International Journal of Community Medicine and Public Health
Masthi NRR et al. Int J Community Med Public Health. 2023 Nov;10(11):4334-4338
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20233473

Original Research Article

A descriptive comparative study on COVID-19 impact among people living with human immunodeficiency virus at tertiary care hospital: Bengaluru urban

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Received: 24 August 2023
Accepted: 17 October 2023

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ABSTRACT

Background: The SARS-CoV-2 virus is the infectious disease known as coronavirus disease (COVID-19). A lockdown was implemented across the nation in response to escalating infections and community transmission. Patients living with human immunodeficiency virus (PLHIV) must get therapy for rest of their lives. Anti-retroviral therapy (ART) must be available and strictly adhered to in order to lower HIV-related morbidity and mortality and stop HIV transmission. ART continuity in PLHIV has been compromised globally by COVID-19 epidemic. This research was done to find out how pandemic affected PLHIV patient's adherence to their ART regimens.
Methods: For nine months, PLHIV visiting the ART centre in a tertiary care hospital in Bengaluru urban participated in this a prospective comparative study. Through systematic random sampling, 470 patients were chosen for the study. Data were gathered by one-on-one interviews using a standardised semi-structured questionnaire. The statistics used were mean, median, and z test for proportion.
Results: The bulk of the study participants were male and between the ages of 41 and 50. The most frequent means of HIV transmission risk was heterosexual interaction. Before and during the COVID-19 pandemic, there was a large difference in the number of PLHIV/day visits. Opportunistic infections and first-line failures were more common and statistically significant during the COVID-19 pandemic. Prior to the pandemic, there was an average 94.84% adherence to ART, which dropped to 80.55% during the pandemic. The variation was substantial.
Conclusions: The COVID-19 pandemic has impacted PLHIV medication adherence, and opportunistic infections have increased during this time.

Keywords: PLHIV, Adherence, COVID-19, Impact, ART

INTRODUCTION

The SARS-CoV-2 virus is the infectious disease known as coronavirus disease (COVID-19). Most infected individuals will develop mild to moderate respiratory infections, while a few will develop catastrophic illnesses. A severe sickness is more likely to strike older persons and people with underlying medical illnesses including cancer, HIV, chronic lung disease, diabetes, or cardiovascular disease.[1] For people who are more likely to experience serious health consequences from COVID-19, including death, the world health organisation (WHO) and the centres for disease control and prevention (CDC) have released health alerts and prevention recommendations. PLHIV are 1 among high-risk people.

HIV infection is linked to aberrant humoral immune responses and T-cell-mediated immunity, which increases susceptibility to a variety of opportunistic diseases. According to the presumption that PLHIV are more likely to be immunosuppressed, there may be cause for concern over the increased risk for severe COVID-19 disease

among PLHIV.[2] PLHIV require ongoing medical care. To achieve viral suppression, lower HIV-associated morbidity and mortality, and stop HIV transmission, PLHIV must have access to and adhere to ART.[3,4]

For a brief time, a number of limitations were put in place in reaction to an increase in infections and community transmission, including a curfew at night, travel restrictions, and the shutdown of unnecessary services. We don't know how this affects PLHIV, who already face disproportionately high rates of stigma, co-morbidity, and mental health problems.[3] Many PLHIV probably had some disruptions to their ART as well as other forms of primary HIV care. These changes could have a deleterious effect on PLHIV's health and be linked to a higher risk of opportunistic infections, more severe diseases, HIV-associated mortality, and HIV transmission.[5] The COVID-19 pandemic has affected ART continuity among PLHIV worldwide.[4]

The pandemic has made ART centres less accessible. Uncertainty exists over how this has affected PLHIV, particularly in terms of their access to ART. High adherence to ART and routine monitoring of PLHIV's, HIV viral load are now required for their care. Strict adherence to ART is necessary to keep a viral load undetectable, which lowers the risk of developing AIDS and transmitting HIV to sexual partners.[6] Nearly little research has been done in India about the effect of COVID-19 on ART adherence. In light of this context, the study described below was carried out to examine adherence to ART among PLHIV before COVID-19 and during the pandemic, to outline the socio-demographic profile of PLHIV on ART, and to determine the relationship between the pandemic's impact and other variables.

