Knowledge, attitudes and preventive practices towards COVID-19 among frontline healthcare workers in Rwanda

Ndishimye Pacifique[1,*], Nkeshimana Menelas[2], Hitimana Nadia[3], Turatsinze David[2], Nahayo Ernest[4], Byiringiro Fidele[4], Habinshuti Mike[1], Nyamusore Jose[1], Nyamwasa Daniel[5], Yvonne Kayiteshonga[7], Mutesa Leon[6], Nsanzimana Sabin[1]

[1]*Rwanda Biomedical Centre, Kigali, Rwanda*

[2]*University Teaching Hospital of Kigali, Kigali, Rwanda*

[3]*Clinton Health Access Initiative, Kigali, Rwanda*

[4]*Rwanda Military Hospital, Kigali, Rwanda*

[5]*Kacyiru Police Hospital, Kigali, Rwanda*

[6]*Centre for Human Genetics, University of Rwanda, Kigali, Rwanda*

[7] *COVID-19 Joint Task Force Committee, Kigali, Rwanda*

ABSTRACT

*Corresponding author:
Pacifique Ndishimye, Msc, PhD
Medical Research Centre
Rwanda Biomedical Centre
Kigali, Rwanda
E-mail: ndipac@gmail.com

The aim of the study was to assess knowledge, attitudes and preventive practices towards COVID-19 among frontline healthcare workers in Rwanda. It was a descriptive cross-sectional study conducted with 177 healthcare workers at the frontline for the current outbreak. Half of the respondents were aged between 31-40 and majority were males, mostly physicians, and working more in urban rather than rural settings. Almost all respondents were able to correctly identify COVID-19 key symptoms, and 89% were aware of factors likely to be associated with increased fatality rates. Considerable proportions of respondents understood dynamics of COVID-19 infectiousness: 87% respondents were aware of possibility of infection before the onset of symptoms; 99% completers responded yes on droplets and fomites as a major transmission route. All respondents- 100 % understood and agreed on the necessity of self-isolation and quarantine as COVID-19 control measures, and about 95% reported to be mainly adopting hand washing, social distancing, limiting unnecessary travels and crowds as well as using facial masks and gloves. All survey respondents were well informed about COVID-19 and its prevention, in a relative way, and it seems to influence their attitudes and practices regarding the prevention of the outbreak.

INTRODUCTION

The coronavirus disease 2019 (abbreviated "COVID-19") is an infectious acute respiratory infection caused by the novel coronavirus. The virus is a positive-strand RNA virus with high homology to bat coronavirus [1]. This pneumonia was first discovered in December 2019 in Wuhan, China, and currently presents a significant global health threat for the entire world [1,2].

COVID-19 is highly transmitted via droplets and fomites during close unprotected contact between an infector and infectee, and based on current evidence, its main clinical symptoms include fever (with temperature above 38 degrees celsius), dry cough, difficulty breathing, fatigue, muscle pain, and difficult breathing [3-5].

The COVID-19 epidemic has spread very quickly these last days, and more people infected with

this virus have since been and continue to be identified in different countries. In response to the pandemic situation, the World Health Organization (WHO) declared it a public health emergency of international concern on January 30 and put in place a series of recommendations calling for collaborative efforts from all countries to prevent further spread of COVID-19 (6, 7). No specific antiviral therapies are available, but efforts to develop antivirals and a vaccine continue (8).

Following the confirmation of its first COVID-19 case on 14/03/2020, Rwanda activated and adopted several unprecedented measures to control COVID-19 transmission, first in the epi-center (Rwanda's capital city- Kigali) but also expanded these measures in other provinces of the country. Measures included air travel bans, closure of all borders, suspension of public transportation, limitations of unnecessary movements, closing of public spaces such as schools, churches, isolation and care for COVID-19 infected patients and/ or suspected cases. From March 20, 2020, a national lockdown, self-quarantine campaign was launched and led by Rwanda National Police- requiring people to stay and work from home (9).

In addition to this, Rapid Response Teams (RRTs) were activated at central and district levels to respond to the pandemic. These multi-sectoral RRTs operate from inside the National COVID-19 Joint Taskforce and are composed of members with different profiles including medical doctors, nurses, infection prevention and control experts, lab technicians, epidemiologists, public health officers and psychologists among others.

