LITERATURE REVIEW

Final Condition of HIV Patients Infected with COVID-19 after Receiving Hospital Treatment: A Systematic Review

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ARTICLE INFO

Article history:
Received 27 June 2022
Received in revised form
23 September 2022
Accepted 15 December 2022
Available online 30 January 2023

Keywords:
COVID-19,
Human immunodeficiency virus,
Infection.

Cite this as:
Hidayat E, Bakar A, Nursalam, *et al*. Final Condition of HIV Patients Infected with COVID-19 after Receiving Hospital Treatment: A Systematic Review. *J Respi* 2023; 9: 56-63.

ABSTRACT

Introduction: Coronavirus disease 2019 (COVID-19) can attack anyone, including those who have human immunodeficiency virus (HIV) due to low immune systems. This study aimed to evaluate the final condition of people living with human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) (PLWHA) who received treatment at the hospital.
Methods: A literature investigation of the last three years (2020-2022) were inquired. Electronic databases (Science Direct, Scopus, ProQuest) with case series or case report designs were examined. The titles, abstracts, and full texts were screened to obtain relevant studies. Data tabulation and narrative analysis were conducted, resulting in 14 studies that met the inclusion criteria. Most of them were case series and case report methods. Each study had different numbers of patients and criteria discussing COVID-19 infection in HIV patients.
Results: A total of 14 reviewed studies revealed that HIV patients with COVID-19 could recover from the infection if proper treatments were performed. Some articles also stated that self-isolation at home can manage HIV-infected patients who are not yet severe. In the case of patients with severe infections, intensive care is performed using supplemental oxygen or a ventilator to prevent respiratory failure or acute respiratory distress.
Conclusion: COVID-19 can worsen the condition of patients with HIV if not appropriately treated. Otherwise, if the proper treatment is properly performed, it can cure the infection.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an infection from a virus (SARS-CoV-2) that infects the respiratory tract. It is a crisis matter due to its exceptionally rapid spread. COVID-19 can be suspected in patients with respiratory symptoms, such as fever >38°C, influenza, sore throat, history of traveling, or direct contact with suspected cases of confirmed COVID-19.[1] To relieve the symptoms, patients with mild conditions can consume over-the-counter or prescription drugs, and it is recommended to self-isolate at home.[2] Patients with severe infections should be hospitalized. Respiratory failure and acute respiratory distress syndrome require intubation and mechanical ventilation.

COVID-19 has high mutations. It is an organism that can live in animals and humans with various symptoms.[3] During the pandemic, people are afraid to go to the hospital for treatment, especially people living with human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) (PLWHA), who are susceptible to the disease. It is important to treat PLWHA who have symptoms of complications due to being infected with COVID-19.[5]

The final condition of PLWHA infected with COVID-19 after receiving treatment at the hospital showed different conditions, depending on the success of the treatment. Based on several studies, some PLWHA who were infected with COVID-19 after receiving treatment at the hospital recovered, and those who experienced complications of pneumonia got more than two weeks of treatment.[6] Several other studies revealed that after the treatment at the hospital, there was a cure for PLWHA infected with COVID-19. Still, some died after being treated with incentives.[7] Many

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Jurnal Respirasi, p-ISSN: 2407-0831; e-ISSN: 2621-8372.
Accredited No. 200/M/KPT/2020; Available at https://e-journal.unair.ac.id/JR. DOI: 10.20473/jr.v9-I.1.2023.56-63
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factors affect the success or failure of treatment related to improving the final condition of PLWHA infected with COVID-19. Receiving treatment, among others, was caused by differences in the type of treatment, such as severity and quality of care received.[8] Based on this statement, it is necessary to study its impact on HIV patients infected with COVID-19.

COVID-19 is reported to have a mortality rate of 2-3%. There is a significant concern worldwide due to COVID-19 cases.[5] This virus could be more dangerous if it is suffered by those who have congenital diseases, such as heart, lung, and diabetes, and those who have weak immunity.[9] One of these concerns will be felt by those who are HIV-positive. Therefore, there are several things that people with HIV who have a weak immune system must pay attention to during this pandemic. According to the Ministry of Health, 13,000 cases, including 435 deaths, have occurred since human interaction with COVID-19.[10]

PLWHA are a group of people with the weak immune system. Those who are infected with HIV have decreased CD4 cells. These leukocytes are essential in the defense system of the body.[5] People with HIV will be susceptible to respiratory diseases, especially COVID-19, because their antibodies are weak and they even have a doubled risk of death rather than the healthy people.[9] A cohort study in South Africa with a large sample revealed that PLWHA infected with COVID-19 are twice as likely to die.[10]

Based on this background, this study aimed to evaluate the final condition of PLWHA infected with COVID-19 who received treatment at the hospital.