METHODS

A comparative study was conducted for a period of nine months during the first wave of the COVID-19 pandemic among PLHIV visiting an ART center in a tertiary care hospital in Urban Bengaluru. The sample size was calculated based on the prevalence of PLHIV on ART, which was 83.3% and was calculated to be 233. This was then doubled and rounded off to 470.[7] Systematic random sampling was used to recruit study subjects. A total of 1,897 patients are registered at the ART center. The sample fraction calculated was N/n, which was 1,897/470=4. The first patient was recruited by simple random sampling, and then every fourth patient was recruited until the sample size was reached. PLHIV were followed up for their adherence to treatment during pre-COVID-19 and during COVID-19 pandemic. Depending on the time period, two comparative groups were made: pre-COVID (April 2019-December 2019) and COVID period (April 2020-December 2020).

A pretested standardized semi-structured questionnaire was used to collect data through one-to-one interviews.

Inclusion criteria

All PLHIV who gave written informed consent and PLHIV over 18 years of age were included.

Exclusion criteria

All newly initiated PLHIV during the study period and PLHIV who had been on ART for less than 3 years were excluded.

Information on history of adherence to ART, opportunistic infections, OPD cases per day, frequency of treatment failure, missed appointments, and lost to follow-up (LFU) collected from all 470 PLHIV during both the pre COVID-19 and COVID-19 pandemic periods.

Institutional ethical committee clearance was obtained, and permission from the Karnataka State AIDS prevention society for conduct of study has been obtained.

Data was entered into MS excel and analyzed using Stata 12.1. Normal distribution of the test was tested using Shapiro wilk test. Results were expressed using mean, standard deviation, median, interquartile range, Mann-Whitney U test, Z test for mean and proportion.

Operational definitions

Adherence to ART: determined by=Number of pills given - number of balance pills/number of pills the patient should have taken*100

Miss: All PLHIV who were supposed to come to the ART centre on a particular day but have not come.

LFU: PLHIV missed for 3 months and above from the last day of the pill pick up.

Treatment failure: Virological failure (PLHIV with viral load >1000 copies/ml)

RESULTS

The study included 470 participants. Of the 470 people, 259 (55.1%) were men. 219 (46.5%) of the study's participants were between the ages of 31 and 40 years, followed by 141 (30%) of the participants who were between the ages of 21 and 30 years.

Among the 470 participants in the survey, 151 (32.1%) had completed secondary school, 131 (29.5%) primary school, 92 (19.5%) were illiterate, and 88 (18.7%) had completed college or higher education.

The 331 (or 70.4%) of study participants were married, 61 (or 12.9%) were widows, 55 (or 11.7%) were single, and 23 (or 4.8%) were divorced or separated. The majority of study participants, 461 (98.0%), contracted

HIV through heterosexual relationships. This followed by 4 (0.8%) through male-to-male sex (MSM), 3 (0.6%) through injectable drug use (IDU), 2 (0.4%) from mother to child, 1 (0.2%) from unknown sources, and 0 through blood transfusion and possibly unsafe injection.

Between pre-COVID-19 and COVID-19 periods, various variables associated with adherence to ART compared. The median number of OPD cases per day between pre-COVID-19 and COVID-19 are shown in Table 1. Pre-COVID-19 OPD cases per day averaged 60.5 (43.2-73.7), which is higher than COVID-19 OPD cases per day average of 37.5 (22-51). It was determined that this difference statistically significant. (U-7.6, p<0.01)

Table 1: Median OPD cases/day during and pre COVID-19 period.

