB interventions focus primarily on biomedical approaches.

“Despite the progress South Africa has made in TB control, it remains listed among the top six countries accounting for 60% of the global TB incidence. Therefore, these findings emphasise the need for interventions to reduce the prevalence of known TB risk factors and address broader social determinants of TB.”

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