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Mental illnesses among COVID-19 patients: Possible immunological underpinnings

To the Editor,

As the COVID-19 pandemic is progressing, the understanding about the pathogenesis, prognostic factors and management is changing. The pandemic has affected almost all the countries of the world and there is no treatment or vaccine available for its treatment. It has been reported that during the course of COVID-19 illness, there is change in immunological parameters in the form of increase in interleukin-6, interleukin 10, and tumor necrosis factor – alpha (Pedersen and Ho, 2020). Certain other immunological changes are reported to be associated with COVID-19 as the severity progresses. Decrease in CD4 and CD8 lymphocytes and reduced expression of interferon –gamma is seen in the CD4 lymphocytes as the illness becomes severe (Pedersen and Ho, 2020).

Cytokine storm is a core immune-pathology in the course of COVID-19 illness and it is a predictor of clinical progression and poor outcome (Henderson et al., 2020; Ye et al., 2020). During the viral illness, the body's innate immune system works in a coordinated fashion to control the infection. However, at times the immune system becomes hyperactive and unregulated, leading to release of excess of pro-inflammatory cytokines and decreased production of endogenous antiviral agents (interferon). This results in cytokine storm (Ye et al., 2020). The virus, SARS-CoV-2 is neuro-invasive. This property of the virus may trigger neuro-inflammation and neuro-degeneration, which may attribute to development of neuro-psychiatric disorder in the COVID-19 patients (Serrano-Castro et al., 2020). The impacts of neuro-inflammation and the progression of neuro-degeneration in long run, is difficult to be predicted. There is need of monitoring various neuropsychological domains of recovered patients of SARS-CoV-2 infection (Serrano-Castro et al., 2020). Researchers hypothesised that acute and severe immune activation leading to cytokine storm is responsible for recent onset neuropsychiatric manifestations in COVID-19 patients (Debnath et al., 2020). The effect of chronic ongoing neuro-inflammation is yet to be seen. It has been seen that chronic neuro-inflammations cause immune-activation that possibly attribute to the development of mood disorders (Brietzke et al., 2020). Evidences suggest that the disease severity has a close link with several immunological parameters like-increased C-reactive protein (CRP), increased lactate dehydrogenase (LDH) and lymphopenia (Zhang et al., 2020). Several other blood parameters like erythrocyte sedimentation rate (ESR), eosinophil count, procalcitonin, neutrophil-lymphocyte ratio, troponin, D-dimer, creatine kinase (CK), aspartate aminotransferase (AST) and interleukin-6 are also found to be deranged in COVID-19 patients (Ponti et al., 2020; Zhang et al., 2020). High level of cortisol in patients with COVID-19 is associated with severe symptoms and increased mortality (Tan et al., 2020).

Several of these parameters have the potential to bring changes in functional changes in brain, which may lead to development of neuropsychiatric disorders. Additionally, the patients with COVID-19

experience anxiety, fear, stress, depression, which also causes alteration in neuroendocrinal changes like – activation of hypothalamo-pituitary-adrenal axis. It further causes worsening of the neuropsychiatric symptoms. The continuation of this vicious cycle may result in continuous worsening of physical and mental health. Incorporation of mental health intervention to the COVID-19 treatment protocol may help in breaking the vicious cycle. As the pandemic is progressing, the mental health issues associated with it, are becoming more evident (Tandon, 2020). There is a need to understand the mental health perspectives of COVID-19 through the immune-biological changes for holistic management of COVID-19 and its neuropsychiatric complications.

Ethical statement

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Declaration of Competing Interest

The authors report no declarations of interest.

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