OPD cases/day	Pre COVID-19	COVID-19	Mann Whitney, U test, p
Median (IQR)	60.5 (43.2-73.7)	37.5 (22-51)	7.62, <0.01

Table 2 indicates, of 470 participants in study, 5 (1.0%) developed opportunistic infections during pre COVID-19, while 35 (7.4%) did so during COVID-19. This difference was shown to be statistically significant (Z-4.8, p<0.01), 24 (5.1%) and 6 (1.2%) of the trial participants experienced treatment failure during COVID-19 and pre COVID-19 period, respectively, it was higher in COVID-19 than in pre COVID-19, and the difference was determined to be statistically significant (Z: -3.3, p<0.01).

Table 2: Description of study subjects according to opportunistic infections acquired and according to treatment failure, (n=470).

Variables	Pre COVID-19 (%)	COVID-19 (%)	Z test, p value
Opportunistic infections			
Yes	5 (1)	35 (7.4)	4.8, <0.01
No	465 (99)	435 (92.6)	
Switch (treatment failure)			
Yes	6 (1.2)	24 (5.1)	-3.3, <0.01
No	464 (98.8)	440 (94.9)	

Tables 3: Mean adherence to ART among study subjects, (n=470).

Adherence	Pre COVID-19	COVID-19	Z score for mean, p value
Mean ± SD	94.8±4.4	80.5±4.4	49.61, <0.01

As shown in Table 3, the mean adherence to ART among study participants was higher during the pre COVID-19 period (94.8±4.4) than it was during the COVID-19 period (80.5±4.4), and this difference was shown to be statistically significant (Z: 49.6, p<0.01).

Out of 470 study participants, 16 (3.4%) were lost to follow-up (LFU) in pre COVID-19 and 27 (5.7%) during COVID-19 period. 24 (5.1%) and 37 (7.8%) of the study participants were missed during pre COVID-19 and COVID-19 period respectively. In terms of both missing and LFU, there was no statistically significant difference.

The number of deaths among the 1872 total PLHIV registered at the ART centre was 20 (1% during pre COVID-19) and 43 (2.2% during COVID-19) [chi square value: 8.5, p<0.01]. A statistical analysis revealed that this difference was significant. Myocardial infarction, tuberculosis, an accident, cancer, and COVID-19 were among the causes of death. 14 of the 43 deaths that occurred during COVID-19 period were due to COVID-19 virus. 462 (98.3%) of the study participants have finished their two doses of COVID-19 vaccine, three of them have not received their first dose of immunisation, and five have not received their second. Among 470 study subjects 9 (1.9%) have acquired COVID-19

The COVID-19 pandemic had a significant impact on ART adherence.

DISCUSSION

The primary goal of the study was to determine how the COVID-19 pandemic affected PLHIV adherence to ART. It was noted that there was a considerable decline in adherence to ART during COVID-19 period. According to research by Rodriguez et al ART adherence was 67% prior to COVID-19 and 43% during COVID-19. This result was collinear with our study, and it is possible that the failure of hospital pharmacies and community pharmacies to supply medications caused a breach in the continuity of care.[7]

Multi-month dispensing, which might have saved time, money, and prevented unwanted exposure to COVID-19, could have improved adherence. The median OPD cases per day is another sign of treatment adherence. Comparing the pre COVID-19 period to the COVID-19 period, the median number of OPD cases per day declined. Clinic visits fell by more than 50% when a national lockdown began, according to Ugandan research. From 5% prior to the lockdown to 25% three months later and to 13% six months later, the likelihood of patients running out of ART on a particular day increased.[8]

The national lockdown, transit problems, the stigma attached to COVID-19, and a lack of alternative tools like telecommunication could all be contributing factors to the decline in patient input. The decline in PLHIV visits to the ART centre is a sign that ART was interrupted, which allowed PLHIV to develop opportunistic infections, which were more common during COVID-19 than preCOVID-19. As a result, there were more treatment failures during the pandemic. According to San Francisco

research of 4252 PLHIV, they were more susceptible to SARS-CoV-2 infection than people without HIV.[9]