METHODS

Literature Search Strategy

The secondary data in this study were from previous studies in the form of journal articles of international journals with a pre-determined theme, which was then analyzed. The literature search in this systematic review used the Science Direct, Scopus, and ProQuest databases. The writing rules of the article search results followed the appropriate protocol and rules using the PRISMA flow chart. The finding for relevant journals was performed in January-February 2022. Formulating questions in this study used the PICOS format. The determination of inclusion and exclusion criteria was included in the PICOS format. The studies were selected if they met the following inclusion criteria: (1) all studies with a case series design, cohort study, and descriptive design; (2) interventions in HIV-infected patients with COVID-19; (3) outcomes related to the final condition of PLWHA infected with COVID-19 after being hospitalized.

A literature search used keywords that have been adjusted to Medical Subject Heading (MeSH), then a combination of boolean operators AND, OR, and NOT, with searched keywords, namely "Coronavirus OR SARS COV 2" AND "HIV OR AIDS" AND "INFECTION OR COINFECTION" with studies selected between the year 2020-2022 because this study wanted to review the most recent studies.

PICOT

The inclusion criteria are described in Table 1. Studies that discussed the correlation between PLWHA infected with COVID-19 without comparing the severity of the patients were included.

Table 1. Inclusion and exclusion criteria

PICOT framework	Inclusion criteria	Exclusion criteria
Population	The study focused on HIV patients infected with COVID-19 and had undergone treatment	The population of HIV patients who were not infected with COVID-19
Intervention	Interventions in HIV patients infected with COVID-19	Interventions were not performed on HIV patients infected with COVID-19
Comparison	No comparison	
Results	The final condition of PLWHA infected with COVID-19 who had undergone treatment at the hospital	Did not explain the final condition of PLWHA infected with COVID-19 after undergoing treatment at the hospital
Time	2020-2022	Before 2020
Design study	Case series, cohort study, case report, descriptive	No exceptions
Language	English	Non-English

Data Extraction

Five authors participated in the preparation of this systematic review. The systematic work was all articles that had been collected and then filtered on the articles that had been found. Then articles that did not meet the inclusion and exclusion criteria or some problems that needed to be fixed in the process were resolved together to create a systematic and practical solution. The authors used it as a reference in writing this systematic review that did not discuss the effects of COVID-19 on PLWHA.

RESULTS

Characteristics of the Study

Fourteen articles met the criteria (Figure 1). The included studies discussed the condition of HIV-infected patients with COVID-19. Contributing articles

involved case reports, case series, cohort studies, and descriptive studies, where the dominant studies were case reports and case series of 23,031 participants. The studies consisted of six case series,[11,12,13,14,15,16] five case reports,[17,18,19,20,21] two descriptive studies,[7,22] and one cohort study.[10] Study locations varied, including Spain,[11] Unites States,[7,12,17,19,13,14] United Kingdom,[15] France,[22] South Africa,[10] Uganda,[18] Japan,[20] China,[22] and Italy.[23]

Study Selection

Study selection used PRISMA guidelines, the first potential article was retrieved from the database (n=508). Two reviewers independently screened the literature, extracted data, and performed cross-check. In the literature screening process, the title of the text was read first. Duplicate deletion was performed and identified as relevant to the topic (n=200), screening based on title (n=84), then conducting a review of the topic and abstract producing relevant studies (n=24), full-text articles (n=17), and articles fulfilling the condition (n=14). This study found 14 articles that were eligible for a systematic review. The exclusion criteria included irrelevant studies and incomplete explanations about the impact of COVID-19 on PLWHA.

