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ORIGINAL PAPER

Knowledge, Attitude, and Practice Towards COVID-19 Among People Living with HIV/AIDS in Kigali, Rwanda

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Abstract

As with other countries globally, Rwanda has faced a recent outbreak of the coronavirus disease 2019 (COVID-19) against a backdrop of an HIV epidemic. At present, there is no successful cure or vaccine for both COVID-19 and HIV. People with underlying conditions, including HIV, are at increased risk of severe COVID-19 manifestations. This underscores the need to enhance the knowledge, attitudes, and practice of people living with HIV (PLWH) to protect this population against COVID-19. An institution-based cross-sectional study was conducted from August 31 to September 18, 2020 among 376 participants who were selected by a simple random sampling technique. A pretested and structured self-administered questionnaire was used to collect data. Quality scores were calculated as a measure of the participants' knowledge, attitudes, and practice (KAP) levels. The student t-test was used to compare continuous variables between low (<65%) and high (≥65%) KAP scores. The chi-square test was used to determine the association between KAP scores and categorical variables. All decisions on statistical tests were concluded at 5% level of significance. All statistical analysis was performed using STATA statistical package version 11.2 (STATA Corp., Texas, USA). Of the 376 participants, 363 (97%) obtained a high knowledge score, while more than a quarter of the participants (26%) had a poor attitude score, and the majority (90%) having a high practice score. There was no association between gender, age, place of residence, employment, or duration on ART and knowledge score. Employment status and duration on antiretroviral treatment (ART) were significantly associated with attitude scores ($p=0.004$ and $p=0.013$, respectively). Gender and duration on ART were significantly associated with practice scores ($p=0.02$ and $p=0.012$, respectively). There was a moderate positive correlation ($r=0.57$) between knowledge and attitude scores, and knowledge and practice scores ($r=0.55$). There was a strong positive correlation ($r=0.67$) between attitude scores and practice scores. Health education programs tailored for PLWH and aimed at mobilizing and improving COVID-19-related knowledge, attitude, and practice should be prioritized in the Rwandan COVID-19 response.

Keywords COVID-19 · HIV · Knowledge · Attitude · Practice

Background

HIV, a global public health problem for nearly four decades, has affected almost 80 million globally, with nearly half of them dying from AIDS-related diseases. In 2019, nearly 25 million people were living with HIV in Sub-Saharan Africa (SSA), the region with the highest number of HIV cases [1]. Rwanda faces a generalized HIV epidemic, and as of 2019, 230,000 people were living with HIV (PLWH) in Rwanda [2]. In the midst of a global and local effort to control the HIV epidemic, a novel coronavirus disease 2019 (COVID-19) pandemic has emerged. The diseases caused by severe acute respiratory syndrome coronavirus 2 (SARS-COV 2) has over 32 million cases and 980,000 deaths globally as of 25th September 2020 [3]. As of 25th September 2020, 4798

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cases and 29 COVID-19 related deaths have been reported in Rwanda [4].

To control the spread of COVID-19, Rwanda instituted a raft of COVID-19 containment and mitigatory measures that ranged from enhanced hygiene by establishing handwashing stations in public places and increasing awareness through community mobilization. A countrywide lockdown was introduced after recording 17 cases only [5]. The country has managed to scale up the laboratory capacity for testing COVID-19, employing the pooling strategy [6].

Forewarning to take extra deterrents against COVID-19 has been emphasized for persons with comorbidities such as asthma, diabetes, severe cardiovascular conditions, obesity, chronic diseases, and immune-compromised persons, including PLWH [7–10]. In addition, PLWH have higher rates of certain underlying health conditions [11]. Those conditions can increase their risk for more severe illness if people with HIV get COVID-19, especially people with advanced HIV disease. The pressure over the increased severity of COVID-19 among PLWH are based on their vulnerability to a predisposition to numerous opportunistic infections [12]. A recent systematic review of COVID-19 revealed that the disease does not pose a high risk to the adequately followed PLWH who suppressed their viral load compared to HIV-uninfected patients despite considering PLWH as a population whom precautions are needed to prevent the COVID-19 [13]. It is also worth noting that restrictions imposed to control the spread of COVID-19 have had unintended disruptions to HIV care and treatment services [14].