In the current investigation, a male to female ratio with a small male preponderance was found. Males made up 58% to 80.9% of the population, females 18% to 18.3%, non-binary 2%, and other 3%.[2,3,7,10] In the current study, the majority of participants were between the ages of 31 and 40. According to Zewude et al the subjects' median age ranged from 27 to 37 years. According to a study by Rodriguez et al 50.2% of participants were between the ages of 25 and 34, and the average age was 48.9±12.3 years.[7,11] Compared to a study by Campbell LS, where 68% of participants had either no education, only primary education, or some secondary education, the majority had completed education up to secondary school in the current study.[12]According to Zewude et al 74.5% of individuals were married, which is different from what the current study found. [11]

It was found from our study that opportunistic infections were more during COVID-19 pandemic. This may be due to reduced immune response due to poor adherence during the pandemic, as accessibility was the issue due to strict lock down measures. However, there might be other factors such as use of steroids in COVID or superadded COVID infection. Even treatment failures were higher during COVID-19 pandemic which is directly related to lower adherence.

Poor areas are particularly affected by inequality in access to healthcare and education, and COVID-19 has a negative effect on people living with HIV. COVID-19 is biologically more contagious among HIV individuals. Due to the lockdown, this vulnerable group has experienced job losses, economic downturns, drug shortages, and a lack of basic essentials like food and housing. Reduced CD4-T cell counts brought on by these factors may allow for hazardous opportunistic infection outbreaks in this population. The overall HIV burden in India consequently rises as a result of this.[13] Health organizations, particularly neighborhood clinics, did not prioritize diseases like HIV and AIDS that require adherence to treatment during the pandemic. Furthermore, COVID-19 harmed medical personnel directly, closing down facilities. The pandemic had a significant impact on HIV testing as well. Despite the implementation of many mitigating techniques, a retrospective cohort analysis conducted in 44 countries across four continents discovered that COVID-19 was linked to a significant decline in HIV testing and in-person consultations.[14]

In contrast to the 4.8% increase seen between January and June 2019, UNAIDS predicted that there would be a 2.4% increase in ART testing by the end of 2020.[15] HIV services in South Africa has been at risk of progressing slowly due to the healthcare system's response to COVID-19, especially since this population relies on overworked public health institutions for their HIV care.[16]

This HIV-positive population is particularly burdened by COVID-19, which makes it difficult for them to get financial assistance, access healthcare, and get support for psychological issues including anxiety, depression, and others.[17] Due to the COVID-19 epidemic, vulnerable groups including sex workers, migratory labourers, and truck drivers experienced unemployment. During the pandemic, job losses and layoffs rapidly rose, and many HIV-positive patients had severe economic hardships.[13]

In Asia, COVID-19 has had an impact on how easy it is to get tested for HIV and how long anti-HIV drugs are prescribed.[18]According to several research, access to HIV antibody testing was difficult for those who were not HIV-positive due to travel limitations, particularly during times of lockdown, and concern over catching COVID-19 in India.[19] Despite more medical professionals providing telemedicine HIV care, it was shown that fewer PLHIV and Key populations used telehealth services.[18]

The pandemic has an impact on treatment access and adherence. It would take some time to evaluate the COVID-19 pandemic's overall impact on compliance and treatment.

Limitations

There could be a number of causes for medication resistance. Therefore, it is outside the scope of the study to determine whether treatment failures were caused by poor adherence during the COVID and post-COVID periods or by any other factors.

CONCLUSION

The COVID-19 pandemic had an impact on PLHIV patient's adherence to ART. Deaths, treatment failures, and opportunistic infections all increased during this time.

Recommendations

Drug distribution by outreach workers at their doorstep, intensive counseling and reassurance for PLHIV patients during follow-up visits, as well as telephone follow-up to obtain ART at nearby clinics. These are some of the steps that could improve compliance and adherence in such circumstances.

ACKNOWLEDGEMENTS

Author would like to thanks to Drishya S., Gagan R. Patil, Eshaa Gokul and Max Sampras Bastian who contributed to the study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee (*KIMS/IEC/A068/M/ 2020).*

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Cite this article as: Masthi NRR, Pruthvi S. A descriptive comparative study on COVID-19 impact among people living with human immunodeficiency virus at tertiary care hospital: Bengaluru urban. Int J Community Med Public Health 2023;10:4334-8.