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Brain Behavior and Immunity

journal homepage: www.elsevier.com/locate/ybrbi

Viewpoint

Tri-infection: Tuberculosis, HIV, COVID-19 and the already strained South African health system

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The 30th of May 2021 marks the latest significant national address, where President Cyril Ramaphosa moves the country back into level two lockdown with the hopes of curving the new COVID-19 surge while guarding an improving economy. The potential third wave comes two months after, the annual commemoration of Dr Koch's March 24th, 1882, Tuberculosis (TB) discovery. March 2021 also marked a year since South Africa (SA) received its first COVID-19 case. An already strained SA public health system could not bear the weight of a third epidemic. This was apparent in a World Health Organization (WHO) report, indicating that SA's access to TB and preventative treatment has plunged by more than 50% between March and June 2020 ([World Health Organization, 2020](#)). Unfortunately, undoing all the work that healthcare programs had put-in to meet the '90-90-90' targets stipulated in the Global plan to end TB. These outcomes are particularly concerning for a nation that continues to present with an unsatisfactory healthcare system. The SA healthcare system was already overburdened and understaffed before COVID-19, serving over 80% of the population who are likely non-white and under privileged.

With these limitations in mind, the SA government implemented one of the most restrictive lockdown measures during the first wave of the COVID-19 epidemic which had a positive impact on a national level however proved to be harsh on the TB and Human Immunodeficiency Virus (HIV) co-infected population.

The first step to disease control considers the highly contagious nature of COVID-19, resulting in governments choice to close the country's borders to mitigate the spread of disease. The second was the banning of cigarette sales as a smoking habit might have a negative effect on individuals infected with COVID-19. The unavailability of cigarettes gave rise to cigarette sharing hence assuring the transmission of disease. Thus, sharing cigarettes becoming a behavioral risk factors that drove TB and COVID-19 infection during the lockdown period. It has been well documented that when individuals infected with HIV and not on Anti-

retroviral Therapy (ART), are at risk of contracting TB which is a disease that exploits those with weakened immune systems, resulting in likelihood of death ([Mukadi et al., 2001](#)). A strict lockdown and the emergence of COVID-19 myths in townships presented another barrier to TB/HIV care. Resulting in many infected individuals being afraid of leaving their homes to collect medication at the local healthcare provider. Therefore, further endangering one's health related quality of life.

Research shows that the neurocognitive impairment rate is 55% for patients with advanced HIV disease ([Yeptthomi, 2006](#)). With a tendency for HIV patients to score in the impaired range according to the international dementia scale. In South Africa, cognitive impairment is reported 50% of the time in the overall HIV population ([Western Cape Government, 2016](#)). Cognitive impairment is the neuropsychological weakening in two or more domains, namely fine movement, memory, fluency, and executive functioning. Functional impairment is the decrease in everyday functioning. These neurocognitive complications can be grouped under a single name, HIV Associated Neurocognitive Disorders (HAND).

The already fragile TB/HIV population were further tasked with self-management and self-soothing practices, independently responsible for mental health maintenance. This is a big request for a community that already battles neuropsychological strain, especially during a pandemic and a restrictive lockdown that had the ability to weaken the mental health of even the more fortunate individuals in the country. The COVID-19 pandemic and lockdown gave rise to peritraumatic distress, depression, and anxiety. For the TB/HIV co-infected population to deal with these feelings, they would have to practice psychological flexibility which is defined as the ability to stay in the present moment irrespective of any unpleasant thoughts, feelings, and bodily sensation. [Pakenham et al. \(2020\)](#) conducted a study looking at the drivers of mental health, showing that the global psychological inflexibility was significantly positively correlated with the COVID-19 lockdown index. Suggesting

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<https://doi.org/10.1016/j.bbi.2021.06.007>

Received 15 April 2021; Received in revised form 10 June 2021; Accepted 12 June 2021

Available online 21 June 2021

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Fig. 1. Distribution of Health-Satisfaction among the TB population of South Africa (NIDS, 2017).

that across the globe most individuals were battling with self-defeating beliefs, experiential avoidance, and focused on the conceptualized past (Schenck, 2020). These findings suggest that the COVID-19 pandemic has had an equally negative mental health impact across all socio-demographic groups (Fig. 1).