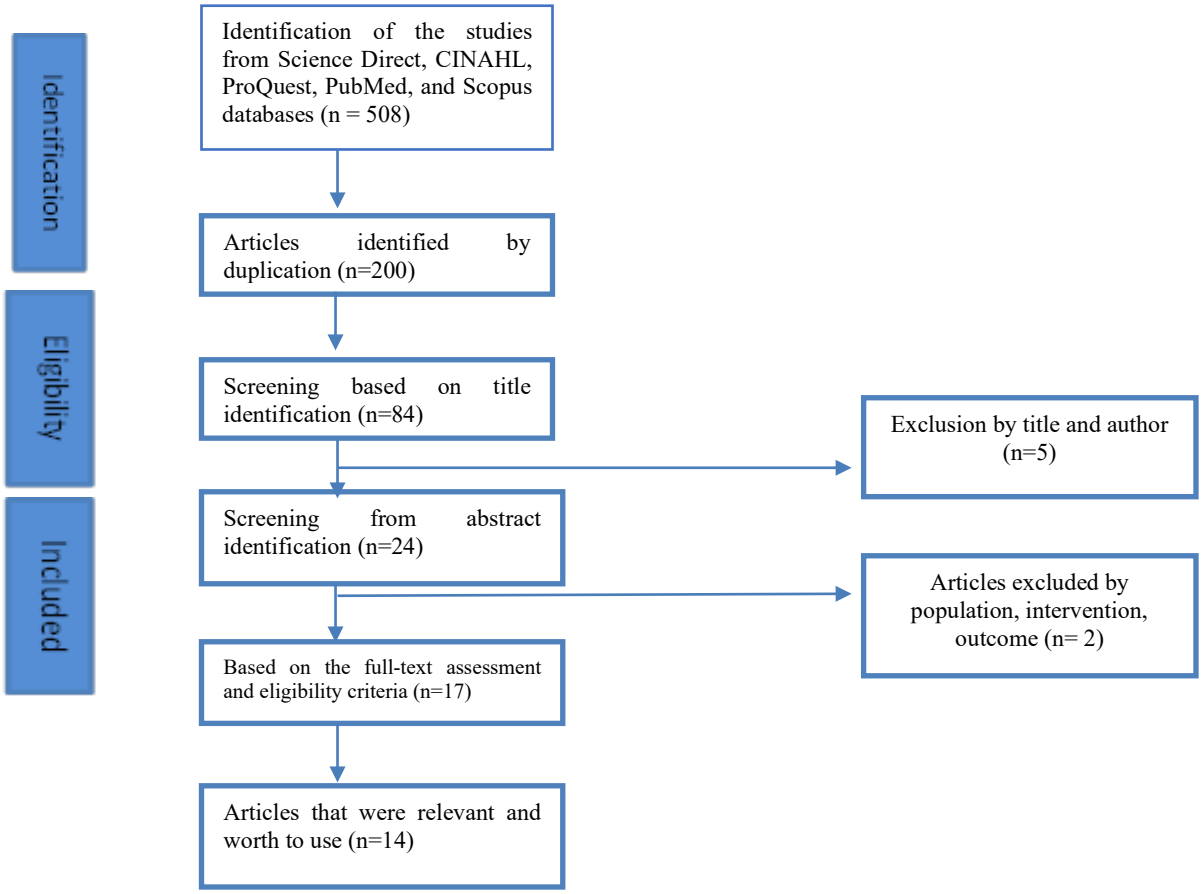

Figure 1. PRISMA flow diagram

Table 2. Data taken from collected studies

No.	Author(s)	Country	Study design	Samples	Results
1.	Blanco JL, *et al*., 2020[11]	Spain	Case series	5 patients	• The treatment was performed until the end of the study. Out of five patients, four recovered and were allowed to go home, one was still being treated. • Pneumonia occurred in patients with low CD4 cells but could be treated with antibiotics.
2.	Gudipati S, *et al*., 2020[7]	United States	Descriptive	14 patients	• The sample in this study involved 14 PLWHA. 12 patients were male and two females due to less severe conditions. • The screening was performed in the emergency unit on patients who had mild symptoms. In the end, six patients went back home for self-isolation. • The other eight patients were hospitalized, and one needed oxygenation. Two of the eight patients who underwent treatment in the inpatient room were moved to the intensive care unit (ICU) for ventilator installation. • Symptoms that appeared include shortness of breath, cough, fever, and diarrhea.
3.	Byrd KM, *et al*., 2020[12]	United States	Case series	27 patients	• 27 PLWHA infected with COVID-19 participated. There were 20 males, six females, and one transgender female with an average age of 49 years old. The patients with HIV viral load were <200, and were still on anti-retroviral therapy with low CD4 cell counts in 27 patients. • The patients received treatment for up to 28 days, and one died. Nine patients recovered quickly, the rest were still being treated in the ICU.
4.	Isernia V, *et al*., 2020[22]	France	Descriptive	30 patients	• The samples were 16 male patients, 10 female patients, and four transgender females with an average age of 53 years old. • 11 patients had comorbid cardiovascular disease, 11 hypertension, nine diabetes, seven obesity, and five chronic kidney disease. 27 samples with CD4 were >500. • The patient was provided antiviral as a treatment. 24 patients recovered, three needed a ventilator, two died, and another four were still hospitalized.
5.	Boulle A, *et al*., 2021[10]	South Africa	Cohort study	22,308 participants	The results showed that the risk of death was twice as significant for PLWHA infected with COVID-19.