Lack of effective antiretroviral treatment against SARS-COV 2 and vaccination impede the current measures to fight the disease threatening immuno-compromised individuals' lives [15]. To the best of our knowledge, there are limited studies to understand the behavior of PLWH towards COVID-19. Thus, the current study aimed to assess the knowledge, attitudes, and practices of PLWH towards COVID-19.

Methods

Study Design and Setting

A cross-sectional survey was conducted from August 31 to September 18, 2020, at the University Teaching Hospital of Kigali (CHUK), ART clinic located in Kigali, Rwanda. We employed a simple random sampling technique for participants' recruitment.

Data Collection Tool

The data collection tool was adapted from two previous COVID-19 KAP studies and WHO recommendations. The questionnaire was initially developed in English, then translated into Kinyarwanda by GP (a public health scientist) and then translated back into English by PGI (a public health scientist) to ensure translation accuracy. The questionnaire was validated in a pilot of 15 participants before the actual survey data collection. Minor changes were made to the questionnaire at this stage. The questionnaire addressed collected information on participant's demographics (including age, gender, employment status, place of residence), assessed knowledge (15 questions), attitude (10 questions), and practice (10 questions). More details on the specific questions are available on the questionnaire (Supplementary File 1).

Data Management and Analysis

Data was captured electronically on an excel sheet. Frequency and percentage were used to analyze categorical variables, while the mean and standard deviation summarize continuous data. Quality scores were calculated as a measure of the participants' knowledge, attitudes, and practice levels. The quality score is calculated by summing up all the individual items' scores in the three sections and scaling the total as a percentage of the maximum possible score. The scaled quality score = (obtained score – minimum possible score)/(maximum possible score – minimum possible score) × 100%. The student t-test was used to compare continuous variables between low (<65%) and high (≥65%) KAP scores. The Chi-square test was used to determine the association between KAP scores and categorical variables. All tests were statistically measured at 5% level of significance using STATA statistical package version 11.2 (STATA Corp., Texas, USA).

Ethics

This study was ethically reviewed and approved by the University Teaching Hospital of Kigali Ethics Committee (approval number: EC/CHUK/070/2020). Study participants were provided with an information sheet explaining the study's objectives, and all participants signed paper informed consent forms before participation.

Results

Demographic Characteristics

Of the 376 participants enrolled in the survey, 212 (56%) were female. The mean age was 38. The majority (51%) were unemployed, 14% reported to be professionally employed, and 35% were self-employed. All participants were currently taking ART with only 4% having been on ART for less than a year, while 27% had between 1 and 5 years duration on

Table 1 Demographics

Variable	Response
Gender, n (%)	
Female	212 (56)
Male	164 (44)
Age, mean (SD)	38 (12)
Place of residence	
Gasabo	105 (28)
Kicukiro	99 (26)
Nyarugenge	136 (36)
Outside Kigali	36 (10)
Employment, n (%)	
Professional	51 (14)
Self	132 (35)
Unemployed	193 (51)
Currently on ART, n (%)	
Yes	376 (100)
Duration on ART, n (%)	
1–5	102 (27)
> 5	260 (69)
< 1	14 (4)

Table 2 Participant knowledge, attitude and practice scores

	Score	
	Poor (<65%) n (%)	High (≥65%) n (%)
Knowledge	13 (3)	363 (97)
Attitude	96 (26)	280 (74)
Practice	38 (10)	338 (90)

ART, and 69% had been on ART for more than 5 years. Additional information is in Table 1.

Presentation of KAP Scores

Of the 376 participants, 363 (97%) obtained a high knowledge score. More than a quarter of the participants (26%) had a poor attitude score. The majority (90%) of the participants had a high practice score. More details are presented in Table 2.

