

Awareness and Hesitancy of COVID-19 and other Vaccines among People Living with HIV/AIDS Attending Antiretroviral Therapy (ART) Center in North India

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Abstract

Introduction: Approximately 40 years have passed since we first learned about the human immunodeficiency virus (HIV), but several people living with HIV (PLHIV) in developing countries such as India cannot avail treatments. This makes preventive measures, such as vaccinations, critical in these persons to avoid vaccine preventable diseases (VPDs). However, little is known about the willingness and perceptions of PLHIV regarding these vaccines. Therefore, we explored vaccine awareness and hesitancy, especially during the recent COVID-19 pandemic.

Objectives: The primary objective was to determine the uptake of the Covid-19 vaccine and other VPD's among PLHIV and factors affecting the same in Antiretroviral therapy (ART) centers in a tertiary care hospital in North India. **Research Design and Methods:** This was a cross-sectional study of HIV patients who attended our Antiretroviral Therapy center (ART). Clinical data were collected using a questionnaire on general profile, disease information, knowledge, attitude, and practice (KAP) regarding vaccinations, and vaccination status for different VPDs.

Results/Findings: We enrolled 300 subjects and found that 82% of the patients attending our ART center were aware of vaccinations, most of whom were aware of the polio vaccine ($n=91$, 30.33%), followed by tuberculosis ($n=61$, 20.33%), and the majority of them were not aware of vaccines indicated in PLHIV. We also found that the majority ($n= 240$, 80.23%) of patients had vaccine hesitancy, especially regarding the new COVID-19 vaccine. **Conclusion:** There is a need to create awareness among people about the benefits and uses of vaccination to achieve the greater goal of reduced morbidity and mortality among PLHIV. There is a need for free vaccination programs for VPDs in PLHIV patients.

Keywords: AIDS, COVID-19, hesitancy, HIV, vaccination

INTRODUCTION

The COVID-19 pandemic has brought unprecedented challenges for public health worldwide, and vaccines have emerged as the most effective tool to control its spread.^[1] However, many individuals remain hesitant or unwilling to receive the COVID-19 vaccine, posing unprecedented challenges for public health worldwide. This phenomenon is vaccine hesitancy and has become a significant obstacle in achieving herd immunity and controlling the COVID-19 pandemic, despite the widespread availability of vaccines^[2,3] As per World Health Organization, vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context-specific, varying across time, place,

and vaccines. It is influenced by factors such as complacency, convenience, and confidence.^[4]

Vaccine hesitancy can have a significant impact on public health by reducing vaccine coverage and increasing the risk of vaccine-preventable diseases. For example, the recent measles outbreaks in the United States have been linked to vaccine hesitancy, and the COVID-19 pandemic has highlighted the

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potential consequences of vaccine hesitancy on a global scale. According to a study published in *The Lancet*, increasing vaccine confidence and addressing vaccine hesitancy are crucial for achieving herd immunity and controlling the spread of infectious diseases.^[5]

Vaccine hesitancy has been observed in previous vaccination campaigns such as measles and polio, but it has been amplified during the COVID-19 pandemic due to unique circumstances^[6,7] People may hesitate to get vaccinated against COVID-19 due to various reasons, such as concerns about the vaccine's safety and efficacy, distrust of the medical system, and misinformation on social media.^[8] One group that has been particularly impacted by vaccine hesitancy is individuals living with HIV or AIDS. Vide the data published by Indian government as of 2020, there were 23.19 lakh PLHIV, indicating the magnitude of this disease. Decreased immunity in AIDS patients can lead to more frequent and severe infectious diseases, as well as increased susceptibility to opportunistic infections. Timely vaccinations can prevent or suppress many opportunistic infections in AIDS patients. Additionally, AIDS patients have higher mortality rates from COVID-19.^[9,10]

In a similar study conducted in China by Huang *et al.*,^[11] in which it was reported that people living with HIV and AIDS (PLWHA) had comparatively low willingness to receive the COVID-19 vaccination as compared to general population around the world

The Centers for Disease Control and Prevention, the National Institutes of Health, and the HIV Medicine Association of the Infectious Diseases Society of America have published guidelines on vaccinations for HIV/AIDS patients, which are widely followed globally, and according to these guidelines, the vaccines recommended for patients with AIDS are pneumococcal, influenza, hepatitis B virus (HBV), diphtheria, tetanus, and pertussis.^[12] Some high-risk patients also require additional vaccines, such as meningococcal, hepatitis A vaccine (HAV), and human papillomavirus vaccine (HPV). Live vaccines like MMR, zoster, and varicella can be given to HIV/AIDS patients with preserved CD4 counts ($CD4 \geq 200$ cells/mm³). However, Hib has been recently removed from the vaccination guidelines.^[13] Therefore, we conducted this study to understand the awareness and vaccine hesitancy for the eligible vaccines among patients with HIV attending our antiretroviral therapy (ART) center.

