

## Original Research Article

# Knowledge, attitude and practices towards COVID-19 among people living with HIV in Pune, India: a cross-sectional study

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## ABSTRACT

**Background:** Studies on knowledge, attitude, and practices (KAP) are important for implementation of interventions. This cross-sectional study was conducted among HIV infected individuals attending antiretroviral therapy (ART) centre at Pune, India, to assess KAP towards COVID-19.

**Methods:** The study conducted between June and December 2020 consisted of twelve, five and seven questions pertaining to knowledge, attitude, and practices respectively towards COVID-19. Frequencies and percentages of correct knowledge, attitude and practices were calculated. Overall knowledge scores were categorized into poor, moderate and good using class width equation.

**Results:** Of the total 1175 participants enrolled, 649 (55.2%) were females. Mean age and CD4 count of participants at study entry were 44 years (SD: 9.1) and 637 cells/mm<sup>3</sup> (SD: 297) respectively. Overall, 400 (34.0%, 95% CI: 31.33-36.83), 612 (52.1%, 95% CI: 49.18-54.98) and 163 (13.9%, 95% CI: 11.95-15.98) participants had good, moderate and poor knowledge respectively regarding COVID-19. Illiterate participants had six times higher probability of having poor knowledge as compared to their counterparts (OR 5.70, 95% CI: 3.94-8.23; p<0.001). Majority of people living with (PLHIV) had correct attitude towards adherence to government prevention and control measures. Healthy preventive practices of social distancing (99.5%), wearing masks at public places (99.7%) and frequent washing hands with soap and water (98.7%) were followed by PLHIV.

**Conclusions:** PLHIV have average knowledge, correct attitude towards adherence to government prevention and control measures, and appropriate practices towards prevention of COVID-19. Counselling sessions at ART centres should include information for improving knowledge related to COVID-19 especially targeting illiterate individuals.

**Keywords:** COVID-19, India, KAP, PLHIV

## INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an emerging respiratory disease that is caused by a novel coronavirus and was first detected in December 2019 in Wuhan, China. The World Health Organization (WHO) declared coronavirus disease as a pandemic on March 11, 2020.<sup>1</sup> India closed its international borders promptly and enforced an immediate lockdown. The lockdown gave

time to government to prepare for a possible surge in cases.<sup>2</sup> The Indian Health Ministry along with State-level Health Departments had been providing information on COVID-19 through web portal, sub national communication channels and through a mobile app 'Aarogya-Setu'.<sup>3</sup> India being a densely populated country, government had challenge to mitigate the spread of virus and testing, tracing contacts, isolating patients, implementing COVID care plans, and disseminating

timely information.<sup>4</sup> As per the Ministry of Health and Family welfare (MoHFW), there are around 1,69,824 active cases, 10,40,9160 discharged and 1,54,147deaths related to COVID-19 as on January 30, 2021.<sup>5</sup>

Patients with advanced age and co-morbidities have higher chances of severe COVID-19 and poor disease outcomes.<sup>6</sup> HIV is a major public health problem with 2.14 million estimated people living with HIV (PLHIV) in India and around 12,92,938 are on treatment under national program in 544 ART centres by March 2019.<sup>7</sup> A systematic review regarding COVID-19 outcomes in HIV/AIDS individuals has inferred that currently PLHIV are not likely to be at increased risk of poorer outcomes of COVID-19 disease as compared to the general population if they have an undetectable viral load and an adequate CD4 count.<sup>8</sup> Another systematic review on COVID-19 among people living with HIV has mentioned that multimorbidity and older age can pose a risk of COVID-19 among PLHIV. The authors have recommended that healthcare providers need to address multimorbidity among PLHIV in order to prevent COVID-19 among them.<sup>9</sup> Following preventive measures to control COVID-19 infection is the utmost critical intervention.<sup>10</sup> Studies on knowledge, attitude, and practice (KAP) are important in acquiring information on knowledge gaps and behavioral patterns which may identify needs, problems, and barriers for implementing interventions.<sup>11</sup> Such information is important to reduce distress and panic caused by lack of clarity in information and negative attitude of community towards infectious diseases.<sup>12</sup> Multiple studies are conducted in India and globally on KAP among general population, health care workers and diabetic individuals but the data among HIV infected individuals on knowledge, attitude, and practice (KAP) towards COVID-19 is lacking.<sup>13-22</sup> This study was conducted to assess the knowledge, attitude and practices towards COVID-19 among PLHIV.

