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Evaluation of the severity of COVID-19 in people living with HIV; a review study

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Abstract

Background: Patients with HIV infection may be at an increased risk for morbidity and mortality from the COVID-19. This study aimed to investigate the severity of COVID-19 disease in people living with HIV (PLHIV).

Methods: We conducted a systematic review of all articles and reports conducted in the Scholar, PubMed, and Magiran databases regarding the effects of COVID-19 on PLHIV from the beginning of 2020 until today.

Results: A total of 1893 articles were found. After deleting unrelated articles according to keywords, a total of 507 articles were selected, after deleting duplicate articles, 400 subjects were selected and finally, after reading the abstracts 59 studies were included in our analysis. Finally, 15 papers were selected depending on the type of review.

Conclusion: The results of the present, prevalence, severity of COVID-19 in PLWH was similar general population and this finding suggests that HIV infection not a risk factor for COVID-19 , and generally, PLWH should receive the same treatment approach applied to the general population.

Keywords: COVID 19, SARS-CoV-2 infection, HIV, Review

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified as the agent of coronavirus disease 2019 (COVID-19) and has led to a significant burden of morbidity, mortality worldwide infection and also a global public health crisis posing numerous increasing health and economic challenges (1). This disease can progress to hypoxic respiratory failure, sepsis, and multi-organ system failure, which can be life-threatening (2). In addition to the physical problems, COVID-19 pandemic represents an unprecedented public health threat. Accordingly, mitigation strategies such as enforced lockdown and physical distancing combined with anxiety about potential infection and recently dubbed corona phobia, can have a profound impact on mental health (1).

High-risk population for severe forms included people 60 years and older and those of any age with underlying medical conditions (e.g., chronic lung disease, asthma, heart conditions, etc). are considered to be at greater risk for adverse out comes due to COVID-19 (1). Therefore, it is logical to assume that individuals with other health problems that impact the immune system such as the human immunodeficiency virus (HIV) would be at higher risk of complications and poor prognosis (3) and, therefore, manifesting a severe form of the disease (4).

COVID-19 is associated with lymphopenia, and thereby, an absolute number of CD4 lymphocytes is expected to decrease in these patients. Hence, infection with COVID-19 can theoretically reduce CD4 count in people living with HIV (PLHIV). A decrease in CD4 count is associated with increased susceptibility to opportunistic infections (5). The risk of further complications due to SARS-CoV-2 infection is even higher for HIV-infected patients with low- CD4 cell count, even when they are not on antiretroviral regimens (ARVs). This has created fear and panic among HIV patients globally, especially those from low-income countries (6).

Antiviral used in the treatment of HIV were initially suggested to have a beneficial impact on COVID-19 infection (1). In addition to the economic resources and manpower for HIV care have been shunted to COVID-19 centers. The lockdown imposed at various times has

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Implication for health policy/practice/research/ medical education

Severity of COVID-19 in in people living with HIV was similar to general population.

inadvertently affected the access to HIV testing and care (5).

Objectives

The purpose of this review is to evaluation of the severity of COVID-19 disease in PLHIV.

Methods

Protocol and registration

This is a review on the highest interest scientific topic of the day, related to pandemic COVID-19. We have searched major electronic databases (PubMed, Google Scholar and Medline) to identify available evidence providing information on severity of COVID-19 disease in PLHIV. Keywords used include HIV, AIDS, COVID-19, SARS-CoV-2, and coronavirus 2.

Study design

Our study was performed from a review and Analysis of published reports examining the on severity of COVID-19 disease in PLHIV included clinical trials, prospective and retrospective cohort studies, case-control studies; cross-sectional studies, case series, and case reports.

Intervention

We included clinical studies involving assessment of the severity of COVID-19 disease in PLHIV between to 23 December 2020 and 14 Jan 2022 using "HIV and COVID-19"assearch term without restrictions on the study type of setting. The extracted information included mortality, clinical benefits, and adverse events. Outcomes were extracted in all data forms (eg, dichotomous and continuous) as reported in the included studies. The results of our databases search were documented and described in Figure 1 and Table 1.