MATERIAL AND METHODS

This was a cross-sectional, observational study. The study was conducted at ART center situated at a public tertiary care center in North India. Data were collected from May and June 2021. All PLHIVs above the age of 18 years attending the ART clinic were enrolled. Consecutive sampling was done. Admitted and critically ill participants were excluded. The questionnaire had four main parts: general profile, disease information, knowledge, attitude, and practices regarding vaccination, and vaccination status for different diseases (Supplemental File 1).

Data were collected using a pre-structured questionnaire, after explaining in vernacular language to the participant. The questions were close ended with two or more options. The interviewer ensured that the participants understood the questions and chose appropriately to the best of their knowledge and awareness in a manner that they did not feel judged at any point during the interview.

The formula used to calculate the sample size, $n = 4pq/d^2$. Assuming expected frequency $p = 50\%$ and acceptable margin of error = 6%, total population is 5417 so at 95% confidence interval the sample size comes out to be 255 and assuming 15% non-response rate and rounding off the sample size is $n = 300$. Data were collected and entered in Microsoft Excel 2016. Data were cleaned, and descriptive and inferential statistics was applied.

This study was granted permission by Punjab State AIDS Control Society (PSACS), which is the nodal agency for conducting and publishing any type of study on HIV-positive individuals in Punjab vide diary no-77 dated-7/05/2021 to conduct study (Supplemental File 2) and Ref No./PSACS/SIMU/2022/253 dated-19.04.2022, to publish the findings of this study (Supplemental File 3).

RESULTS

Patient demographics

We enrolled 300 patients during the study period. The majority of the subjects were in age range 30–40 years (27.67%) followed by 50–60 years (18.67%), 40–50 years (18.33%), 20–30 years (18.33%), with a median age of 40 years; however, those with age more than 60 years constituted 13% of sample. Males were 59.33% and females 41.34%, while others were 0.66%. Majority of them were married ($n = 274, 91.33\%$), and almost all 97.33% were adherent to treatment. Most patients who attended the clinic had a low socioeconomic status, with a mean disease duration of five years and three months, and the longest was 23 years.

The majority ($n = 203, 67.67\%$) of patients had CD4 counts below 500. A total of twenty individuals had CD4 counts higher than 1000/mm³ [Figure 1]. We found that even with a high illiteracy rate, only 1.67% of the patients did not adhere to antiretroviral therapy (ART) treatment, and most patients

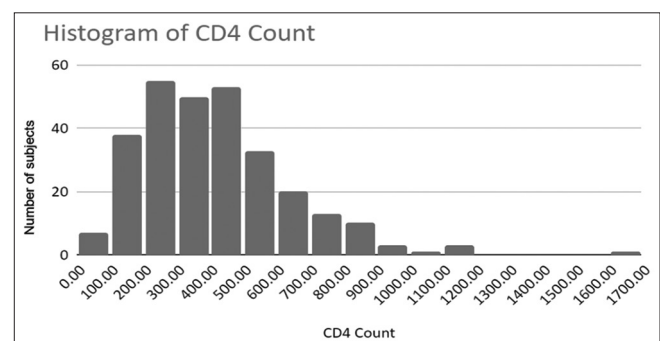


Figure 1: CD4 count of study participants

Table 1: Distribution of PLHIVs regarding knowledge, attitude, and practices about vaccines

Knowledge, Attitude, and Practices regarding Vaccines among People Living with HIV		
	Yes	No
Do you think vaccination is important?	83%	17%
Do you think it is important to complete vaccination schedule?	84.67%	15.33%
Do you think vaccination has side effects?	55.4%	44.6%
Do you think certain vaccines are hot/cold in nature?	70.33%	29.67%
Awareness about diseases against which vaccinations are available	38.33%	61.67%
Do you think having HIV will lead to the vaccine becoming ineffective/less effective?	85.4%	14.6%
Do you think vaccine will flare HIV?	83.33%	16.67%
Are you willing to pay for vaccines that are not available free of cost/in government supply?	41.67%	58.33%
Whether COVID vaccination taken?	19.33%	80.67%
Did the COVID-vaccinated people have any side effects after vaccination?	62.07%	37.93%
Was the COVID vaccine provided free of cost?	100%	0%
Any other vaccination taken other than COVID vaccine?	0.01%	99.99%

292/300 received regular treatment. Furthermore, 29.3% of the patients reported improvement in their health after antiretroviral therapy (ART) treatment.