## METHODS

### *Study design and setting*

This cross-sectional study was conducted among HIV infected adults attending an outpatient clinic at ICMR-National AIDS Research Institute, Pune, between June and December 2020. The ART center affiliated to National AIDS Control Organization (NACO) is nested in this clinical facility.

### *Sample size determination and sampling*

Due to lack of data among PLHIV, we assumed 50% prevalence to get the desired sample size by considering 95% confidence interval, marginal error (d) of 3% and 10% non-response rate. The derived sample size was 1175. A consecutive sampling method was employed to include the study participants.

### *Study tool*

Data were collected using a pre-tested, structured interviewer-administered questionnaire. The questionnaire comprised of four sections: sociodemographic information, knowledge about COVID-19, attitude towards adherence to government prevention and control measures of COVID-19 and practices relevant to COVID-19. The questions assessing knowledge were answered as yes or no or "I don't know". A correct answer was given 1 point and an incorrect/don't know answer was given 0 point. We used the awareness material regarding COVID-19 advised by Ministry of Health and Family Welfare, Government of India to frame knowledge questionnaire.<sup>23</sup> Four questions were based on disease presentation and management (K1-K4), four questions were pertaining to HIV and COVID-19 (K5-K8) and four questions were based on disease transmission (K9-K12). The total knowledge score ranged from 0 to 12. Participants' overall knowledge was categorized by class width and calculated by dividing the range (12-0 = 12) by 3 (desired number of the class interval) (Class width (CW)=Maximum Value-Minimum Value/Number of required class interval).<sup>21</sup> Based on the derived class width, the total score was converted into a three proportionate ordinal scale namely, poor (score 0-4), moderate (score 5-8), and good (score 9-12).<sup>21</sup> Attitude of participants towards adherence to government prevention and control measures during COVID-19 was assessed by 5 questions. The questions assessing practice were answered either yes, no or don't remember. The correct answer was given 1 point and an incorrect 0 point. A study counselor and a clinician performed the data collection process by using novel coronavirus disease 2019 (COVID-19): Guidelines on rational use of Personal Protective Equipment at a well-ventilated room keeping a minimum distance of 2 meter from the participants.<sup>24</sup>

### *Statistical analysis*

Software package SPSS 20.0 (SPSS, Inc.; Chicago, IL, USA) was used for data analysis. Frequencies and percentages of correct knowledge, attitude and practices were calculated. The overall scores of each individual were used to obtain mean scores for knowledge. A binary logistic regression was used to analyse demographic characteristics and CD4 counts of participants associated with poor knowledge. Variables with significant association ( $p < 0.05$ ) and confidence interval of odds ratios not capturing the null value of 1 with poor knowledge was reported.

## RESULTS

### *Demographic and clinical characteristics*

Of the 1175 HIV infected individuals enrolled in the study, 649 (55.2%) were females and 916 (78%) were on ART for more than five years. Mean age and CD4 count of participants were 44 years (SD: 9.1) and 637 cells/mm<sup>3</sup>

(SD: 297) respectively. Of the total, 994 (84.6%) were literate, 727 (61.9%) were employed and 443 (37.7%) earned more than Rs.10,000 as their monthly family income (Table 1). The median duration on antiretroviral treatment was 8.3 years (IQR: 5.4-10.8).