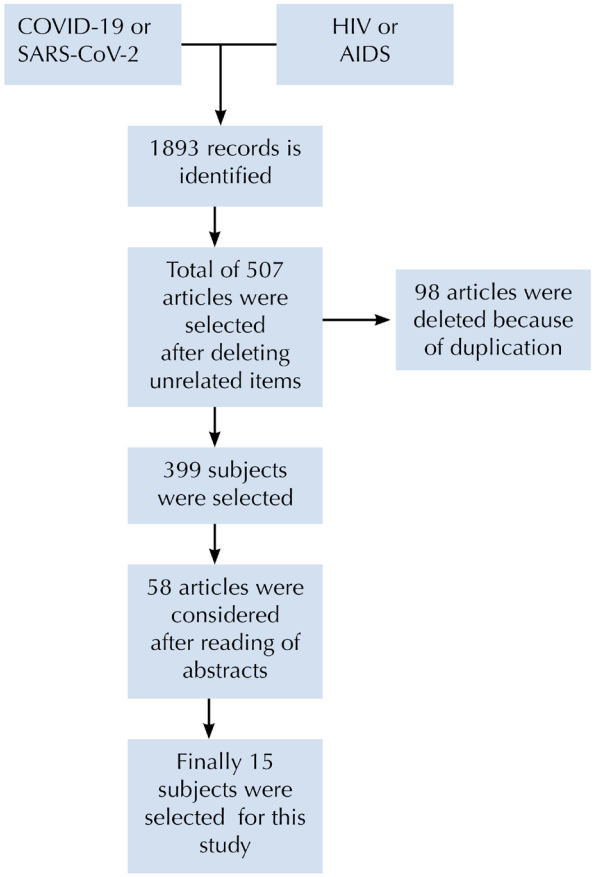

Figure 1. Summary of search strategy and paper exclusion.

Discussion

According to the World Health Organization, by the end of 2018, there were approximately 37.9 million PLWHs, with an estimated prevalence of 0.6 to 0.9 percent of 15- to 49-year-olds worldwide with HIV (22). COVID-19 is a potentially fatal respiratory illness caused by SARS-CoV-2) (23).

Generally, PLHIV are perceived to be at high risk of contracting SARS-CoV-2, even though currently (24), and no specific information about the risk of COVID-19 in people with HIV is available. However, the prevalence and prognosis, as well as other clinical characteristics of COVID-19 co-infected PLWH, have not been studied extensively, as an analysis, some studies reported, most symptoms of COVID-19, such as cough, fever, malaise, hospitalized intensive care unit (ICU) admission and breathlessness, in PLWH were similar to the normal population and HIV is not a negative prognostic indicator in COVID-19 infections so (8,10,11,13,15-17). Although, in the some if studies mentioned persons living with diagnosed HIV experienced poorer COVID-related outcomes relative to persons living without diagnosed HIV (20), this may be due to the use of antiviral drugs that can affect the SARS-CoV-2.

Maggiolo and et al, concluded that HIV-infected individuals are not protected from SARS-CoV-2 infection or have a lower risk of severe disease and generally they should receive the same treatment approach applied to the general population (17).

According to some of studies, the presence of comorbidity in particular heart disease, diabetes mellitus, hepatic disease, hypertension, and lung disease affects the severity of COVID-19 complications in PLWH (25).

In addition to the COVID-19 pandemic represents an unprecedented public health threat, and mitigation strategies such as enforced lockdown and physical distancing combined with anxiety about potential infection, recently dubbed 'corona phobia,' can have a profound impact on mental health (1).

