

Vaccination against COVID-19 among People Living with HIV: A Cross-Sectional Survey in Chittoor District of Andhra Pradesh, India

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Abstract

Background: Vaccination against COVID-19 among people living with HIV (PLWH) infection is crucial. At present, evidence lacks to strategize vaccinating the hesitant PLWH. This study has estimated the proportion of PLWH vaccinated till October 2021, enumerated the various adverse events following vaccination, and identified the enabling and constraining factors associated with vaccination. **Methods:** A cross-sectional survey was conducted among PLWH by the snowball sampling in the Chittoor district of Andhra Pradesh, India. Data were analyzed using the descriptive statistics and qualitative analyses. **Results:** Two-hundred and forty-seven PLWH responded, out of which 52 (20.7%) were yet to be vaccinated. Seventy-five (30%) participants reported having adverse events, out of which five (7%) had pain at the injection site, and 72 (96%) had systemic reactions. Fever ($n = 51$, 68%), dizziness ($n = 23$, 31%), and joint pain ($n = 23$, 31%) were the major systemic reactions. Among the vaccinated, motivation by the health-care workers and village volunteers were the major enabling factors. On the contrary, uncertainty about the vaccine effects, negative feedback from the health-care workers, and lack of self-motivation were the important constraining factors in taking the vaccines. **Conclusion:** Some PLWH are still hesitant to take the vaccine. Evidence generation, coupled with community mobilization, is required to upthrust the vaccination campaign in achieving the herd immunity against COVID-19.

Key words: COVID-19, COVID-19 vaccine, human immunodeficiency virus, India

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INTRODUCTION

COVID-19 vaccination is a critical preventive measure to curve the COVID-19 pandemic. The vaccine is critical to reducing severe disease outcomes such as hospitalization and death.^[1-3] In January 2021, the Drug Controller General of India authorized the emergency use of two vaccines, namely-BBV152 (Covaxin) and Chad 0x1 (Covishield).^[4] The initial vaccination campaign started with the health-care workers and then extended to the general adult population. Based on Phase 3 clinical trials, both vaccines were safe with an efficacy above 70%.^[5,6] Hence, the Government of India has recommended using these vaccines among populations with comorbidities such as hypertension, diabetes, cancer, human immunodeficiency virus (HIV), and other chronic diseases.^[7]

The vaccination campaign in India has sometimes been affected due to administrative reasons and vaccine hesitancy among the population.^[8,9] To date, most of the vaccine-related safety and efficacy information is based on the clinical trials of Phase I to Phase III.^[5,6,10] These trials are primarily in Phase I to III stage and mainly recruit healthy volunteers. Therefore, we need evidence

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on the epidemiological and social information on COVID-19 vaccination, especially among vulnerable populations like people living with HIV (PLWH), to effectively strategize the vaccination program.

PLWH are immunologically deficient compared to the general population. Moreover, the higher proportion of comorbidities has put them at higher risk of facing morbidity and mortality from COVID-19 infection.^[11-13] Besides, the vaccines are not live-attenuated, and no drug interaction was reported between anti-retroviral medicines and COVID-19 vaccines. Considering the risks and benefits, the World Health Organization (WHO) has recommended vaccinating the PLWH.^[14] A report from Pakistan suggests that, unfortunately, PLWH have faced harassment and stigmatization while taking the vaccine.^[15] Besides, vaccine hesitancy has remained a significant challenge among vulnerable populations like PLWH globally. The vaccine hesitancy can delay the herd immunity achievement.^[16,17] At present, the evidence is limited on vaccination among PLWH in the Indian setting, which contributes to one of the highest numbers of PLWH in the world.^[18] Such scientific evidence can have vital programmatic implications in boosting the vaccination rate. In this background, we have done this study to estimate the proportion of PLWH vaccinated till September 2021, enumerate the various adverse events following COVID-19 vaccination among the PLWH, and identify the enabling and constraining factors associated with COVID-19 vaccination.

METHODS

Study design

Cross-sectional study.

Study duration

September to October 2021.

Study setting

We conducted the study in the Chittoor district of Andhra Pradesh, India. The district is located in the southern part of the state and hosts approximately 10,000 HIV-infected populations (as registered in the anti-retroviral therapy [ART] centers).

Study participants

All adult PLWH were eligible for the study. We excluded PLWH <18 years as COVID-19 vaccination is yet to start for this group.

Sampling strategy

We recruited the participants by nonprobability sampling (snowballing) till the sample size was reached. Initially, we selected the participants from the contact list we had for our earlier institutional academic activities.