### Knowledge towards COVID-19

The mean knowledge score of 1175 participants was 7.2 (SD: 2.4) out of the total maximum score of 12. Overall, 400 (34.0%, 95% CI: 31.33-36.83), 612 (52.1%, 95% CI: 49.18-54.98) and 163 (13.9%, 95% CI: 11.95-15.98) participants had good, moderate and poor knowledge, respectively regarding COVID-19. The knowledge scores of the participants regarding COVID-19 are presented in Table 2. The results showed that common symptoms of covid-19 (fever, dry cough, and tiredness) were correctly answered by 758 (64.5%) participants and 294 participants (25%) believed that only symptomatic individuals can have corona virus infection. Nine hundred and seventy-nine (83.3%) participants were aware that individuals with diabetes, hypertension and cardiovascular disease had increased chances of coronavirus infection. Nine hundred and forty participants (80%) did not know about use of lopinavir/ritonavir drugs being considered in the treatment protocol of COVID-19 and hence could not answer the question as yes or no. HIV infected individuals with CD4 count more than 500 cells/mm<sup>3</sup>

may also have risk of acquiring corona virus was answered by 307 (26.1%) participants.

**Table 1: Socio-demographic characteristics of the study participants (n=1175).**

Characteristics	Number of participants N (%)
<b>Gender</b>	
Male	526 (44.8)
Female	649 (55.2)
<b>Age (year)</b>	
≤30	85 (7.2)
31-50	839 (71.4)
>50	251 (21.4)
<b>Education</b>	
Illiterate	181 (15.4)
Literate	994 (84.6)
<b>Employment</b>	
Employed	727 (61.9)
Unemployed	448 (38.1)
<b>Monthly family income (rupees)</b>	
No income	152 (12.9)
≤5000	167 (14.2)
5001-10000	413 (35.1)
>10000	443 (37.7)

**Table 2: Knowledge towards COVID-19 among study participants (n=1175).**

S. No.	Questions	Yes N (%)	No N (%)	Don't know N (%)
<b>K1</b>	The most common symptoms of COVID-19 are fever, dry cough, and tiredness	758 (64.5)	310 (26.4)	107 (9.1)
<b>K2</b>	Sore throat, diarrhoea, headache, loss of taste and smell are less common symptoms of COVID-19	779 (66.3)	230 (19.6)	166 (14.1)
<b>K3</b>	Only symptomatic individuals have Coronavirus infection	294 (25.0)	628 (53.4)	253 (21.5)
<b>K4</b>	Individuals with Diabetes, hypertension and cardiovascular disease have increased chances of Corona virus infection	979 (83.3)	50 (4.3)	146 (12.4)
<b>K5</b>	Currently as there is no cure for COVID-19, if the symptoms of the disease are diagnosed early, the person affected by Corona can be managed by the supportive medical treatment.	912 (77.6)	130 (11.1)	133 (11.3)
<b>K6</b>	HIV infected individuals on regular effective antiretroviral treatment and following preventive measures don't have an increased risk of getting Coronavirus	892 (75.9)	80 (6.8)	203 (17.3)
<b>K7</b>	HIV infected individuals taking lopinavir/ritonavir drug can't acquire corona virus	110 (9.4)	125 (10.6)	940 (80.0)
<b>K8</b>	HIV infected individuals with CD4 count more than 500 cells/mm <sup>3</sup> do not have risk of acquiring Corona virus	311 (26.5)	307 (26.1)	557 (47.4)
<b>K9</b>	The corona virus spreads through droplets from the nose or mouth, which are expelled when an individual with COVID-19 coughs, sneezes, or speaks	1047 (89.1)	32 (2.7)	96 (8.2)
<b>K10</b>	The corona virus can't be contracted by touching surfaces that have virus on them and then touching their eyes, nose or mouth	172 (14.6)	868 (73.9)	135 (11.5)
<b>K11</b>	The chances of Corona virus transmission are more only in crowded places	885 (75.3)	232 (19.7)	58 (4.9)
<b>K12</b>	There are no chances of Corona virus transmission through spitting	126 (10.7)	919 (78.2)	130 (11.1)