Table 1. The study characteristics and the data extracted

Author Name	Location	Population	Number of people surveyed	Type of study	Result
DM Willner (7)	New York City	Patients were identified with HIV and COVID-19 from March 15th –June 18th 2020.	39	Retrospective	Final outcome of the patients, with 77% of the patients discharged, and a mortality rate of 18%. Of note, the only age had a significant correlation with mortality.
Ming J Lee (8)	China	17 PLWH and 50 matched HIV-negative	67	Retrospective study	PLWH had fewer deaths, and have not worse outcomes than HIV-negative patients even after adjustment for confounding variables - HIV is not a negative prognostic indicator in COVID-19 infections.
AM Geretti (9)	Hospitals in England, Scotland	People with COVID-19	53993	Prospective Observational	HIV-positive status was associated with an increased risk of day-28 mortality among patients hospitalized for COVID-19.
J Huang (10)	Wuhan city, China	COVID-19 cases in PLHIV	35	Cohort	With the cumulative incidence of COVID-19 to be 0.58% (95%CI: 0.42%-0.81%). Among the COVID-19 cases, 15 (42.86%) had severe illness, with 2 deaths.
ME Ceballos (11)	Santiago	PLHIV hospitalized with COVID-19	36	Prospective, multicentric, observational study	The findings of this study do not support that PLWH have a higher risk for aggravation or death from COVID-19 than the general population. We are still learning and understanding about the interactions between HIV and SARS-CoV-2. Further studies should clarify the effect of HIV on the overall risk of COVID-19.
Del Amo J (12)	Spain	HIV-positive persons receiving ART	236	Cohort Study	15 were admitted to the ICU, and 20 died. The risks for COVID-19 diagnosis and hospitalization were greater in men and persons older than 70 years. HIV-positive patients receiving TDF/FTC have a lower risk for COVID-19 and related hospitalization than those receiving other therapies. No patient receiving TDF/FTC was admitted to the ICU or died.
D'Souza G (13)	US	Participants, including PLWH and HIV-seronegative (SN)	3411	Cohort	Prevalence and type of COVID-19 symptoms were similar in PLWH and seronegative. SARS-CoV-2 infection may be elevated among PLWH.
Karmen-Tuohy S (14)		HIV-Positive Patients Hospitalized With COVID-19	21 HIV-positive patients with 42 non-HIV patients	Retrospective matched cohort study	Mortality, hospitalization and other inflammatory markers were not statistically significant. Outcomes in our cohort are similar in all patients with COVID-19. HIV-positive patients had significantly higher admission and peak C-reactive protein values.
Nagarakanti SR (15)	Newark Beth Israel Medical Center (47)	COVID-19 in people with HIV	23	Retrospective cohort	In our cohort of HIV-infected patients, mortality, ICU admission, and the need for mechanical ventilation was similar all patients with COVID-19.

Table 1. Continued

Author Name	Location	Population	Number of people surveyed	Type of study	Result
Stoeckle K(16)	New York City	COVID-19 in Hospitalized Adults With HIV	30	Retrospective cohort	The clinical manifestations and outcomes of COVID-19 among patients with SARS-CoV-2 and HIV co-infection was similar patients without HIV co-infection. However, PLWH were hospitalized with less severe hypoxemia, a finding that warrants further investigation. Differences in the need for invasive mechanical ventilation during hospitalization, length of stay, or in-hospital mortality.
Maggiolo F(17)	Italy	HIV)-infected individuals PLHIV with confirmed SARS-CoV-2 infection	55	Prospective cohort	Age distribution, gender, time with HIV infection, among patients with SARS-CoV-2 and HIV co-infection was similar patients without HIV co-infection. The clinical symptoms were similar to normal people. HIV-infected individuals are not protected from SARS-CoV-2 infection or have a lower risk of severe disease.
Geretti AM (18)	United Kingdom	COVID-19 in people with HIV	122	Prospective observational study	HIV-positive people were younger, and had fewer comorbidities, more systemic symptoms and higher lymphocyte counts and C-reactive protein levels. The cumulative day-28 mortality was similar in the HIV-positive and HIV-negative groups, but in those under 60 years of age HIV-positive status was associated with increased mortality, Mortality was higher among people with HIV after adjusting for age.
Yang R (19)	Wuhan, China	COVID-19 in people with HIV	3	retrospective study	the patients with SARS-CoV-2 and HIV coinfection had higher maximum body temperatures. Longer duration of fever, longer time to have improvement of chest CT images (22 vs 15 days from the onset of illness, lower level of SARS-CoV-2 IgG. However, no statistically significant difference of duration of SARS-CoV-2 shedding in the two groups was found.
Tesoriero JM (20)	New York	HIV-infected patients with COVID-19	2988	cohort	Persons living with diagnosed HIV experienced poorer COVID-related outcomes relative to persons living without diagnosed HIV.
Nasreddine R (21)	Belgium	HIV-infected patients with COVID-19	101	Retrospective cohort	Median age was 51.3 years and 44% were female. Overall, 46% of patients required hospitalization and the median length of hospital stay was 6 days.

