

## Characteristics, Comorbidities and Outcomes of Covid-19 in HIV Patients in a Tertiary Care Hospital

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### Abstract

**Introduction:** The impact of HIV/AIDS on severity SARS-CoV-2 infection are limited. Hence a study was taken to find the incidence of COVID 19 among the HIV individuals.

**Materials and Methods:** This were a retrospective study, conducted in KMC, Warangal from March 2020 to 2022. Study protocol was approved by the Institutional Ethical committee. HIV positive individuals who were reported for the anti-retroviral therapy (ART) were included. A standard patient information forms were maintained for the monthly follow-ups. Which include basic demographic characteristics as per the guidelines. In these patients COVID 19 was confirmed as per the by RTPCR, as per the guidelines. Individual HIV patient's COVID-19 data was extracted from the electronic data. The data collection had two parts; first part included the HIV related data like age, gender, education level, comorbid conditions like DM or HTN or both, mode of HIV acquisition, duration of HIV infection, current ART regimens and treatment status, recent CD<sub>4</sub> cell count and HIV viral load (< 12 months) and second part included COVID-19 related data like date of onset, symptoms and how many days they last, date of diagnosis, hospitalization with COVID-19, length of stay in hospital, treatment taken and date of death.

**Results:** During the study period, 32 (0.5%) were tested positive for SARS-CoV-2, the male female ratio was 0.8 and mean ages were 35±7.8 and 34±11.5, respectively. Low CD<sub>4</sub> count was reported. Tuberculosis was diagnosed in 1 (3.125%) patient; diabetes mellitus (15.625%) was the leading comorbidity Fever was the most (20/32; 62.5%) common symptom. Seven (21.88%) patients were sought hospitalization, 6 (85.71%) were male three (9.4%) were dead; 2:1 was male female ratio.

**Conclusion:** Present study indicate there was less severe clinical presentation in HIV covid co infection. No increased rate of hospitalization.

**Keywords:** Anti-retroviral therapy, covid 19, tuberculosis, comorbidity, demographic characteristics.

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## Introduction

As of May 19, 2022, the number of confirmed cases of COVID-19 exceeded 4.31 crore; with more than 5.24 lakh deaths registered in India, out of 4,111 deaths are reported from Telangana state among 7.93 lakhs confirmed COVID-19 cases [1]. Prior studies have identified that older age or underlying comorbidities such as cancer, diabetes mellitus (DM), cardiovascular diseases (CVD), hypertension (HTN), chronic kidney disease and obesity were increase the risk of Severe acute respiratory syndrome (SARS-CoV-2) infection and mortality from Covid-19 [2,3]. However, the impact of HIV/AIDS on severity SARS-CoV-2 infection are limited [4].

Immunosuppression in HIV makes the people living with HIV (PLHIV) to be more susceptible to SARS-CoV-2 infection; and more likely to present with COVID-19 when infected [5]. However, some studies suggest that immunosuppression and low CD<sub>4</sub> counts might protect PLHIV from developing the cytokine storm [5]. As they are 37.9 million PLHIV and 1.7 million new infections each year [6]. it remains urgent to characterize the epidemiology and outcomes of covid-19 such as ICU admission, mechanical ventilation and death among this group [7]. Hence a study was taken to find the incidence of COVID 19 among the HIV individuals.

## Materials and Methods

This was a retrospective study, conducted in KMC, Warangal in Northern Telangana state, India. Study was conducted for 2 year period, March 2020 to 2022. Study protocol was approved by the Institutional Ethical committee.

The HIV positive individuals who were reported for the anti-retroviral therapy (ART) were included in this research. A standard

patient information forms were maintained for the monthly follow-ups. The form consists the details such as basic demographic characteristics (age, gender, occupation, education level, economic status etc.), mode of HIV acquisition and baseline CD<sub>4</sub> count, HIV viral load and ART regimen as per the National AIDS Control Organization (NACO) eligibility criteria.