Study size

We calculated our sample size using the following formula: $N = (1.96)^2 pq/d^2$ where p = expected prevalence, q = $(100 - p)$, and d = precision. Assuming 40% of the study

population received at least one dose of any vaccine, and considering absolute precision as 5%, the final sample size was 251.

Data collection

We developed a pilot tested, semi-structured questionnaire in the local language (Telugu) containing sections on sociodemographic profile, COVID-19 vaccination details, including enabling and constraining factors. We got the contact details of the probable participants through the snowballing method. The researchers conducted telephonic/face to face interviews based on participants choice after obtaining verbal/written consent based on feasibility.

Data analysis

We collected the data electronically through Google forms. We analyzed the data in Statistical Package for the Social Sciences (SPSS) (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY, USA: IBM Corp.) using the descriptive statistics. We analyzed the qualitative data manually under different domains and used the verbatim to understand the enabling and constraining factors.

Human participant protection: Besides the Institutional Ethics Committee (Ref No: IEC07/AIMSR/2021 dated 30/05/2021), we have obtained written/verbal informed consent from all the participants.

RESULTS

We recruited a total of 247 participants. The mean age of the participants was 40 years (standard deviation 11.5). The median duration of HIV was 5 years (inter quartile range 2–10 years). Most of the participants belonged to female gender ($n = 140$, 56.7%), and rural areas ($n = 180$, 72.9%) [Table 1].

To date, 79.3% ($n = 195$) of the PLWH got vaccinated against COVID-19 with at least one dose of any vaccine. Vaccination was highest with Covishield ($n = 83$, 42.8%), followed by Covaxin ($n = 21$, 10.8%) and Sputnik V ($n = 2$, 0.8%). Eighty-eight (45.4%) was unsure about the type of vaccine. Among the vaccinated, 108 (56.5%) took one dose and 83 (43.5%) took two doses. Among 52 (20.7%) unvaccinated, 23 (44.2%) expressed willingness toward COVID-19 vaccination. Seventy-five (30%) participants reported having adverse events, out of which five (7%) had pain at the injection site and 72 (96%) had systemic reactions. The various systemic adverse reactions include fever ($n = 51$, 68%), dizziness ($n = 23$, 31%), joint pain ($n = 23$, 31%), generalized body pain ($n = 20$, 27%), headache ($n = 3$, 4%), vomiting ($n = 1$, 1%), and pedal edema ($n = 1$, 1%). Reportedly, 2 (1%) contracted COVID-19 infection after the first vaccination dose. Among vaccinated, motivation by the health-care workers (Like-Accredited Social Health Activist, and auxiliary nurse midwife) and village volunteers from village secretariate, NGOs working at ART, by the family members and peers, and self-motivation were the major drivers in taking the vaccine [Table 2]. On the contrary, uncertainty about the effects of the vaccine, negative feedback

Table 1: Sociodemographic profile of study participants

Variables	Estimate, n (%)
Age (years), mean (SD)	40 (11)
Gender (n=247)	
Females	140 (56.7)
Males	106 (42.9)
Place of residence (n=247)	
Rural	180 (72.9)
Urban	67 (27)
Marital status (n=245)	
Never married	14 (5.7)
Currently married	194 (79.2)
Divorced	4 (1.6)
Widowed	33 (13.5)
Type of family (n=241)	
Nuclear	202 (83.3)
Joint	38 (15.8)
Broken	1 (0.4)
Religion (n=244)	
Hindu	203 (83.2)
Muslim	30 (12.3)
Christian	11 (4.5)
Occupation (n=246)	
Working outside home	165 (67)
Home maker	76 (31)
Currently unemployed	5 (2)
Mean education in completed years (SD)	5.8 (5)
Median per capita monthly income in Indian Rupee (IQR)	5000 (2000-10,000)

SD: Standard deviation, IQR: Interquartile range

by the health-care workers, and lack of self-motivation were the important constraining factors in taking the vaccines [Table 2].

DISCUSSION

In this study, we estimated the proportion of HIV-infected population who got vaccinated against COVID-19. We also enumerated the various adverse reactions following vaccination and explored the various enabling and constraining factors for COVID-19 vaccination in this group. By the end of the 3rd week of October 2021, India had reached an overwhelming landmark of vaccinating with 100 million doses, with 30% of the eligible population being fully vaccinated and nearly 70% partially vaccinated.^[19] Our study with the PLWH estimated that vaccination is going on at a marginally higher pace than the general population as almost four-fifths got at least one dose, and nearly half got the two doses.