**Table 3: Factors associated with poor knowledge of COVID-19 among study participants.**

Characteristics	Total participants (n=1175)	Poor knowledge (n=163, 13.9%)	Odds ratio (95% CI)	P value
<b>Gender</b>				
Male	526 (44.8)	71 (13.5)	0.95 (0.68-1.32)	0.738
Female	649 (55.2)	92 (14.2)	1	
<b>Age (year)</b>				
>40	806 (68.6)	110 (13.6)	0.94 (0.66-1.34)	0.742
≤40	369 (31.4)	53 (14.4)	1	
<b>Education</b>				
Illiterate	181 (15.4)	68 (37.6)	5.70 (3.94-8.23)	<0.001
Literate	994 (84.6)	95 (9.6)	1	
<b>Employment</b>				
Unemployed	448 (38.1)	63 (14.1)	1.03 (0.73-1.44)	0.882
Employed	727 (61.9)	100 (13.8)	1	
<b>Recent CD4 count (cells/mm<sup>3</sup>)</b>				
≤500	414 (35.2)	51 (12.3)	0.81 (0.57-1.16)	0.256
>500	761 (64.8)	112 (14.7)	1	
<b>Duration on ART (year)</b>				
≤5	259 (22.0)	36 (13.9)	1.00 (0.67-1.49)	0.989
>5	916 (78.0)	127 (13.9)	1	
<b>Family income (rupees)</b>				
No income	152 (12.9)	21 (13.8)	1.17 (0.71-1.94)	0.538
≤5,000	167 (14.2)	39 (23.4)	2.23 (1.47-3.37)	<0.001
>5,000	856 (72.9)	103 (12.0)	1	

**Table 4: Attitude of study participants towards adherence to government prevention and control measures of COVID-19 (n=1175).**

S. No.	Questions	Agree N (%)	Disagree N (%)	Don't know N (%)
A 1	I can shake hands with people known to me	104 (8.9)	1020 (86.8)	51 (4.3)
A 2	There is no need to take precautions from my relatives as I can't get Corona virus from them	65 (5.5)	1035 (88.1)	75 (6.4)
A 3	I can attend family functions/weddings even if the place is crowded	73 (6.2)	1023 (87.1)	79 (6.7)
A 4	I will approach COVID-19 treatment centres only if I have severe symptoms	308 (26.2)	717 (61.0)	150 (12.8)
A 5	Indians have good immunity and less deaths as compared to western countries so I am safe	698 (59.4)	246 (20.9)	231 (19.7)

The correct knowledge about the spread of SARS CoV-2 virus through droplets from the nose or mouth, which are expelled when an individual with COVID-19 coughs, sneezes or speaks, was present in 1047 (89.1%) participants. Three fourth of the participants (75.3%) thought that the chances of corona virus transmission are more only in crowded places.

Univariate analyses showed that age, gender, employment, recent CD4 count and ART duration were not associated with poor knowledge among study participants. Illiterate participants had six times higher probability of having poor knowledge as compare to their counterparts (OR 5.70, 95% CI: 3.94-8.23; p<0.001) (Table 3).

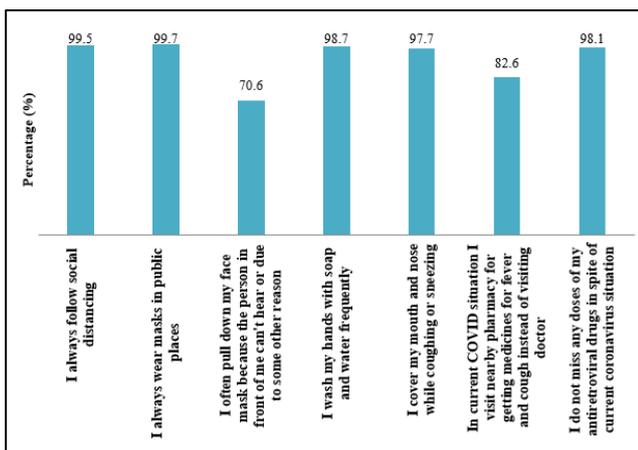
#### **Attitude towards adherence to government prevention and control measures of COVID-19**