Association Between Demographic Variables and KAP Scores

There was no association between gender, age, residence, employment, or duration on ART and knowledge score ($p > 0.05$). Employment status was significantly associated with attitude scores ($p = 0.004$). 84% of self-employed individuals had higher attitude scores than 65% and 70% of professional and unemployed individuals respectively. The duration of ART was significantly associated with attitude scores ($p = 0.013$). 97% of participants who reported to be on ART for less than a year had high attitude scores compared with 65% and 77% of 1–5 and >5 years duration on ART respectively. Gender ($p = 0.02$) was significantly associated with practice scores, with 93% female having high practice scores compared to 86% male. Also, the duration of ART was significantly associated with practice scores ($p = 0.012$). 100% of participants who reported to be on ART for less than a year had high attitude scores compared with 82% and 92% of 1–5 and >5 years duration on ART, respectively. More details are presented in Table 3.

Correlation Between Knowledge, Attitude, and Practice

There was a moderate positive correlation ($r = 0.57$) between knowledge and attitude scores ($p < 0.001$); attitude scores increase as knowledge scores are increasing. There was a moderate positive correlation ($r = 0.55$) between knowledge and practice scores ($p < 0.001$); practice scores increase as knowledge scores are increasing. There was a strong positive correlation ($r = 0.67$) between was observed between attitude scores and practice scores ($p < 0.001$) (Table 4).

Discussion

Knowledge, attitude, and practice are critical factors in controlling the transmission of an infectious disease. COVID-19, an emerging infectious burden, especially in aged and immunocompromised individuals, calls for special care for PLWH as usual. This study aimed to assess the knowledge, attitude, and practice (KAP) towards COVID-19 and associated factors among PLWH in Kigali, Rwanda.

The current study involved 376 HIV patients (212 females and 164 males) on ART showed a high knowledge and practice score towards COVID-29 prevention measures and a high poor attitude score (1/4). There was no association between knowledge score and gender, age, residence, employment, or duration on ART. Duration on ART significantly affected both attitude and practice scores while also, employment was associated with attitude and gender was associated with practice scores. The correlational study showed that attitude scores increase as knowledge scores increase, practice scores increase as knowledge scores increase, and attitude scores increase as practice scores increase. The findings of the current study revealed a high prevalence of poor attitude among the participants (26%), unlike other studies in Saudi Arabia [16] and China [17], which reported low prevalence. Although Rwanda's government put strict measures against preventive measures against

Table 3 Association between demographic variables and KAP scores

Variable	Knowledge score		p-value	Attitude score		p-value	Practice score		p-value
	<65%	≥65%		<65%	≥65%		<65%	≥65%	
Gender, n (%)									
Female	6 (3)	206 (97)	0.316	50 (24)	162 (76)	0.193	15 (7)	197 (93)	**0.021**
Male	7 (4)	157 (96)		46 (28)	118 (72)		23 (14)	141 (86)	
Age, mean (SD)	38 (12)	38 (12)	0.511	37 (11)	39 (12)	0.130	36 (12)	39 (12)	0.06
Place of residence									
Gasabo	1 (1)	105 (99)	0.246	27 (26)	78 (74)	0.205	10 (9)	95 (91)	0.601
Kicukiro	5 (5)	94 (95)		26 (26)	74 (74)		12 (12)	87 (88)	
Nyarugenge	5 (4)	131 (96)		29 (21)	107 (79)		11 (8)	125 (92)	
Outside Kigali	2 (6)	34 (94)		14 (39)	22 (61)		5 (14)	31 (86)	
Employment, n (%)									
Professional	2 (4)	49 (96)	0.670	18 (35)	33 (65)	**0.004**	6 (12)	45 (88)	0.143
Self-employed	3 (2)	129 (97)		21(16)	111 (84)		8 (6)	124 (94)	
Unemployed	8 (4)	185 (96)		57 (30)	136 (70)		24 (12)	169 (88)	
Duration on ART, n (%)									
1–5	3 (3)	99 (97)	1.0	36 (35)	66 (65)	**0.013**	18 (18)	84 (82)	**0.012**
>5	10 (4)	250 (96)		59 (23)	201 (77)		20 (8)	240 (92)	
<1	0 (0)	14 (100)		1 (7)	13 (93)		0 (0)	14 (100)	

Bold value indicates statistically significant association

Table 4 Correlation between knowledge, attitude, and practice

Variable	Knowledge score	Attitude score	Practice score
Knowledge score	1		
Attitude score	0.57 (<0.001)	1	
Practice score	0.55 (<0.001)	0.67 (<0.001)	1