Conclusion

The results of the present, prevalence, severity of COVID-19 in PLWH was similar general population and this suggests that HIV infection not a risk factor for COVID-19 , and generally, PLWH should receive the same treatment approach applied to the general population. Of course, this pointed should be noted, must people infected with HIV were treated with antiviral prophylaxis, which it may prevent CD4 decrease and thus suppress of the immune system.

Conflicts of interest

The authors declare that they have no competing interests.

Ethical issues

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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References

1. Jones DL, Ballivian J, Rodriguez VJ, Uribe C, Cecchini D, Salazar AS, et al. Mental Health, Coping, and Social Support Among People Living with HIV in the Americas: A Comparative Study Between Argentina and the USA During the SARS-CoV-2 Pandemic. AIDS Behav. 2021;25:2391-2399. doi: 10.1007/s10461-021-03201-3.
2. Sikkema KJ, Dennis AC, Watt MH, Choi KW, Yemeke TT, Joska JA. Improving mental health among people living with HIV: a review of intervention trials in low- and middle-income countries. Glob Ment Health (Camb). 2015;2:e19. doi: 10.1017/gmh.2015.17.
3. Shareef MA, Bashaiwth HM, AlAkbari AO, Bahamran MS, AlAmodi MO, Albaiti SH, et al. A systematic review of contemporary evidence on SARS-CoV-2 and HIV coinfection: What does it look like up to date? Avicenna J Med. 2020;10:189-197. doi: 10.4103/ajm.ajm_175_20.
4. Di Giambenedetto S, Del Giacomo P, Ciccullo A, Porfidia A, De Matteis G, Cianci R, et al. SARS-CoV-2 infection in a highly experienced person living with HIV. AIDS. 2020;34:1257-1258. doi: 10.1097/QAD.0000000000002572.
5. Bhatt M, Soneja M, Gupta N. COVID-19 in patients living with human immunodeficiency virus (HIV) infection: Challenges and way-forward. Drug Discov Ther. 2021;15:42-43. doi: 10.5582/ddt.2020.03111.
6. Adadi P, Kanwugu ON. Living with HIV in the time of COVID-19: A glimpse of hope. J Med Virol. 2021;93:59-60. doi: 10.1002/jmv.26118.
7. Willner DM, Bengualid V, Bisono-Garcia B, Trigueros R, Berger J. 525. Characteristics of HIV SARS-COV-2 Coinfection in a Highly HIV Seropositive Population in New York City. InOpen Forum Infectious Diseases 2020 Oct. US: Oxford University Press. doi: 10.1093/ofid/ofaa439.719.
8. Lee MJ, Smith C, Snell LB, Lwanga J, Simons R, Fitzgerald N, et al. Comparative outcomes in hospital admissions with COVID-19 in people living with HIV and people living without HIV: A retrospective study. AIDS 2020 Virtual; July 2020. doi: 10.13140/RG.2.2.13341.54249.
9. Geretti AM, Stockdale AJ, Kelly SH, Cevik M, Collins S, Waters L, et al. Outcomes of Coronavirus Disease 2019 (COVID-19) Related Hospitalization Among People With Human Immunodeficiency Virus (HIV) in the ISARIC World Health Organization (WHO) Clinical Characterization Protocol (UK): A Prospective Observational Study. Clin Infect Dis. 2021;73:e2095-e2106. doi: 10.1093/cid/ciaa1605.
10. Huang J, Xie N, Hu X, Yan H, Ding J, Liu P, et al. Epidemiological, Virological and Serological Features of Coronavirus Disease 2019 (COVID-19) Cases in People Living With Human Immunodeficiency Virus in Wuhan: A Population-based Cohort Study. Clin Infect Dis. 2021;73:e2086-e2094. doi: 10.1093/cid/ciaa1186.
11. Ceballos ME, Ross P, Lasso M, Dominguez I, Puente M, Valenzuela P, et al; Chilean HIV/COVID-19 Study Group. Clinical characteristics and outcomes of people living with HIV hospitalized with COVID-19: a nationwide experience. Int J STD AIDS. 2021;32:435-443. doi: 10.1177/0956462420973106.