Global and in country evidence shows that the battle against COVID-19 is still continuing, and health professionals are and will continue to play an important role in the management and response of the outbreak. To guarantee success, people's adherence to COVID-19 well informed control measures is essential and is largely affected by their knowledge, attitudes, and practices (KAP) towards the disease. Previous studies have shown that knowledge and attitudes towards infectious diseases are associated with level of panic emotions among the population, which can further complicate attempts to prevent the spread of the disease (10, 11).

The aim of this assessment was to investigate the knowledge, attitudes and preventive practices among frontline health professionals towards COVID-19. Findings form this survey may be useful in recommending any remedial measures and additional interventions to improve awareness and attitudes among concerned task forces.

METHODS

A survey was administered from March 25 - April 1, 2020, ten days following Rwanda's registration of its first COVID-19 case. It was an online survey and a google questionnaire was circulated to 220 health care workers (HCWs) trained as frontline responders.

All healthcare workers including, medical doctors, pharmacists, nurses, laboratory staff and epidemiologists, prepared and responding to COVID-19 from both urban and rural areas were considered eligible to take part in this survey. Participants were first briefed about the objectives and the outcomes of the assessment.

The tool had 10 questions on general knowledge about COVID-19 and 7 questions on attitudes towards the management of COVID-19. This survey asked an open-ended question to understand personal practical measures put in place by HCWs in order to protect themselves and their families. A general practical question was also posed for HCWs to suggest health education channels.

The study toolkit was designed by a team of investigators after a rigorous literature review. The kit was validated in 2 steps. First, it was sent to researchers and health professionals to provide their expert opinion with respect to its simplicity, relativity and importance. Second, a pilot study was conducted by selecting a small sample of health professionals from the RRTs who gave their opinions on making the questionnaire simpler and shorter. This survey was reviewed and registered under the Rwanda National Health Research Registry. Data was analyzed using Excel.

RESULTS

A total of 177 HCWs responded to the survey and their demographic characteristics are summarized in the table below [Table 1].

Half of the respondents were aged between 31-40 and most were males.

Predominant occupations were medical doctor and pharmacist. Respondents worked more in urban than rural settings.

Table 1: Demographic characteristics of respondents

Characteristic		% of respondents
Age	20-31	29
	31-40	51
	41-Above	20
Gender	Male	73
	Female	27
Occupation / Profession*	Med. Doctor	68
	Nurses	8
	Pharmacist	12
	Lab Technician	2
	Other	10
Work Area**	Rural	29
	Urban	74

* Profession in health care can be cross cutting from one occupation to another. We assumed that a few respondents worked under more than one occupation. "Others" was defined in this survey as any other HCW potentially responding to the crisis i.e.: physiotherapists, anesthesiologist and/or radiologists. ** HCWs often work from both rural and urban areas.

Off all respondents, 52% mentioned they were involved in COVID-19 response activities at the time of survey as shown in Figure 1..
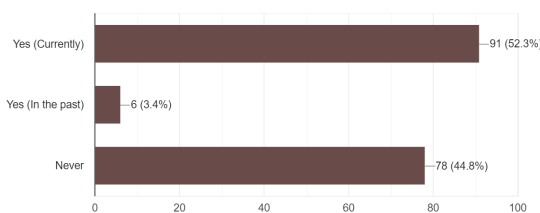
Figure 1. *I have been involved in COVID-19 Preparedness and Response Activities:*

### General knowledge about COVID-19

Almost all HCWs were able to correctly identify COVID-19 key symptoms. However, only about 52% and 58% of respondents selected respectively fatigue and sore throat equally important signs. In addition, only 35% and 18% were able to identify myalgia, and loss of smell/taste as other COVID-19 symptoms respectively.
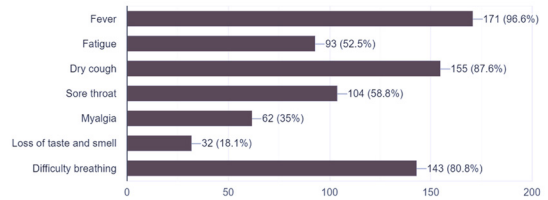

Figure 2. *The main identified clinical symptoms of COVID-19*

Data from this survey revealed that 98% of respondents fully understood that the management of COVID patients is currently only limited to palliative care. 89% were also aware of factors likely to be associated with death or increased fatality rates.