The two vaccines launched in India, namely Covaxin (inactivated virus vaccine) and Covishield (adenovirus vector vaccine), reportedly have fewer adverse events than the m-RNA vaccines.^[20] Pooled analysis from the vaccine trial studies shows the adverse effects for inactivated vaccine produces fewer

adverse events (local reaction: 12.3%–29.8%; systemic effects: 9.8%–37.6%) compared to the inactivated virus vaccine (local: 50.9%–81.7% and systemic: 38.7%–73.2%). In our study, three-fifths of the participants reported having any reactions, primarily systemic. We did not analyze adverse reactions separately for vaccine types as nearly half of the participants failed to recall the vaccine type. The types of adverse reactions were similar to what is reported by the WHO.^[21] However, the proportion of fever, dizziness, and joint pain was reportedly more in our study, unlike what is reported from the WHO database.^[22]

Even though COVID-19 increases the risk of hospitalization and severity among the PLWH, we found that hesitancy exists among the PLWH group in taking the vaccine. Evidence from France showed that only 5% of the PLWH are hesitant in taking the vaccine.^[16] On the contrary, one study from the Canadian population reported that the intention to get vaccinated among the PLWH was much lower (65%) than the general population (80%). Notably, both the authors suggested that a proper communication strategy from the health-care system can improve the vaccination proportion. In the present study, we found that the health-care workers and the village volunteers play a crucial role in promoting vaccination for this group. Besides, the family members, peer groups, and local leaders sometimes played an important role in vaccination. Concern about the vaccine side effects, existing co-infection with other diseases, misleading information are significant reasons for not taking the vaccine. Evidence from South Africa suggests that misleading information and misconceptions can affect the COVID-19 response for the PLWH.^[23] Participants from Southern India expressed concern about the side effects of the COVID-19 vaccine by the PLWH.^[17] One of our participants even expressed that not much information he got related to vaccination among the PLWH. Nevertheless, evidence generation on the enabling factors, coupled with community engagement, could be pivotal in improving the vaccination among the PLWH as it is helpful among the general population. As safety and efficacy study is limited with the PLWH group, an efficient surveillance system is required to identify the vaccination status of PLWH and closely monitor the adverse effects.

Our study had a few limitations. As we used a nonprobability sampling, the proportion vaccinated may be an overestimation of the actual figure. However, the implication of the finding still holds good. On the other hand, the proportion of adverse events could be underestimated because of recall bias. Besides, we might have missed a few eligible participants who have died after vaccination. To overcome this, we asked our participants if they knew about any such incidence. Finally, because of the methodological limitations, we could not check the stages of HIV. Hence, we were unable to provide the stratified analysis for the adverse effects.

CONCLUSION

PLWH need to be protected with COVID-19 vaccination. The adverse events due to COVID vaccines are mostly minimal.

Table 2: Enabling and constraining factor for COVID-19 vaccination among people living with human immunodeficiency virus, Chittoor, India, 2021

