

SARS-CoV-2 infection and pulmonary tuberculosis: an analysis of the situation in Peru

Infección por SARS-CoV-2 y tuberculosis pulmonar: análisis de la situación en el Perú

Infecção por SARS-CoV-2 e tuberculose pulmonar: análise da situação no Peru

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SARS CoV-2 infection, called COVID-19, began in China and spread to the rest of the planet with harmful impacts on public health and the world economy. Brazil was the first country in Latin America, to report a case, in February 2020, followed by gradual spread to the rest of the continent¹, with a heterogeneous pattern in time and in the number of cases, and homogeneous in terms of the socioeconomic effects. As of mid-August, South America had recorded more than 5 million cases and 200,000 deaths². In Peru, following confirmation of the first case in early March³, the measures adopted by the government aimed to mitigate mass transmission and the impact on vulnerable populations through the imposition of an early quarantine, border closings, restriction of domestic and international travel, social distancing, a relief allowance for poor and extremely poor Peruvians, early withdrawal of deposits from private pensions, and closing of schools and universities in order to avoid the collapse of health systems, already weakened⁴.

Nevertheless, despite these containment measures, the Peruvian health systems have been overloaded to the point of collapse. The country has a high number of cases, more than 550,000, the second most in Latin America after Brazil. Of the confirmed cases, some 15,000 Peruvians are hospitalized, with more than 500 receiving mechanical ventilation⁵. More than 25,000 deaths have been reported², with mortality disproportionately affecting the older adult population⁶ and making Peru one of the world's ten countries with the most deaths from the novel coronavirus⁷. The pandemic's magnitude has been compared to that of critical areas in Europe⁸, with the number of cases and deaths increasing rapidly and with a continuously heterogeneous regional distribution in relation to the temporal spread, initially hitting the national capital Lima, regions of the east and north, spreading successively to the south and with no distinction according to climate, geography, or altitude⁴.

Factors in the country's insufficient response to COVID-19 include lack of infrastructure and deficient logistics in the health systems at the national level, centralization of the response plan in hospitals in the capital Lima, low initial budgeting to deal with disease, which includes insufficient medical supplies, limited commitment by the population to comply with the containment measures imposed by the government, and precarious job security and high labor informality^{9,10,11}. The results are the consequences of decades of low investment in health, education, and labor.

Our underlying concern is with the situation after the pandemic for patients diagnosed with pulmonary tuberculosis (TB), the seventeenth leading cause of mortality in the country¹², due to its

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important social component, associated with poverty and malnutrition, endemic problems in Peru. In 2019, 32,970 cases were reported, with an incidence rate of 88.6 new TB cases per 100,000 inhabitants. The statistics reveal an upturn in the number of reported cases compared to previous years. However, the absolute number of individuals with respiratory symptoms has also increased consistently in the last 5 years, reaching 2,049,897 identified cases last year¹³. Uncertainty concerning the pandemic's impact on the sustained growth in the national reporting and surveillance system, alongside the impending socioeconomic crisis, may deepen the health problem with TB in the country.

TB patients are at high risk of succumbing to the novel coronavirus due to their vulnerability from chronic lung damage, associated comorbidities, including HIV infection and diabetes mellitus, malnutrition, and poverty¹⁴. A preliminary observational study in China had already identified pulmonary TB as a risk factor for severe COVID-19¹⁵, corroborating previous findings with other viral pneumonias: influenza, MERS-CoV, and SARS-CoV-1^{16,17}. In addition, case series of coinfection have already been reported that involve a diagnosis of TB following infection with the novel coronavirus¹⁸. However, the high overall prevalence of TB and the growing burden of COVID-19 suggest higher likelihood that coinfection involves simultaneous occurrence rather than a causal association¹⁹. Additional risks have also been discussed, involving insufficient attention to diagnosis, case follow-up, access to treatment, and research in new drugs, diagnostic tests, and vaccine trials to orient efforts and resources to fight COVID-19. The expected results are predictable and include an increase in case reporting, community transmission, and multidrug resistance²⁰. This population is thus at a disadvantage in the race to survive the novel coronavirus.

Meanwhile, COVID-19 survivors may run a high risk of acquiring TB, and infection with the novel coronavirus itself can increase the risk of progression of latent TB infection to the active disease²¹. The hypothetical mechanism lies in immunodepression. The initial unregulated immune response, through the phenomenon called cytokine storm, involves a stage of subsequent immune suppression characterized by a sustained and substantial drop in peripheral lymphocyte count, especially CD4 and CD8 T-cells²². The mechanism for this lymphopenia is still unknown, but new studies hypothesize that the novel coronavirus may directly infect the lymphocytes, particularly T-cells, by initiating and promoting cell death, giving rise to damaged antiviral responses and predisposition to bacterial superinfection²³. This hypothesis is based partially on findings of viral replication in the lymphocyte population in previous studies on SARS-CoV-1²⁴.

A challenge for Peru's national public health system is to mitigate the pandemic's effects without failing to care for preexisting diseases. It is thus essential to anticipate the potentially destructive synergy between COVID-19, TB, and poverty. We support the health benefits of the work done over the years by TB programs in areas such as infection control, diagnosis, contact tracing, and isolation. There is a clear opportunity to take advantage of the acquired knowledge for the pandemic's control²⁵. Meanwhile, any efforts in coronavirus management should be applied to care for TB patients, citing as examples effective social isolation, hand-washing, and mandatory mask-wearing in public places. Likewise, the implementation of new molecular laboratories should serve to optimize and streamline TB diagnosis in the future. Equally important is the development of longitudinal studies to identify the pandemic's future consequences. The current situation is radically changing the way we will manage TB in the immediate future and will further reveal the vulnerabilities. It is essential to reclaim the direction of TB control efforts in order to avoid an unprecedented health crisis.

Contributors

P. Aguilar-León, J. Cotrina-Castañeda and E. Zavala-Flores participated in the study's conception, relevant critical revision of the intellectual content, writing of the article, and approval of the final version for publication, taking full responsibility for all aspects of the work.

Additional informations

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