The responses from participants related to attitude towards adherence to government prevention and control measures of COVID-19 are presented in Table 4. A total of 1020 (86.8%) participants knew that shaking hands with known people have risk of acquiring corona virus whereas 1035 (88.1%) agreed with the fact that there is a need to take precautions from their relatives as they could get infected from them. Attending family functions even if it is crowded may have risk of acquiring corona virus was agreed upon by 1023 (87.1%) participants. Three hundred and eight (26.2%) participants felt that they will approach COVID treatment centres only in case of development of severe symptoms. Many participants

(59.4%) thought that Indians had good immunity and fewer deaths as compared to western countries and hence they were safe.

### Practices towards COVID-19

Correct practices of social distancing, wearing masks at public places and frequently washing hands with soap and water, and covering mouth and nose while coughing or sneezing were followed by 1169 (99.5%), 1171 (99.7%), 1160 (98.7%) and 1148 (97.7%) respectively. Facemasks were often pulled down during conversations with people or for some other reasons by 333 (28.3%) participants. The study findings revealed that despite various restrictions during COVID-19 lockdown, 1153 (98.1%) of the participants didn't miss any dose of antiretroviral therapy (Figure 1).



**Figure 1: Distribution of correct responses among study participants for practices towards COVID-19, Pune (n=1175).**

## DISCUSSION

The information on knowledge, attitude and practices of the population is useful to identify barriers, improve quality of services and making strategic planning for program purposes. To the best of our knowledge, this is the first study in India assessing the KAP towards COVID-19 among HIV infected individuals.

In this study, we found an overall 34% good and 52% moderate scores on the knowledge questions. These knowledge score were lower as compared to other studies which might be due to the differences in the study population, age groups, sample size, education, differences in the tool used and period of data collection.<sup>14,15,25,26</sup> Majority of the PLHIV in our study were above 30 year age with 15% illiteracy and varying levels of education among literate individuals. A study on KAP among diabetic individuals published from India showed overall higher rates of knowledge towards COVID-19.<sup>22</sup> This nationwide survey among diabetic individuals included young adults, majority residing in

urban area and having higher education and income in contrast to the population of our study.

Our study tool included three knowledge questions on HIV/AIDS. During the initial phase of pandemic lopinavir/ritonavir was included in the treatment protocol of COVID-19.<sup>27</sup> This information was published in newspapers and shared in social media. But, it was found that 80% of PLHIV didn't know the answer and only 11% could give correct answer. Also, the treatment protocol kept changing rapidly based on scientific evidence and hence the participants would not have focused on medicines used in the management of COVID-19. Some PLHIV (75.9%) knew that taking regular effective antiretroviral treatment and following preventive measures did not have an increased risk of getting coronavirus infection. This is important as there is evolving and conflicting evidence whether people living with HIV have an increased risk of acquisition of SARS-CoV-2 infection and/or COVID-19 clinical complications compared to the general population.<sup>28</sup> It was important to take preventive measures and precautions that would help to mitigate the risk of acquisition of coronavirus among PLHIV. Knowledge scores of transmission and symptoms in our study was less as compared to studies conducted elsewhere.<sup>14,22,25,26</sup> This highlights the fact that despite awareness campaigns and social media information; the knowledge scores were not adequate among PLHIV. ART centers can play a crucial role in imparting the correct and complete information to PLHIV during the counselling sessions.