Domain	Enabling factors	Constraining factors
Healthcare providers	<p>"ASHA workers motivated in taking vaccination, so took it"</p> <p>"I got infected with TB, then hospital staff motivated in taking the vaccine"</p> <p>"At the time taking ART medication, I asked the madam giving the medication about taking the vaccination, she advised me to take the vaccine so took it"</p>	<p>"ASHA workers didn't approach me, only elders were called for vaccination in my place"</p> <p>"I asked at ART center whether I can take vaccine. One of the madams over there told me not to take as I am weak"</p> <p>"ANM/ASHA workers mentioned not to have vaccine," "My elder sister working in ESI hospital said not to go for vaccination"</p>
Volunteers from various organizations	<p>"Village volunteer motivated and taken me for vaccination"</p> <p>"Enquired at ART center and then took the vaccine after confirmation from them"</p> <p>"Sachivalayam volunteer took me for vaccination"</p>	
Self	<p>"Took it out of own interest"</p> <p>"I myself made a call to ART staff and asked whether vaccine can be taken or not, they said I can take, so, I took the vaccine"</p> <p>"Took the vaccine out of own interest as I have a baby and want to protect her too"</p> <p>"Being a health care worker, I know the importance of vaccination, so I took it"</p>	<p>"Due to body pains, I rejected taking second dose"</p> <p>"Not aware about the importance of vaccination"; "I have no time to go for vaccination"</p>
Family members	<p>"Initially hesitated to go for vaccination due to side effects of vaccine like fever and body pains. Later, my family members insisted as there are children in family and after enquiring with others that nothing is happening after vaccination, I took the first dose"</p>	<p>"Busy with household responsibilities"</p>
Peer group	<p>"When I went to clinic for HIV medication, I heard other PLWH got vaccinated without facing any physical problem. So, I took a step and got vaccinated"</p>	<p>"I heard from my friend that vaccine causes heart attack"</p>
Local leaders	<p>"Village Surpanch (leader) helped in taking the vaccine"</p> <p>"In my village school teachers are motivating to take the vaccine"</p>	
Social	<p>"It was made mandatory to be vaccinated to visit sabarimalai (Hindu temple), so got vaccinated"</p> <p>"In my company they made it mandatory to get vaccination"</p>	<p>"Initially no one told me to take vaccine. After that my mother got sick, so I was attending her," "Nobody came to give vaccine"</p>
Perceived threat	<p>"Initially hesitated to take vaccine due to confusion whether to take it or not as I am on ART medications but took it finally because my neighbor's and village heads said that if not vaccinated, they will stop giving ration, and ration card will be cancelled. So, I took it"</p>	<p>"Even after taking vaccine my relatives have expired. Hence, in fear I did not go for vaccination"</p> <p>"As I am taking HIV and TB medication, I feared to take vaccine"</p> <p>"Afraid to take vaccine due to uncertainty about its outcome/side effects"</p> <p>"Out of fear of reaction which I got after the first dose, I skipped the second dose"</p>

TB: Tuberculosis, HIV: Human immunodeficiency virus, ART: Anti-retroviral therapy, PLWH: People living with HIV, ASHA: Accredited social health activist, ANM: Auxiliary nurse midwife, ESI: Employee State Insurance

There is a group of PLWH still hesitant to take the vaccine. The hesitation is justified as the background evidence is not enough to support or refute vaccination for PLWH. Further evidence is required to improve the vaccination rate among the PLWH.

Research quality and ethics statement

All authors of this manuscript declare that this scientific study is in compliance with standard reporting guidelines set forth by the EQUATOR Network. The authors ratify that this study required Institutional Review Board/Ethics Committee review,