COVID-19 has been listed as a Class B infectious disease on January 20, 2020 in China. According to the clinical management protocol for COVID-19, Government of India, Ministry of Health and Family Welfare guidelines, COVID-19 cases were categorized into suspect case, probable case and confirmed.

And the severity status of COVID-19 cases was categorized as mild, moderate and severe. Diagnosis of COVID-19 was made by detection of SARS -Co V-2 RNA in oro-and nasopharyngeal swab specimens by RTPCR. The COVID-19 status of the PLWHIV presenting to the ART department was updated in electronic data base on their routine monthly follow-ups by the trained staff.

A separate structured data collection form with a questionnaire was designed and validated. Individual HIV patient's COVID-19 data was extracted from the electronic data. The data collection had two parts; first part included the HIV related data like age, gender, education level, comorbid conditions like DM or HTN or both, mode of HIV acquisition, duration of HIV infection, current ART regimens and treatment status, recent CD<sub>4</sub> cell count and HIV viral load (< 12 months) and second part included COVID-19 related data like date of onset, symptoms and how many days they last, date

of diagnosis, hospitalization with COVID-19, length of stay in hospital, treatment taken and date of death.

### Results

During the study period, 32 (0.5%) were tested positive for SARS-CoV-2. Baseline characteristics of the patients are tabulated in Table 1. In the HIV COVID-19 co-infected patients, 15 (46.9%) were males and 17 (53.1%) were females; the mean ages were  $35\pm 7.8$  and  $34\pm 11.5$ , respectively.

Statistically there was no significant difference between age and gender ( $P = 0.37$ ). Of 32 patients, 2 (6.25%) were not on ART. Low CD<sub>4</sub> count ( $<200$  cells/mm<sup>3</sup>) was reported for 10 (31.25%) patients. Viral load was high ( $>1000$  copies/ml) for 4 (0.12%) patients. Tuberculosis was diagnosed in 1 (3.125%) patient; diabetes mellitus (15.625%) was the leading comorbidity followed by hypertension (9.375%) and cardiovascular disease (18.75%).

**Table 1: Baseline characteristics of the PLHIV with COVID-19 co-infection**

Variables	Number (Percentage)	p value
PLHIV alive on ART	6187	
PLHIV on ART with COVID-19 co-infection	32 (0.5)	
Male	15 (46.9)	
Female	17 (53.1)	
Age of the patients in years		
Male	$35\pm 7.8$	0.37
Female	$34\pm 11.5$	
Body Mass Index (BMI) kg/m <sup>2</sup>		
Male	$23 \pm 4.9$	0.09
Female	$21\pm 3.8$	
Latest CD <sub>4</sub> count cells/mm <sup>3</sup>		
Male	$489 \pm 481.22$	0.44
Female	$465.65\pm 248.73$	
Viral load (copies/ml)		
<1000	28 (87.5; TND)	
1000-10000	2 (6.25)	
10000-100000	1 (3.125)	
>100000	1 (3.125)	
Other comorbid conditions		
Opportunistic infection	1 (3.125)	
Diabetes Mellitus	5 (15.625)	
Hypertension	3 (9.375)	
Cardiovascular Diseases	6 (18.75)	

\*PLHIV–Patients Living with HIV; ART–Anti retroviral therapy; p–probability; TND–Technically Not Detected

A total of 31.25% (10/32) were asymptomatic. Among the symptomatic patients, fever was the most (20/32; 62.5%) common followed by cough (18/32; 56.25%), dyspnea (10/32; 31.25%) and loss of smell/taste (12/32; 37.5%). Seven (7/32; 21.88%) patients were sought hospitalization, 6

(85.71%) were male and 1 (14.29%) female. The average length of hospital stay was 6.3 days; 85.71% (6/7) were treated with steroids + Remdesivir. Five patients (5/7; 71.43) required oxygen. A total of 21 (65.63%) were noticed to continued regular ART regimen during affected with COVID-19 and the rest stopped taking ART. Three (3/32; 9.4%) were reported to be dead; 2:1 was male female ratio. Only one patient has hospitalization history.