Pearson correlation coefficient (p = value)

COVID-19, this might be due to theories that people tend to develop negative emotions like panic and anxiety during a pandemic, which significantly affects their attitude [18]. The study revealed high knowledge and practice scores, and these findings are consistent with other KAP studies done in Ethiopia [19], China [17], Kenya [20], and Iran [21, 22]. This may be explained by the easy availability and accessibility of health information online, improving patient knowledge and practice [23]. The study was also conducted in an urban setting with limitless access to COVID-19- associated updates and preventive actions posted online by the Rwandan MOH and various media platforms that have been positively associated with improving knowledge and practices. These findings differ from those of a study done in rural setting Ethiopia with limited COVID-19 access due to lack of electricity and the internet, where the prevalence of poor knowledge was 33.9% [24]. The current study showed that participants knowledgeable about COVID-19 were more likely to have good practices. This finding is similar to a study in China [17]. This can be justified by the reason that knowledge is a key modifier of positive attitudes for preventive practices of COVID-19, and these practices are executed after acquiring awareness and information of practices to be implemented. Knowledge of COVID-19 reduces the possibility of infection by improving patient's practices [25]. The current study reported that gender is considerably associated with practice score, and these findings corroborate studies done in other settings, which reported that females are more likely to take preventive and protective measures than males [26–28]. The study found no association between gender, age, residence, employment, and duration on ART, contrary to Nepal's studies conducted during the peak of COVID-19 [29]. This could be due to the fact that this study was conducted at a later stage of the pandemic than in Nepal when information about COVID-19 was found everywhere and accessible to all age groups. Also, the government of Rwanda deployed drones to raise COVID-19 awareness in communities [30]. The current study reported an association between ART duration and attitude and knowledge scores, with those on ART for less than one year recording high attitude and knowledge scores. This might be because those on ART for less than a year were enrolled during the pandemic and benefited from opportunistic health promotion [31, 32].

The study outcomes could be valuable in informing authorities and MOH with its partners on other awareness campaigns, policies, public health interventions, and health promotion programs. Targeted health promotion and prevention interventions must be directed to this particularly vulnerable population at high risk of contracting COVID-19, especially males. For instance, COVID-19 attitudes and practices may increase considerably if

health promotion programs are especially directed to men. Health information can be sent to females living with males, which can sway their practices, as suggested by Leung et al. [26]. Opportunistic health promotion should be advocated in all health settings.

To our knowledge, this is the first study to investigate KAP toward COVID-19 in PLWH in Kigali, Rwanda. A random sampling technique was used to eliminate participant bias, and data collection took place after relaxed COVID-19 restrictions using a WHO-recommended tool.

However, the study was conducted in only a few locations in Kigali, Rwanda, and this might not allow generalizability of the results to other locations and cities towns. Furthermore, the measurement of KAP may be inaccurate due to different grading systems. The other limitation is that the participants could give socially acceptable answers. Small sample size was used to make conclusions. In addition, this study was carried out among PLWH, mostly females, and their knowledge, attitude, and practice are not comparable to people without HIV/AIDS.

In conclusion, the current study was able to give a comprehensive assessment of the knowledge, attitudes, and practices of PLWHI in Kigali towards COVID-19. The outcomes suggest that PLWH in Kigali have a satisfactory level of knowledge on COVID-19 and are mostly positive in their practice and attitude on overcoming the pandemic, although females are more cautious than males. Regardless, regular messaging from the MOH and other authorities are important to increase public knowledge, practices, and attitude towards COVID-19. The results found no association between knowledge score and gender, age, residence, employment, and duration on ART. Moreover, some groups of PLWH may benefit from targeted health education interventions to raise COVID-19 awareness and improve practices. Improving the KAP of vulnerable populations is essential during pandemic outbreaks like COVID-19. Consequently, the development of effective health education systems incorporating considerations of KAP-modifying factors is needed.

Conclusion

This study showed a high knowledge and practice score despite a poor attitude score. Health education programs tailored for PLWH and aimed at mobilizing and improving COVID-19-related knowledge, attitude, and practice should be prioritized in the Rwandan COVID-19 response.