However, for some populations such as the TB/HIV co-infected, this pandemic has worsened pre-existing conditions. In early 2020 SA scientists wanted to better understand the potential impact of tri-infection, hence Boule and colleagues explored the association between TB and HIV co-infection and COVID-19, finding that TB/HIV co-infection is indeed linked to COVID-19 mortality (Dreisbach, 2020). In late 2020 a fast-spreading new strain of coronavirus was first discovered in SA. Although it is common for viruses to mutate, the SA strain raised concerns of immune response (Steinhauser, 2021). The discovery of the SA variant also known as B.1.351 resulted in more uncertainties with reports approximating B.1.351 to be 50% more contagious. The halt in vaccination created an ambiguous environment which might have been too much for a disadvantaged TB/HIV co-infected population to handle.

Especially when the lockdown had a less desired effect on household dynamics resulting in increased domestic violence (Stiegler and Bouchard, 2020). With a more devastating effect on the disadvantaged, forcing them into a more concentrate environment with poor sanitation, lack of food, inconsistent income streams and increased promiscuity (Stiegler and Bouchard, 2020). The more concerning of these trials is the decline in healthcare works, with an estimated 391 claimed by COVID-19 by February 2021. SA nurses provide a more hands-on approach, with constant monitoring of patients. This is to help minimize patient default while preventing multi-drug resistances. Regrettably COVID-19 has challenged this strategy, with frontline workers becoming a vulnerable resource, exposed to super-spreading events within the hospital whilst becoming prone to mental health challenges (Stiegler

and Bouchard, 2021).

The world has made progress during these unprecedented times; however, we cannot deny the impact that the COVID-19 pandemic has had on the subjective well-being of the TB/HIV co-infected. Adding more pressure on a populace that is likely to be poverty-stricken and battling felt stigma. While healthcare providers fight to reduce the spread of COVID-19, they should promote initiatives that promote mental health and social cohesion.

References

- Dreisbach, E.N. 2020, HIV, TB associated with increased COVID-19 mortality in South African study. <https://www.healio.com/news/infectious-disease/20200903/hiv-tb-associated-with-increased-covid19-mortality-in-south-african-study> [Accessed Mar 16 2021].
- Mukadi, Y.D., Maher, D., Harries, A., 2001. Tuberculosis case facility rates in high prevalence populations in sub-Saharan Africa. *AIDS* 15 (2), 143–152.
- Pakenham, K.I., Landi, G., Boccolini, G., Furlani, A., Grandi, S., Tossani, E., 2020. The moderating roles of psychological flexibility and inflexibility on the mental health impacts of COVID-19 pandemic and lockdown in Italy. *PMC* 17, 109–118.
- Schenck, L.K. 2020, 6 Core Processes of Psychological Inflexibility. <https://www.mindfulnessmuse.com/acceptance-and-commitment-therapy/6-core-processes-of-psychological-inflexibility> [Accessed May 27 2021].
- Steinhauser, G. 2021, South Africa Covid-19 Strain: What We Know About the New Variant. <https://www.wsj.com/articles/the-new-covid-19-strain-in-south-africa-what-we-know-11609971229> [Accessed May 27 2021].
- Stiegler, N., Bouchard, J.P., 2020. South Africa: Challenges and successes of the COVID-19 lockdown. *Ann. Med. Psychol.* 178, 695–698.
- Stiegler, N., Bouchard, J.P., 2021. Covid-19 en Afrique du Sud : les soignants impliqués. *La revue de l'infirmière* 268, 32–34.
- Western Cape Government, 2016. Provincial Strategic plan on HIV/AIDS, STIs and TB. Department of Health, Cape Town.
- World Health Organization, 2020. Global Tuberculosis Report 2020. World Health Organization, Geneva.
- Yepthomi, T., et al., 2006. Neurocognitive consequences of HIV in southern India: A preliminary study of clade C virus. *J. Int. Neuropsychol. Soc.* 12 (3), 424–430.