and hence, prior approval was obtained IRB Min. No. IEC07/AIMSR/2021 dated 30/05/2021). We also declare that we did not plagiarize the contents of this manuscript and have performed a Plagiarism Check.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Bahl A, Johnson S, Maine G, Garcia MH, Nimmagadda S, Qu L, *et al.* Vaccination reduces need for emergency care in breakthrough COVID-19 infections: A multicenter cohort study. *Lancet Reg Health Am* 2021;4:100065.
- Moghadas SM, Vilches TN, Zhang K, *et al.* The impact of vaccination on COVID-19 outbreaks in the United States. *medRxiv* 2021.
- Alagoz O, Sethi AK, Patterson BW, Churpek M, Alhanaee G, Scaria E, *et al.* The impact of vaccination to control COVID-19 burden in the United States: A simulation modeling approach. *PLoS One* 2021;16:e0254456.
- Coronavirus | India Approves COVID-19 Vaccines Covishield and Covaxin for Emergency Use. *The Hindu*. Published January 03, 2021. Available from: <https://www.thehindu.com/news/national/drug-controller-general-approves-covishield-and-covaxin-in-india-for-emergency-use/article33485539.ece>. [Last accessed on 2021 Oct 28].
- Ella R, Reddy S, Blackwelder W, Potdar V, Yadav P, Sarangi V, *et al.* Efficacy, safety, and lot-to-lot immunogenicity of an inactivated SARS-CoV-2 vaccine (BBV152): interim results of a randomised, double-blind, controlled, phase 3 trial. *The Lancet* 2021;398:2173–84.
- Falsey AR, Sobieszczyk ME, Hirsch I, Sproule S, Robb ML, Corey L, *et al.* Phase 3 safety and efficacy of AZD1222 (ChAdOx1 nCoV-19) covid-19 vaccine. *N Engl J Med* 2021;385:2348–2360.
- Ministry of Health and Family Welfare. Prioritised Groups For COVID-19 Vaccine. Available from: https://static.mygov.in/rest/s3fs-public/mygov_161104930451307401.pdf.
- BBC. Coronavirus: India Temporarily Halts Oxford-AstraZeneca Vaccine Exports. *BBC News*. Published March 24, 2021. Available from: <https://www.bbc.com/news/world-asia-india-56513371>. [Last accessed on 2021 Oct 29].
- Arora H. India Has a Vaccine Hesitancy Challenge. *The Indian Express*. Available from: <https://indianexpress.com/article/opinion/india-has-a-vaccine-hesitancy-challenge-7388907/>. [Last accessed on 29 October 2021].
- Ella R, Vadrevu KM, Jogdand H, Prasad S, Reddy S, Sarangi V, *et al.* Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBV152: A double-blind, randomised, phase 1 trial. *Lancet Infect Dis* 2021;21:637–46.
- Tesoriero JM, Swain CE, Pierce JL, Zamboni L, Wu M, Holtgrave DR, *et al.* COVID-19 outcomes among persons living with or without diagnosed HIV infection in New York state. *JAMA Netw Open* 2021;4:e2037069.
- Ssentongo P, Heilbrunn ES, Ssentongo AE, Advani S, Chinchilli VM, Nunez JJ, *et al.* Epidemiology and outcomes of COVID-19 in HIV-infected individuals: A systematic review and meta-analysis. *Sci Rep* 2021;11:6283.
- Bhaskaran K, Rentsch CT, MacKenna B, Schultze A, Mehrkar A, Bates CJ, *et al.* HIV infection and COVID-19 death: A population-based cohort analysis of UK primary care data and linked national death registrations within the OpenSAFELY platform. *Lancet HIV* 2021;8:e24–32.
- WHO. Coronavirus Disease (COVID-19): COVID-19 Vaccines and People Living with HIV. Available from: [https://www.who.int/news-room/q-a-detail/coronavirus-disease-\(covid-19\)-covid-19-vaccines-and-people-living-with-hiv](https://www.who.int/news-room/q-a-detail/coronavirus-disease-(covid-19)-covid-19-vaccines-and-people-living-with-hiv). [Last accessed on 29 October 2021].
- Reuters. FEATURE-Fear, Stigma Slow COVID-19 Vaccine Take-Up among Trans Pakistanis. *Reuters*. Published August 10, 2021. Available from: <https://www.reuters.com/article/health-coronavirus-pakistan-lgbt-idUSL8N2P563M>. [Last accessed on 2021 Oct 29].
- Vallée A, Fourn E, Majerholc C, Touche P, Zucman D. COVID-19 vaccine hesitancy among French people living with HIV. *Vaccines (Basel)* 2021;9:302.
- Ekstrand ML, Heylen E, Gandhi M, Steward WT, Pereira M, Srinivasan K. COVID-19 vaccine hesitancy among PLWH in South India: Implications for vaccination campaigns. *J Acquir Immune Defic Syndr* 2021;88:421–5.
- Murray CJ, Ortblad KF, Guinovart C, Lim SS, Wolock TM, Roberts DA, *et al.* Global, regional, and national incidence and mortality for HIV, tuberculosis, and malaria during 1990–2013: A systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014;384:1005–70.
- BBC. Covid Vaccine: India Administers More Than one Billion Covid Jabs. *BBC News*. Published October 21, 2021. Available from: <https://www.bbc.com/news/world-asia-india-56345591>. [Last accessed on 2021 Oct 27].
- Wu Q, Dudley MZ, Chen X, Bai X, Dong K, Zhuang T, *et al.* Evaluation of the safety profile of COVID-19 vaccines: A rapid review. *BMC Med* 2021;19:173.
- WHO. Coronavirus Disease (COVID-19): Vaccines Safety. Available from: [https://www.who.int/news-room/q-a-detail/coronavirus-disease-\(covid-19\)-vaccines-safety](https://www.who.int/news-room/q-a-detail/coronavirus-disease-(covid-19)-vaccines-safety). [Last accessed on 27 October 2021].
- Dutta S, Kaur RJ, Charan J, Bhardwaj P, Sharma P, Ambwani S, *et al.* Serious adverse events reported from the COVID-19 vaccines: A descriptive study based on WHO database [Internet]. 2021 Mar [cited 2021 Oct 27] p. 2021.03.23.21253433. Available from: <https://www.medrxiv.org/content/10.1101/2021.03.23.21253433v1>.
- Schmidt T, Cloete A, Davids A, Makola L, Zondi N, Jantjies M. Myths, misconceptions, othering and stigmatizing responses to Covid-19 in South Africa: A rapid qualitative assessment. *PLoS One* 2020;15:e0244420.