6.	Suwanwongse K, *et al*., 2021[17]	United States	Case report	5 patients	Delays in administering corticosteroids caused a high mortality rate in HIV patients with COVID-19. Due to limited resources for health services and because the patients were already vulnerable, the mortality rate increased.
7.	Baluku JB, *et al*., 2020[18]	Uganda	Case report	5 patients	Administration of hydroxychloroquine and broad-spectrum antibiotics were adequate for HIV patients infected with COVID-19 without other comorbidities and reduced infection in these patients.
8.	Benkovic S, *et al*., 2020[19]	United States	Case report	4 patients	PLWHA infected with uncomplicated COVID-19 could be treated by self-isolation.
9.	Nakamoto T, *et al*., 2020[20]	Japan	Case report	1 patient	The results showed that more severe complications in PLWHA infected with COVID-19 did not occur if they had proper treatment. Administration of immune reconstitution inflammatory syndrome (IRIS) therapy with antiretroviral therapy (ART) should be performed with caution in PLWHA infected with COVID-19.
10.	Menghua W, *et al*., 2020[21]	China	Case Report	One patient	In PLWHA infected with COVID-19, the release of the virus takes longer, hence they need more than 14 days for isolation and monitoring when they return home to avoid complications.
11.	Ridgway JP, *et al*., 2020[13]	United States	Case series	5 patients	The patients' symptoms varied: cough, influenza, fever, gastroenteritis, and dyspnea. Two of them had heart symptoms. The patients had already been on ART with CD4 cell counts over 200. Five patients were treated in the treatment room, and two used oxygen. Azithromycin, cephalosporin, and hydroxychloroquine antibiotics were used. All patients recovered after having treatment for three days.
12.	Collins LF, *et al*., 2020[14]	United States	Case series	530 patients	The last symptoms occurred in about five days, such as cough, malaise, fever, and dyspnea. On admission, the patient required oxygenation assistance, some required intensive care and intubation. About 15% of the total sample died.
13.	Cooper TJ, *et al*., 2020[15]	United Kingdom	Case series	70 patients	• PLWHA with well-controlled disease will reduce severe complications when infected with COVID-19.

					• Complications that were often encountered in PLWHA infected with COVID-19 involved pneumonia to death.
14.	Calza L, *et al*., 2020[16]	Italy	Case series	26 patients	Of the 26 samples treated, five had pneumonia complications, but none died. Five patients were treated in the ICU.

Quality Assessment and Risk of Bias

The assessment used allowable weight (JBI) to analyze the quality study (n=9). In the JBI assessment, various assessment criteria were used. These criteria used a score of '*Yes*', '*No*', '*Unclear*', and '*Not Applicable*'. The *Yes* criteria had one point, after which the points were totaled. The cut-off point used in determining the score was 50%; if the result showed 50% or more, it was included in the analysis. To avoid the risk of bias, this study did not include low-quality studies in the review. In the end, 14 studies revealed scores above 50% and could be data synthesis.