Factors significantly associated with participants' knowledge in this study were literacy and income. These findings are in line with other studies which have found that more educated respondents are more knowledgeable about emerging communicable diseases.<sup>29-31</sup> This might be due to continuous reporting and availability of the information on television, internet, government website and newspapers during pandemic situation where educated population might have actively learnt and gained knowledge on COVID-19. Secondly, it might be possible that due to existing HIV infection, literate PLHIV would have accessed more information to protect them from this infectious disease. One of the significant factors associated with poor knowledge is income of PLHIV. Similar findings have been reported in studies elsewhere.<sup>10,15</sup>

The present study found that majority of participants held positive attitudes towards adherence to government prevention and control measures in COVID-19. Roughly, nine out of ten participants answered that they will not shake hands with people if they are known to them. Around 87% participants mentioned that they would avoid attending the family functions like weddings which is a crowded place. Our findings suggested that PLHIV prefer protecting their health than following the social traditions. Our data showed that 26% PLHIV felt that they should approach government COVID-19 treatment

centres only in case of severe symptoms and around 13% participants did not know the answer. One of the articles had reported that individuals with SARS-CoV-2 should be treated early in order to speed their recovery, reduce the severe outcomes and demand on the healthcare system.<sup>32</sup> It has further stated that despite experiencing only mild symptoms early in infection, many COVID-19 patients progress to severe disease that leads to hospitalization.<sup>33</sup> So it is crucial for the programme managers to develop IEC material highlighting the importance for approaching the healthcare system immediately even if the symptoms are mild for seeking timely treatment in order to reduce morbidity and mortality due to COVID-19. Around 59% PLHIV had a feeling of being safe as they thought Indians have good immunity and comparatively less number of deaths as compared to western countries. The government website, television and social media were sharing the news on number of cases, hospitalizations and mortality and more than 50% PLHIV felt that India is at a better position as compared to the western world and they are comparatively safer.

The finding of a high correct score of COVID-19 practices among PLHIV was surprising compared to their average knowledge scores. Healthy preventive practices of social distancing (99.5%), wearing masks at public places (99.7%) and frequent washing hands with soap and water (98.7%) were followed by PLHIV. The reason for high adherence to following appropriate practices might be due to the intense work by Indian government and steps taken to reduce the spread of this highly infectious virus. Implementing lockdowns, banning travels, spreading the messages of correct practices on government websites, social media, television, and radio across the country, making face mask mandatory and 'Arogya-Setu' application for COVID-19 had an impact to change the mindset of people. National AIDS Control Organization had also released a note for all facilities to display the posters and educating PLHIV on preventive practices.<sup>34</sup>

One-third of PLHIV (28%) mentioned that they often pull the mask down during their conversation with other people as it was perceived that people are unable to hear them properly. This has been an observation not only for PLHIV but for overall population despite knowing the fact that the virus can be transmitted or acquired through aerosols. So, the information on correctly wearing the masks should be given to PLHIV.

One of the encouraging findings of our study was that a majority of PLHIV (98%) took their antiretroviral drugs without missing their dose despite COVID-19 restrictions. Government ART programme advised ART centers for multi month dispensation (MMD) to PLHIV. Strategies like community dispensation (through Care and Support Centers, home delivery through outreach workers volunteers, PLHIV networks) and family dispensation were followed in COVID-19 scenario as

advised by the government programme.<sup>34</sup> Local action plans were developed in consultation with ART center and community networks, to ensure that PLHIV receive uninterrupted ART supply without having to travel to ART center every month. These actions as advised by government ART programme helped PLHIV to adhere to their treatment.

Our study has limitations. The tool used to assess KAP among PLHIV was not validated. The study was carried out in one ART centre and findings can't be generalized. The respondents might have given answers that are socially acceptable.

## CONCLUSION

This is the first study to investigate KAP among PLHIV towards COVID-19 in India. Our findings suggest that PLHIV have average knowledge, correct attitude towards adherence to government prevention and control measures, and good practices towards COVID-19. The results of this study suggest that more attention should be given to PLHIV with low literacy levels and income. Counseling sessions at ART centres should be inclusive of information on COVID-19 prevention to mitigate the infection among PLHIV.

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