Considerable proportions of survey respondents understood dynamics of COVID-19 infectiousness: 87% respondents were aware of possibilities to infect before the onset of symptoms; 99% of completers responded yes on droplets as a major transmission route (Fig. 3). The majority- 94% of respondents were informed that the incubation period is not constant and could vary from shorter (2 days) to longer (14 days) periods. In the same way, 89% were aware that the virus could survive on different surfaces for varied lengths of time (minutes or hours) (Fig. 4).
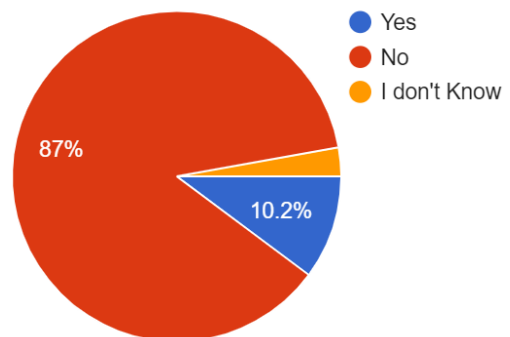

Figure 3. *People with COVID-2019 cannot be infectious before the onset of symptoms:*
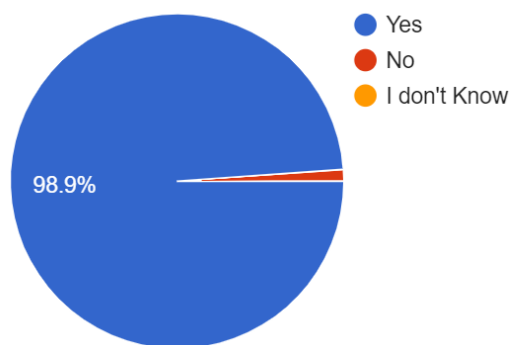
Figure 4. *COVID-19 spreads through coughing droplets from infected individuals*

Attitudes toward COVID-19

All respondents 100% understood and agreed on the necessity of self-isolation and quarantine as COVID-19 control measures and about 98% believed that placing hand washing stations in public places was one among other effective prevention strategies. However, Fig. 5 shows that about 40% total believed or did not know if the virus is less resistant to high temperatures. About 22% HCWs believed or are still uncertain about effects of lemon water and garlic as potential COVID-19 cures.
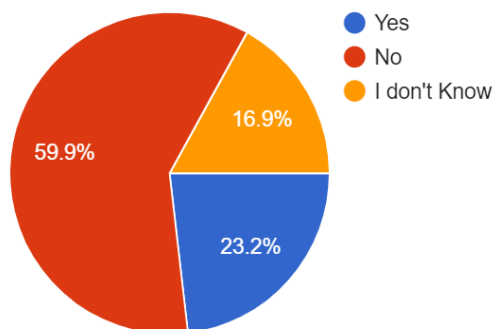
Figure 5: *It is easy to control COVID-19 in warm settings, since the virus is less resistant to high temperatures.*

A proportion of about 28% HCWs also believed it was important for wider communities to use protective masks as opposed to limiting usage to only medical professionals and suspected cases. And finally, 68% of respondents believed that there is still not much known about COVID-2019, the new coronavirus, and current knowledge is based on other types of coronavirus.

Protective Practices toward COVID-19

About practical measures put in place by HCWs in order to protect themselves and their families, about 95% of health care workers reported to be mainly adopting hand washing, social distancing, limiting unnecessary travels and crowds as well as using facial masks and gloves. Other measures included: disinfecting before entering their residences and interacting with family members, and using electronic payments rather than handling money. HCWs also mentioned a reinforcement of patients' triage measures_mainly based on temperature monitoring and educating their communities. In addition, HCWs said they suspended their activities outside Kigali.

Recommended Communication Channels

Seventy-two percent of respondents suggested the use of radios, TV shows, posters, billboards, community leaders, and other social media platforms as probable channels for health education and awareness approaches on COVID-19.

DISCUSSION

Overall, findings from this survey suggest good levels of knowledge and informed beliefs about COVID-19. This could be explained by the fact that majority of responders to this survey were medical doctors, who are likely expected to be more interested in the disease, and therefore, to continuously be educated about it. Moreover, working in urban areas could also have exposed respondents to several sources of information (e.g.: COVID-19 preparedness and response meetings and billboard messages) compared to working in rural settings. The lower response rate from HCWs in rural settings might have been due to limited accessibility to the internet for HCWs to be able to complete the online survey.

Results from this survey show a considerable number of HCWs not currently being involved in COVID-19 response activities, while there is a likelihood of HCWs global shortage (12). A plausible explanation to this would be that many of the case management sites have not yet been activated due to the small number of confirmed cases by the time of survey. However, this survey cannot ascertain whether if those not involved are more located in rural or in urban settings.