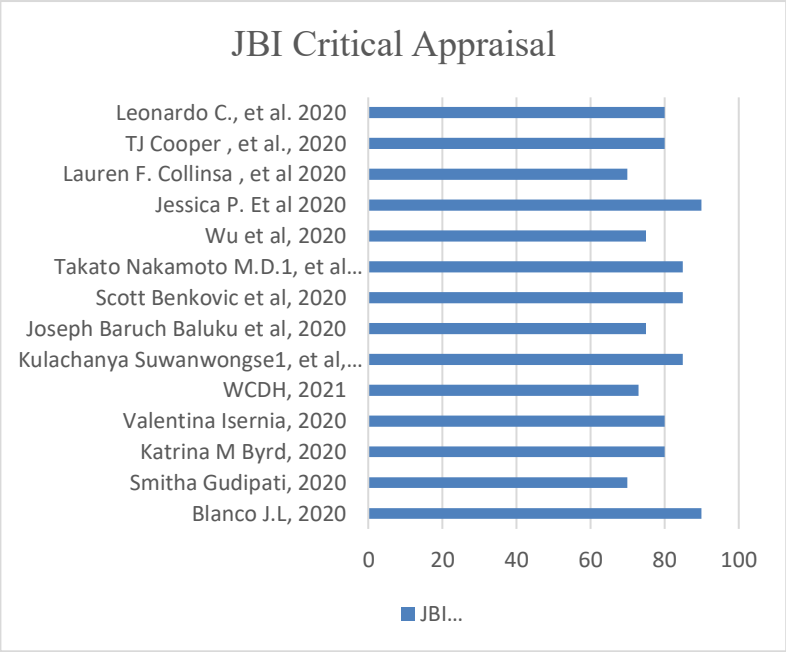

Figure 2. Risk of bias

DISCUSSION

Based on the data analysis, most patients with COVID-19 came for treatment with complaints of fever, shortness of breath, cough, diarrhea, nausea, and decreased sensitivity to smell. The sample used in the reviewed article had comorbidities, such as hypertension, diabetes, heart disease, and kidney disease, and some were overweight. All patients had performed ART therapy with a CD4 count >200. Viral load was suppressed when diagnosing COVID-19 in these patients. Administration of hydroxychloroquine and broad-spectrum antibiotics are effective in HIV patients with COVID-19 without other comorbidities. For mild cases of infection, people can buy over-the-counter drugs and self-isolate to reduce symptoms.[15] Treatment must be performed in an inpatient room for patients with severe infections. In contrast, respiratory failure and acute respiratory distress patients need to be treated with intubation and mechanical ventilation. In addition, the high mortality rate in HIV patients with COVID-19 was caused by delays in corticosteroid administration, different patient susceptibility, and limited healthcare resources.[15]

One of the articles was a study in Barcelona on five HIV-infected patients with COVID-19. The results showed that four patients recovered after receiving treatment in the ICU, and one recovered only by undergoing self-isolation. Nevertheless, the patient continued to use ART as HIV therapy.[14] The next study is from Smitha Gudipati who studied 14 PLWHA, consisting of 12 men and two women. The results showed that six people were discharged from the emergency unit to the quarantine room at home, and eight others underwent treatment in an inpatient room. Two of them were admitted to the ICU requiring invasive ventilation. The most common complaints were fever, shortness of breath, cough, and diarrhea for 12 days, but the patients could recover from the symptoms of COVID-19. HIV patients who do not have severe complications, if being handled adequately, will be able to recover from COVID-19 but not with HIV. This follows the findings in a study in Wuhan of 1,178 patients with HIV who were on ART but infected with COVID-19; after six months of treatment, it showed significant recovery, and only one patient died.[7]

The study of Kulacnya Suwanwongse is related to the cause of HIV-infected patients with COVID-19 which has a high mortality rate due to the delay in giving corticosteroids. The patients were elderly, and there was a lack of healthworkers. Corticosteroid drugs work very well in treating COVID-19 because it can reduce inflammation, improve mortality rates by 20-35% in patients on ventilators. Other studies also revealed that corticosteroid drugs could help COVID-19 patients get out of bed during the critical period.

Complications for PLWHA due to COVID-19

The article explained several complications due to COVID-19, including pneumonia, which can worsen the condition of PLWHA, but it could be treated by giving antibiotics to minimize the risk of death.[23] The mortality rate can occur in the infected patients who are already susceptible, have severe chronic disease conditions, and have spread to other body parts, hence it is challenging to be treated.[24]

Guidelines for PLWHA

Guidelines that can be performed for PLWHA during COVID-19 pandemic are to continue ART therapy and COVID-19 vaccinations routinely, but it must be monitored by a doctor when performed.[17] If the patient does not control HIV properly as recommended, they will impact more severe complications.

The Psychological Conditions of PLWHA during COVID-19 Pandemic

The ineffective treatment for PLWHA during COVID-19 pandemic caused psychological disorders and social isolation, which worsen the patient's condition. Aside from experiencing social isolation due to HIV, PLWHA must stay at home to avoid transmission, which will cause psychological stress to PLWHA.[14] As a result, the management of HIV care will be disrupted due to decreased medication adherence.

Future Research

Future research should be continued to regarding the impact of PLWHA infected with COVID-19 by using high-quality studies to produce relevant research. There are still many cases related to the impact of COVID-19 on PLWHA that have not been revealed, therefore the results of high-quality studies that discuss this will emerge in the future.

Limitations

Some studies used small samples, and the studies used were mostly case series and case reports. No confounding variables were reported in the data reporting.

CONCLUSION

The final condition of HIV patients infected with COVID-19 revealed different conditions depending on the treatment performed in the hospital. The faster and more appropriate the treatment for PLWHA infected with COVID-19, the better the final condition after undergoing treatment.

Acknowledgments

The authors would like to thank the Master of Nursing Study Program, Department of Nursing, Universitas Airlangga, which has facilitated the authors in completing this study.

Conflict of Interest

The authors declared there is no conflict of interest.

Funding

This study did not receive any funding.

Authors' Contributions

Design and concept: EH, NM. Data collection: EH, HM. Data analysis and interpretation: EH and AB. Article draft: EH. Revision: NM, RI. Statistics: EH, AB. Last examination: NM, RI, HM.

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