12. Del Amo J, Polo R, Moreno S, Díaz A, Martínez E, Arribas JR, et al; The Spanish HIV/COVID-19 Collaboration. Incidence and Severity of COVID-19 in HIV-Positive Persons Receiving Antiretroviral Therapy : A Cohort Study. Ann Intern Med. 2020;173:536-541. doi: 10.7326/M20-3689.
13. D'Souza G, Springer G, Gustafson D, Kassaye S, Alcaide ML, Ramirez C, et al. COVID-19 symptoms and SARS-CoV-2 infection among people living with HIV in the US: the MACS/WIHS combined cohort study. HIV Res Clin Pract. 2020;21:130-139. doi: 10.1080/25787489.2020.1844521.
14. Kuman Tunçel Ö, Pullukçu H, Erdem HA, Kurtaran B, Taşbakan SE, Taşbakan M. COVID-19-related anxiety in people living with HIV: an online cross-sectional study. Turk J Med Sci. 2020;50:1792-1800. doi: 10.3906/sag-2006-140.
15. Nagarakanti SR, Okoh AK, Grinberg S, Bishburg E. Clinical outcomes of patients with COVID-19 and HIV coinfection. J Med Virol. 2021;93:1687-1693. doi: 10.1002/jmv.26533.
16. Stoeckle K, Johnston CD, Jannat-Khah DP, Williams SC, Ellman TM, Vogler MA, et al. COVID-19 in Hospitalized Adults With HIV. Open Forum Infect Dis. 2020;7:ofaa327. doi: 10.1093/ofid/ofaa327.
17. Maggiolo F, Zoboli F, Arosio M, Valenti D, Guarneri D, Sangiorgio L, et al. SARS-CoV-2 infection in persons living with HIV: A single center prospective cohort. J Med Virol. 2021;93:1145-1149. doi: 10.1002/jmv.26352.
18. Geretti AM, Stockdale AJ, Kelly SH, Cevik M, Collins S, Waters L, et al. Outcomes of Coronavirus Disease 2019 (COVID-19) Related Hospitalization Among People With Human Immunodeficiency Virus (HIV) in the ISARIC World Health Organization (WHO) Clinical Characterization Protocol (UK): A Prospective Observational Study. Clin Infect Dis. 2021;73:e2095-e2106. doi: 10.1093/cid/ciaa1605.
19. 20.Yang R, Gui X, Zhang Y, Xiong Y, Gao S, Ke H. Clinical characteristics of COVID-19 patients with HIV coinfection in Wuhan, China. Expert Rev Respir Med. 2021;15:403-9. doi: 10.1080/17476348.2021.1836965.
20. Tesoriero JM, Swain CA, Pierce JL, Zamboni L, Wu M, Holtgrave DR, et al. Elevated COVID-19 outcomes among persons living with diagnosed HIV infection in New York State: Results from a population-level match of HIV, COVID-19, and hospitalization databases. MedRxiv. 2020 Jan 1. doi:10.1001/jamanetworkopen.2020.37069.
21. Nasreddine R, Florence E, Moutschen M, Yombi JC, Goffard JC, Derdelinckx I ,et al; Belgian Research on AIDS and HIV Consortium (BREACH). Clinical characteristics and outcomes of COVID-19 in people living with HIV in Belgium: A multicenter, retrospective cohort. J Med Virol. 2021;93:2971-

2978. doi: 10.1002/jmv.26828.
22. Costenaro P, Minotti C, Barbieri E, Giaquinto C, Donà D. SARS-CoV-2 infection in people living with HIV: a systematic review. Rev Med Virol. 2021;31:1-12. doi: 10.1002/rmv.2155.
23. Kanwugu ON, Adadi P. HIV/SARS-CoV-2 coinfection: A global perspective. J Med Virol. 2021;93:726-732. doi: 10.1002/jmv.26321.
24. Wu M, Ming F, Wu S, Liu Y, Zhang X, Guo W, et al. Risk of SARS-CoV-2 Infection Among People Living With HIV in Wuhan, China. Front Public Health. 2022;10:833783. doi: 10.3389/fpubh.2022.833783.
25. Braunstein SL, Lazar R, Wahnich A, Daskalakis DC, Blackstock OJ. Coronavirus Disease 2019 (COVID-19) Infection Among People With Human Immunodeficiency Virus in New York City: A Population-Level Analysis of Linked Surveillance Data. Clin Infect Dis. 2021;72:e1021-e1029. doi: 10.1093/cid/ciaa1793.