Author contributions All authors contributed equally.

Data availability If needed, the raw data used for this article are available upon reasonable request in writing to the corresponding author. Permission will be sought from the chairperson of the University Teaching Hospital of Kigali Ethics Committee prior to data release.

Compliance with Ethical Standards

Conflict of interest The author (s) declared no conflict of interest concerning research, authorship, and publication of this article.

References

1. UNAIDS (2019). Factsheet: global AIDS update. 2019. UNAIDS Geneva.
2. de Mendoza, C. (2019). UNAIDS update global HIV numbers. *AIDS Reviews, 21*(3), 170–171.
3. WHO (2020). Novel coronavirus (COVID-19). Available September 20, 2020 from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019.
4. RBC (2020). Update on COVID 19. Available September 20, 2020 from: https://www.rbc.gov.rw/fileadmin/user_upload/annoucement/Update-on-COVID-19-24-09-2020-eng.jpg.
5. GoR (2020). Office of the Prime Minister: announcement on enhanced COVID-19 prevention measures. Available September 20, 2020 from: https://primature.gov.rw/index.php?id=2.
6. Mutesa, L., Ndishimye, P., Butera, Y., Uwineza, A., Rutayisire, R., Musoni, E., et al. (2020). A strategy for finding people infected with SARS-CoV-2: optimizing pooled testing at low prevalence. Available September 20, 2020 from arXiv preprint arXiv:200414934.
7. Ozma, M. A., Maroufi, P., Khodadadi, E., Köse, Ş, Esposito, I., Ganbarov, K., et al. (2020). Clinical manifestation, diagnosis, prevention and control of SARS-CoV-2 (COVID-19) during the outbreak period. *Le Infezioni in Medicina, 28*(2), 153–165.
8. CDC (2020). Coronavirus (COVID-19). Available September 28, 2020 from: https://www.cdc.gov/coronavirus/2019-ncov/index.html.
9. Khalili, M., Karamouzian, M., Nasiri, N., Javadi, S., Mirzazadeh, A., Sharifi, H. (2020). Epidemiological characteristics of COVID-19: a systemic review and meta-analysis. MedRxiv.2020. https://doi.org/10.1101/2020.04.01.20050138
10. Mirzaei, H., McFarland, W., Karamouzian, M., Sharifi, H. (2020). COVID-19 among people living with HIV: a systematic review. *AIDS and Behavior*. 1–8. https://doi.org/10.1007/s10461-020-02983-2
11. Carpio, A.L.M., Adil, A. (2020). Acquired immune deficiency syndrome (AIDS) antiretroviral therapy. StatPearls [Internet]. Available September 29, 2020 from https://europepmc.org/books/n/statpearls/article-17300/?extid=28846346&src=med.
12. Chang, C. C., Crane, M., Zhou, J., Mina, M., Post, J. J., Cameron, B. A., et al. (2013). HIV and co-infections. *Immunological Reviews, 254*(1), 114–142.
13. Cooper, T., Woodward, B., Alom, S., Harky, A. (2020). Coronavirus disease 2019 (COVID-19) outcomes in HIV/AIDS patients: a systematic review. *HIV Medicine*. https://doi.org/10.1111/hiv.12911.
14. Pierre, G., Uwineza, A., Dzinamarira, T. (2020). Attendance to HIV antiretroviral collection clinic appointments during COVID-19 lockdown. A Single Center Study in Kigali, Rwanda. *AIDS and Behavior*. https://doi.org/10.1007/s10461-020-02956-5.
15. Nsanzimana, S., McArdle, F., Remera, E., Mulindabigwi, A., Ribakare, M., Ndimubanzi, P., et al. (2019). Viral suppression in a nationwide sample of HIV-infected children on antiretroviral