Although fever, dry cough and shortness of breath are major symptoms of COVID-19, current evidence also shows that other symptoms such as myalgia and loss of smell and taste could equally be indicative of COVID-19 infection (13). Not being able to identify these other possible symptoms might cause HCWs to dismiss potential cases, particularly in settings where no rapid tests exists to rule out uncertainty.

Results from this survey also revealed satisfactory levels of understanding of COVID-19 dynamics of infectiousness; this could suggest that health care workers might be applying good prevention practices, leading to possible reductions in cross contaminations among HCWs particularly in treatment facilities.

This survey also showed a certain level of non-evidenced global beliefs in Rwanda HCWs (14). In situations where no cure and scientific evidence are available, a circulation of miss information is inevitable. The belief that there is still not much known about COVID-2019, could partially be explained by the uncontrolled increase of information, scientifically proven or not that is circulating on different platforms. In the current situation, fear and panic can lead people to be less critical of the content that they receive.

Among protective measures stated by HCWs, The investigators suspect that limitation of movement between districts could have affected patients with other existing health conditions other than COVID-19. This assumption could be due to the plausible fact that generally majority of specialists tend to be more concentrated in cities- versus in rural areas. Suggested health education channels in this survey are already being utilized by the response task force team to disseminate information to both HCWs and the general population at large.

REFERENCES

[1] Liu, W., & Li, H. [2020]. COVID-19: Attacks the 1-Beta Chain of Hemoglobin and Captures the Porphyrin to Inhibit Human Heme Metabolism. ChemRxiv. Preprint. https://doi.org/10.26434/chemrxiv.11938173.v5

[2] Li, X., Zai, J., Wang, X., & Li, Y. [2020]. Potential of large "first generation" human-to-human transmission of 2019-nCoV. Journal of Medical Virology, 92[4], 448-454.

[3] Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., ... & Xing, X. [2020]. Early transmission dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. New England Journal of Medicine.

Limitations

The most predominant responders were medical doctors; results in this survey might have been skewed to the highest level of knowledge compared to the actual knowledge and skills of HCWs.

Qualitative surveys through interviews could have better measured attitudes.

CONCLUSION

Overall, findings from this survey suggest that Rwanda's healthcare workers were relatively well informed about COVID-19 with appropriate preventive practices during the rapid rise period of the outbreak. With no confirmed cure and vaccine, effective response to COVID relies more on strong prevention measures and well-prepared health care providers. Hopefully, under the joint efforts of the Government of Rwanda and partners, the country surely will win the fight against COVID-19 in the near future.

Acknowledgement

[4] Chang, D., Lin, M., Wei, L., Xie, L., Zhu, G., Cruz, C. S. D., & Sharma, L. [2020]. Epidemiologic and clinical characteristics of novel coronavirus infections involving 13 patients outside Wuhan, China. Jama.

[5] Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., ... & Cheng, Z. [2020]. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The Lancet, 395[10223], 497-506.

[6] Li, X., Zai, J., Wang, X. & Li, Y. Potential of large 'first generation'human-to-human transmission of 2019-nCoV. Journal of Medical Virology [2020].

[7] World Health Organization. [2020]. WHO Director-General's statement on IHR Emergency Committee on Novel Coronavirus [2019-nCoV]. Geneva: World Health Organization.

[8] Kandel, N., Chungong, S., Omaar, A., & Xing, J. [2020]. Health security capacities in the context of COVID-19 outbreak: an analysis of International Health Regulations annual report data from 182 countries. The Lancet.

[9] Office of the Prime Minister. Republic of Rwanda Announcement on Enhanced COVID-19 Prevention Measures. Kigali, 21 March 2020. https://www.primature.gov.rw/index.php?id=2

[10] Zhong, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T., & Li, Y. [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.

[11] Harapan, H., Rajamoorthy, Y., Anwar, S., Bustamam, A., Radiansyah, A., Angraini, P., ... & Akmal, I. [2018]. Knowledge, attitude, and practice regarding dengue virus infection among inhabitants of Aceh, Indonesia: a cross-sectional study. BMC infectious diseases, 18[1], 96.

[12] https://docs.google.com/forms/d/1-ZCpqx9nDTinHTG SmWwSMjWBAeiBLfPmSSvTI6EAX6s/edit#responses

[13] https://www.nytimes.com/reuters/2020/04/01/world/europe/01reuters-health-coronavirus-taste.html

[14] https://www.bbc.com/news/av/world-africa-52137299/coronavirus-in-africa-debunking-fake-news-and-myths-around-covid-19