



# The Vital Role of CD4 Count in Human Immunodeficiency Virus

Kurtkoyokul Ahmet Bilgi\*

Department of Infectious Disease Epidemiology, Kocaeli University, Turkey

## INTRODUCTION

The current Coronavirus disease 2019 (COVID-19) epidemic is caused by the SARS-CoV-2 Coronavirus (SARS-CoV-2). Although it impacts people of all ages and backgrounds, some research suggests that individuals with comorbid conditions like diabetes, obesity, and hypertension are likely to be the most impacted. There are few studies from high-income nations that provide information on chronic illnesses like the Human Immunodeficiency Virus (HIV). This research identifies factors that indicate SARS-CoV-2 seropositivity (IgG + IgM) in HIV-positive, unvaccinated patients at Tanzania's Bugando Medical Center in Mwanza. Methodology: Between June and July 2022, 150 HIV-positive individuals participated in a cross-sectional hospital survey at Bugando Medical Center. Information about the subjects was gathered through the use of a pretested questionnaire. Immunochromatographic assays were performed on blood samples to identify SARS-CoV-2 (IgM/IgG) antibodies. Infection with SARS-CoV-2 stimulates both innate and adaptive immune reactions, including the production of T and B cells that are unique to the virus.

Additionally, it leads to immune system dysfunction, including inflammatory cytokine storms, which have been associated with serious types of COVID-19. It is well known that CD4 T cells are crucial in orchestrating immunological reactions because they cause B cells to produce antibodies. Furthermore, they encourage B and T cell memory formation as well as CD8 T cell effector activity. Despite having CD4 T cell lymphopenia, the SARS-CoV-2 and HIV viruses exhibit different virological traits. People with HIV (PLHIV) were discovered to have a notably elevated chance of contracting SARS-CoV-2 infection, according to recent studies. However, due to the widespread use of antiviral medications, the immune system has become balanced, which is crucial for preventing diseases like COVID-19 and defending against them.

## DESCRIPTION

According to a recent comprehensive analysis, individuals with HIV who are also co-infected with SARS-CoV-2 have a high prevalence of comorbid conditions, particularly diabetes mellitus and hypertension. According to reports, roughly two-thirds of PLHIV patients showed minor to intermediate symptoms, with temperature and cough making up the majority. Deaths among PLHIV have been seen more frequently in men over 50 who have several associated conditions. These findings highlight the importance of routine HIV patient screening for SARS-CoV-2 cases during the COVID-19 epidemic. Reverse transcriptase polymerase chain reaction and the number of clinically verified cases have been primarily used to determine the prevalence of SARS-CoV-2. Seroepidemiological studies are required because not every infected person exhibits COVID-19's signs and symptoms, making it uncertain how widespread the illness actually is. If quantitative assays are used, population-based seroepidemiological research can be used to evaluate the degree of humoral immunity and provide accurate approximations of exposure to infection. By September 2021, approximately 6 out of 10 people would be SARS-CoV-2 seropositive globally, according to a comprehensive analysis. In Africa, seroprevalence was discovered to rise considerably in 2021, from 26.6% to 86.7%. Additionally, a sizable rise was noted in high-income nations and was associated with an increase in immunisation prevalence. Further research using pre-vaccination data showed that low seroprevalence was related to strict public health and societal policies.

Patients with serious symptoms or those who have taken immunosuppressants make up the bulk of cases. The relationship between COVID-19 and cryptococcosis is still unclear, though. After SARS-CoV-2 infection, we describe eight instances of cerebral cryptococcosis in non-HIV individuals that was accompanied by CD4<sup>+</sup> T lymphocytopenia. 5/8 of the population was

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**Corresponding author** Kurtkoyokul Ahmet Bilgi, Department of Infectious Disease Epidemiology, Kocaeli University, Turkey, E-mail: hanplayboytoys@gmail.com

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male and the median age was 57. Additionally, a median of 75 days passed before the identification of cerebral cryptococcosis, and 2/8 of the patients had diabetes and 8/8 had a history of moderate COVID-19. Each patient said they had never previously gotten immunosuppressive treatment. Confusion (8/8), headache (7/8), regurgitation (6/8), and nausea (6/8) were the most prevalent complaints. By identifying *Cryptococcus* in cerebral fluid, all patients' conditions were determined. There were 247 and 173.5 median CD4<sup>+</sup> and CD8<sup>+</sup> T cells, respectively.

HIV and HTLV infection were ruled out as additional immunosuppressive factors in each case. Finally, three patients passed away, one of whom had visual and auditory effects that persisted. During follow-up, the CD4<sup>+</sup>/CD8<sup>+</sup> T lymphocyte level returned to baseline in the patients who lived. We speculate that individuals with CD4<sup>+</sup> T lymphocytopenia in this case series may be more susceptible to developing cryptococcosis after contracting SARS-CoV-2. Cerebral cryptococcosis is an opportunistic infection that primarily affects people with Human Immunodeficiency Virus (HIV) infection and CD4<sup>+</sup> T-lymphocyte counts below 100 cells/L, as well as transplant recipients, patients with haematological malignancies, people who have idiopathic CD4 lymphocytopenia, and people who take

prolonged corticosteroid therapy or other immunosuppressive medications. It rarely manifests in individuals with functioning immune systems.

## CONCLUSION

Although there have been some documented instances of COVID-19, these patients typically had serious illness, were given corticosteroids, and were brought to the ICU. We describe eight instances of brain cryptococcosis among patients receiving care at Lima, Peru's National Institute of Neurological Sciences (INCN), who were not HIV-positive. All patients had COVID-19, which was determined by the clinical picture, IgM/IgG blood antibodies against COVID-19, and/or PCR for SARS-CoV-2 from nasopharyngeal samples. We included all patients who were found to have cerebral cryptococcosis by isolating *Cryptococcus* in cerebrospinal fluid culture and diagnosis or antecedent of confirmed COVID-19 (by RT-PCR of SARS-CoV-2 in those patients with a disease time of less than 7-10 days or by detecting serum IgM/IgG antibodies against SARS-CoV-2 when the disease time was greater than 7-10 days). All survivors provided informed permission for the research, which was authorised by the INCN Research Ethics Committee.