therapy in Rwanda. *The Pediatric Infectious Disease Journal, 38*(2), 149–151.
16. Al-Hanawi, M.K., Angawi, K., Alshareef, N., Qattan, A.M., Helmy, H.Z., Abudawood, Y., et al. (2020). Knowledge, attitude, and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study. *Frontiers in Public Health*. 8. https://doi.org/10.3389/fpubh.2020.00217
17. Zhong, B.-L., Luo, W., Li, H.-M., Zhang, Q.-Q., Liu, X.-G., Li, W.-T., et al. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences, 16*(10), 1745.
18. Blendon, R. J., Benson, J. M., DesRoches, C. M., Raleigh, E., & Taylor-Clark, K. (2004). The public's response to severe acute respiratory syndrome in Toronto and the United States. *Clinical Infectious Diseases, 38*(7), 925–931.
19. Kebede, Y., Yitayih, Y., Birhanu, Z., Mekonen, S., & Ambelu, A. (2020). Knowledge, perceptions and preventive practices towards COVID-19 early in the outbreak among Jimma University Medical Center visitors, Southwest Ethiopia. *PLoS ONE, 15*(5), e0233744.
20. Austrian, K., Pinchoff, J., Tidwell, J.B., White, C., Abuya, T., Kangwana, B., et al. (2020). COVID-19 related knowledge, attitudes, practices and needs of households in informal settlements in Nairobi, Kenya. https://doi.org/10.2139/ssrn.3576785
21. Erfani, A., Shahriarirad, R., Ranjbar, K., Mirahmadizadeh, A., Moghadami, M. (2020). Knowledge, attitude, and practice toward the novel coronavirus (COVID-19) outbreak: a population-based survey in Iran. *Bulletin of the World Health Organization*. https://doi.org/10.2471/BLT.20.256651
22. Taghrir, M. H., Borazjani, R., & Shiraly, R. (2020). COVID-19 and Iranian medical students; a survey on their related-knowledge, preventive behaviors and risk perception. *Archives of Iranian medicine, 23*(4), 249–254.
23. Estacio, E. V., Whittle, R., & Protheroe, J. (2019). The digital divide: examining socio-demographic factors associated with health literacy, access and use of internet to seek health information. *Journal of Health Psychology, 24*(12), 1668–1675.
24. Akalu, Y., Ayelign, B., & Molla, M. D. (2020). Knowledge, attitude, and practice towards COVID-19 among chronic disease patients at Addis Zemen Hospital, Northwest Ethiopia. *Infection and Drug Resistance, 13,* 1949.
25. McEachan, R., Taylor, N., Harrison, R., Lawton, R., Gardner, P., & Conner, M. (2016). Meta-analysis of the reasoned action approach (RAA) to understanding health behaviors. *Annals of Behavioral Medicine, 50*(4), 592–612.
26. Leung, G., Lam, T., Ho, L., Ho, S., Chan, B., Wong, I., et al. (2003). The impact of community psychological responses on outbreak control for severe acute respiratory syndrome in Hong Kong. *Journal of Epidemiology and Community Health., 57*(11), 857–863.
27. Moran, K. R., & Del Valle, S. Y. (2016). A meta-analysis of the association between gender and protective behaviors in response to respiratory epidemics and pandemics. *PLoS ONE, 11*(10), e0164541.
28. ALdowyan, N., Abdallah, A.S., El-Gharabawy, R. (2017). Knowledge, attitude, and practice (KAP) study about Middle East Respiratory Syndrome Coronavirus (MERS-CoV) among population in Saudi Arabia. *International Archives of Medicine*, *10*. https://doi.org/10.3823/2524
29. Nepal, R., Sapkota, K., Adhikari, K., Paudel, P., Adhikari, B., Paudyal, N., et al. (2020). Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Chitwan, Nepal. https://doi.org/10.21203/rs.3.rs-26774/v1
30. Africa Surveyors News (2020). Rwanda deploys drones to raise COVID-19 awareness in communities—Africa Surveyors. Available September 29, 2020 from: https://www.africasurveyorsonline.com/2020/04/15/rwanda-deploys-drones-to-raise-covid-19-awareness-in-communities/.
31. Spanou, C. et al. (2009). PreEmpt: preventing disease through opportunistic, rapid engagement by primary care teams using behaviour change counselling. *Psychology and Health*, *24*. 372–373
32. Van den Broucke, S. (2020). *Why health promotion matters to the COVID-19 pandemic, and vice versa*. Oxford: Oxford University Press.