Participants' knowledge attitude and practices

A total of 249 (83%) patients strongly believed that vaccines are important, while 17% were not in agreement [Table 1]. As we questioned patients in their native language, we found that 45 (15%) patients were of the view that vaccination was harmful to health and can even cause death, 51 (16.6%) patients had a strong belief that they can cause disease against which they were being used, and 0.66% of the patients did not believe that they were safe for use in any condition.

As we further questioned the patients about vaccination, we found that 98.33% preferred government centers for vaccination. The main reason (68.81%) was the availability of vaccines free of cost. Very few participants (less than 2%) stated that private centers were better because of less time consumption and more hygienic practices.

Of the 134, 44.6% experienced any adverse effects from vaccination. Most of them reported that fever ($n = 128, 42.67\%$) was the most common effect they had followed by body aches ($n = 105, 35\%$) and ($n = 2, 0.66\%$) subjects were of the view that vaccination can cause infertility as a presumed adverse effect. We also recorded data on patient awareness about the type and availability of vaccination [Table 2]. Every seventh patient ($n = 44, 14.66\%$) believed that HIV can make the vaccine ineffective, even if taken as per schedule. Conversely, ($n = 50, 16.67\%$) patients stated that vaccines can even cause a flare-up of their HIV infection.

Of the 300 patients, very few ($n = 58, 19.33\%$) had taken the COVID-19 vaccine and out of them only ($n = 17, 5.6\%$) completed their vaccine dose schedule. The majority of these patients were reluctant to receive the second dose because of adverse effects such as fever ($n = 23, 7.6\%$), pain at the injection site ($n = 12, 4\%$), and fatigue with malaise in a few patients.

Among those who were aware of and desired to get vaccinated, we found that 33 (11%) were motivated by their peers for

vaccination, 14 (4.6%) were motivated by health workers, and 11 (3.6%) were motivated by various sources such as social media and newspapers. These vaccinated subjects felt comfortable with the vaccination program, and the main reason for this was the efficiency of the vaccine and the free cost. Many were of the opinion that vaccines are indeed important, but opposite results were observed when asked about the diseases against which the vaccinations are available [Table 2]. Similarly, not many were willing to pay for the vaccines that are in government supply free of cost though they have taken the COVID vaccination, and the differences were found to be statistically significant [Table 3].

COVID-19 Vaccine hesitancy

We found that 242 (80.66%) participants were not vaccinated against COVID-19. The reasons behind COVID-19 vaccine hesitancy are shown in [Figure 2]. One hundred and forty-two (47.3%) had fear and anxiety associated with the vaccine and the vaccination process. This fear and anxiety are mainly associated with the myths and adverse effects of the vaccine. Sixty-one subjects had doubts about the outcomes, were also affected by the rumors associated with it, and were concerned about the vaccines not being efficacious. A few, that is, 2% (8) stated that they did not want to sit in queue for it, while 5.3% (16) were of the view that they did not want to add a vaccine among the long list of medications they were already on. Finally, 15 (5%) participants stated that they did not want to visit the hospital again and again in this low immunity state, and they also mentioned a shortage of vaccine they might face even if they visited the hospital.

As per the latest guidelines published,^[11] we queried whether patients were aware of the need for vaccinations to their near contacts or other household persons. We observed that none of the patients were aware of it.

DISCUSSION

Our study sheds light on the vaccination status of patients with HIV/AIDS, as well as the reasons behind underutilization of

Table 2: Distribution of patients' regarding their awareness about vaccines availability

Awareness on Availability of Vaccine (n)	Percentage (%)
Polio (n=91)	30.33
Tuberculosis (n=61)	20.33
COVID-19 (n=58)	19.33
Rabies (n=54)	18.00
Hepatitis B (n=21)	7.00
Hepatitis C (n=20)	6.66
HIV (n=18)	6.00
Pneumonia (n=15)	5.00

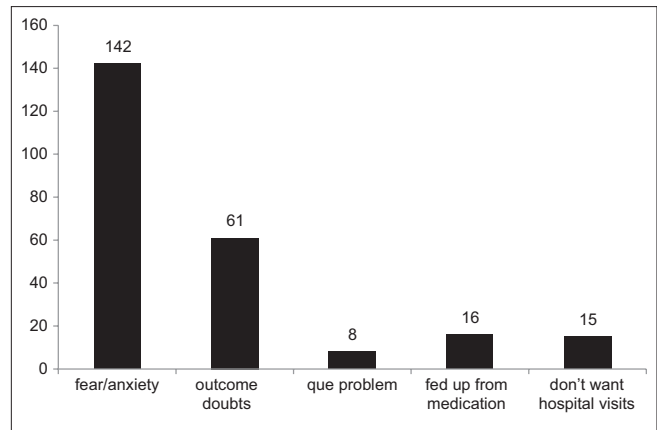
Table 3: Distribution of PLHIVs regarding their knowledge about importance of vaccination vs availability and patient's willingness to pay vis-à-vis uptake