**Table 2: Characteristics of COVID-19 co-infection in PLHIV.**

Variables	Number (Percentage)		
PLHIV on ART with COVID-19 co-infection	32		
Symptoms of COVID-19 infection			
Fever	20 (62.5)		
Loss of Smell/Taste	12 (37.5)		
Cough	18 (56.25)		
Dyspnea	10 (31.25)		
Asymptomatic	10 (31.25)		
Mean Duration of the symptoms	5.09±3.82		
Hospitalization	7 (21.88)		
Male	6 (85.71)		
Female	1 (14.29)		
CD <sub>4</sub> (<200cells/mm <sup>3</sup> )	3 (42.86) (males)		
Co-morbid condition			
Diabetes Mellitus	2 (28.57)		
Cardiovascular disease	1 (14.29)		
Average length of hospital stay (in days)	6.3		
In hospitalization COVID-19 management	7 (21.88))		
Steroid+Remdesivir	1 (14.29)		
Oxygen therapy alone	1 (14.29)		
Steroid+Remdesivir+Oxygen	5 (71.43)		
ART usage during COVID-19 infection			
Continued taking of ART	21 (65.63)		
Stopped taking of ART	11 (34.37)		
Death	3 (9.4)		
Gender	Male	Female	
Number of patients	2 (66.7)	1 (33.3)	
Hospitalization	Yes	No	Yes
On ART regimen	Yes	No	No
Rx for COVID-19 infection	Yes	No	No
Steroid+Remdesivir+Oxygen	Yes	No	No
Co-morbid condition			
Diabetes Mellitus	Yes	Yes	No
Cardiovascular disease	No	No	Yes
History of Tuberculosis	No	No	Yes
CD4 count (cells/mm <sup>3</sup> )	29	788	330
Viral load (copies/ml)	TND	TND	TND

## Discussion

The present retrospective data analysis was undertaken to generate an evidence base to address the myth that people living with HIV are at increased risk of contracting SARS-CoV-2. Many experts initially considered individuals living with HIV as a vulnerable group with regards to SARS-CoV-2 infection due to greater burden of comorbidities, higher systemic inflammation despite effective ART, and some degree of immune alterations even among those on effective ART with immune reconstitution [8]. In contrast, the present study results showed only 32 (0.5%) were tested positive to SARS-CoV-2 among 6187 PLHIV. Some authors have speculated that HIV infected patients on ART may have a lower risk of COVID-19 and related complications because of invitro activity of some ART drugs against SARS-CoV-2 and their defective cellular immunity, leading to a decreased possibility of cytokine dysregulation and consequent sever lung damage [9]. Overall mean age was  $34.5 \pm 10$  years with no significant age difference between males and females gender in Covid-19 exposure. Although the age difference between genders was not significant, the percentage of Covid-19 exposure was slightly higher in females. This is contrast to other studies which reported a higher percentage of males than females [10,11] But data points to higher morbidity and mortality among male patients.

The main clinical symptom of covid 19 among PLHIV were fever and cough, which is in par with other studies [12,13]. In this study, CVD (6/32) was the most common comorbidity followed by DM (5/32); similar findings were reported in the literature also. 14 Out of 32 patients, 7/32 (21.88%) were hospitalized. Among 7, 6 were males and 1 was female. Among 7 patients 4 had comorbidities and 3 deaths were reported.<sup>24-31</sup>. As per the study published by Hossein

mizari *et al*, among the HIV covid coinfection, the death rate was reported to be 14.3% and 64.7% hospitalization.

## Conclusion

Observations of the present study indicate that there was less severe clinical presentation in patients living with HIV on ART treatment co infected with Covid-19 and there was no increased rate of hospitalization. Further studies are required to assess the long-term outcomes in PLHIV who survives COVID-19.

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