Variable	Yes	No	Chi-Square and P
Knowledge about importance of vaccination	83	17	42.3684 and <0.00001
Knowledge about vaccine-preventable diseases	38	62	
Willingness to pay for vaccines (not in government supply)	42	58	12.4779 and 0.00412
COVID vaccination taken	19	81	

vaccination in such patients attending an antiretroviral clinic at a tertiary care center in India. About 80% (a large proportion) were not vaccinated against COVID-19. A similar proportion believed that vaccines might flare their disease. Additionally, half of the participants had a fear of adverse effects, which were the main reasons reported for low vaccine uptake.

It is now well known that vaccines decrease mortality and morbidity from various preventable diseases, and a recent meta-analysis showed that any type of vaccine can reduce mortality related to a specific disease.^[14-18] Hence, it is recommended to vaccinate PLHIV to reduce mortality. We found that 83% of the participants were aware of vaccination, but unfortunately, 61.67% were not aware of vaccinations specifically recommended for AIDS. The majority (74.6%) knew about vaccinations for newborns provided in hospitals free of cost. Similar poor awareness results have been reported in other countries.^[19-21] In response, various governments have taken steps, such as observance of HIV vaccine awareness day on May 18.^[22] However, there is a need to create further awareness through various social media platforms, tele advertisements, and national policies.

Seventeen percent of our patients strongly denied vaccination. Reasons for this were fear, anxiety, and efficacy. A similar study was published in 2013, 2021 indicating that 14.9% of eligible candidates were in denial^[23,24] The reasons mentioned in the above studies were similar to the reasons we found in our patients. All 17% of the patients were illiterate, so a lower education level may also be considered a factor behind vaccine hesitancy.

**Figure 2: Causes of COVID-19 vaccine hesitancy among participants**

We asked patients about their knowledge of the adverse effects of vaccination and found that most patients reported adverse effects similar to a large study on 6,55,590 doses by Menni *et al.*,^[25] but the frequency of reporting varies in comparison with both studies. We did not find any data related to vaccinations causing infertility in human subjects, indicating that there is a misunderstanding of the effects of vaccines in the general population. Such misunderstandings can be improved by patient education and vaccination awareness programs, but unfortunately, these are lacking in our country.

We asked patients about their socioeconomic status and stability; most of our enrolled patients (96.5%) were below the poverty line (BPL). This was the main factor behind many other factors for failure of the vaccination program, which is paid in our country, and if we include private sector insurance, they did not provide any vaccine under insurance. The universal immunization program (UIP) of India does not cover patients affected by HIV,^[26,27] so we recommend that there must be a program for AIDS immunization programs along with ART treatment to prevent vaccine-preventable diseases (VPDs). Policymakers can also extend the UIP to AIDS patients. More effectively, UIP can also be integrated with the National AIDS Control Program (NACP).^[28]

This is a unique study that asked patients about vaccines that could be used in AIDS for better treatment and decreased morbidity. The majority of the responses we received were for polio vaccine, indicating that the pulse polio program is effective in communication. Hence, we can strategically follow the steps of such an effective program to aid VPDs in PLHIV.

The main strength of this study was its novelty, as very little is known regarding vaccination prevalence and attitudes toward vaccines among PLHIV in India. The information gathered from this study can directly inform policymakers to guide efforts to increase awareness among people regarding the necessity and safety of vaccines.^[29]

The main limitation of this study is that it was a single-center study, and the data could not be extrapolated to the whole country.

CONCLUSION

Majority (69%) of the participants were below 50 years of age, married (91.33%), and adhered to the treatment (97.33%). The participants were hesitant to receive vaccines, despite knowing the significance of getting vaccinated and completing its schedule (83% and 84.67%, respectively). However, their knowledge regarding its adverse effects, availability, and its effect in the presence of HIV disease was poor and inaccurate. They had certain concerns that vaccines not being effective in people with HIV (85.4%). Moreover, less than 50% of people are willing to pay for vaccines and almost all felt that they should be provided for free. Thus, inferring that there is a need to allay their fears, misconceptions, and false beliefs and provide the accurate knowledge and motivation for vaccination.

RECOMMENDATIONS

We urge local and national organizations to come to action, so that there could be a robust vaccination program for PLHIV based on local endemicity of VPDs and media support for its success. We also recommend that there be focus group discussions with PLHIV regarding vaccines that can help reduce their hesitancy. There is an urgent need for vaccination to decrease morbidity and mortality, especially also from the COVID-19 infection, in persons with a suppressed immune system such as PLHIV.

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Conflicts of interest

There are no conflicts of interest.

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