

# Knowledge, Attitude, and Practice During the COVID-19 Pandemic in South-east Gabon.

Roméo Karl IMBOUMY-LIMOUKOU (✉ [imboumykarl@gmail.com](mailto:imboumykarl@gmail.com))

Centre International de Recherches Medicales de Franceville <https://orcid.org/0000-0002-5124-8140>

Barthélemy NGOUBANGOYE

Centre International de Recherches Medicales de Franceville

Serge Ely DIBAKOU

Centre International de Recherches Medicales de Franceville

Lydie Sandrine OYEGUE-LIBAGUI

Centre International de Recherches Medicales de Franceville

Franck MOUNIOKO

Centre International de Recherches Medicales de Franceville

Lady Charlene KOUNA

Centre International de Recherches Medicales de Franceville

Steede Seinnat ONTOUA

Centre International de Recherches Medicales de Franceville

Nancy Cheronne MBANI MPEGA

Centre International de Recherches Medicales de Franceville

Walter Roddy MATANGOYE

CIRMF: Centre International de Recherches Medicales de Franceville

Jean-Bernard LEKANA-DOUKI

Centre International de Recherches Medicales de Franceville

---

## Research

**Keywords:** COVID-19, Gabon, Knowledge, Practice, Perceptions, Attitude, Rural, Urban

**Posted Date:** March 15th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-299801/v1>

**License:**   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

## *Background*

COVID-19 is an emerging respiratory disease caused by severe acute respiratory syndrome coronavirus SARS-CoV-2. It has spread from China to more than 200 countries and has been declared a global pandemic by the World Health Organization (WHO). This survey aimed to describe the knowledge, attitudes, perception and practices (KAP) of the Gabonese public towards the COVID-19 disease.

## *Methods*

This cross-sectional study was performed on 1016 participants aged 10 years and over in rural and urban area in south-east Gabon, using a questionnaire. All participants filled the questionnaire voluntarily, reporting demographic characteristics and answering questions assessing their level of knowledge, attitudes, perceptions and practice toward the COVID-19.

## *Results*

Among the 1016 participants, there were 535 men (52.7%) and 476 women (46.9%). The mean age of the participants was  $33.2 \pm 16.7$  years old. Almost all participants (98.1%) said that they had heard about COVID-19 but only 2.8% knew the pathogenic agent responsible for COVID-19. Only 20.9% of respondents thought that vaccination can protect them but 51.9% were looking forward to getting the vaccine when available. More than 80% knew that the disease could be transmitted by greeting infected people (87.3%), kissing an infected person (90.0%), touching an infected doorknobs (83.5%), and attending meetings (83.9%). The mean knowledge score was higher among younger than older participants, higher among participants living in urban area than those living in rural areas, and higher among participants with higher levels of education than those with lower levels of education.

## *Conclusion*

In general, respondents had good knowledge of COVID-19, and a positive attitude towards using protective measures. These results are encouraging in the fight against the spread of COVID-19 in Gabon. However, efforts are needed to improve the knowledge level in older participants, those living in rural areas and those with low levels of education. Awareness campaigns in local languages could, for example, be conducted to improve knowledge of the disease in rural areas.

# Background

In December 2019, coronavirus disease 2019 (COVID-19) emerged in Wuhan, China. COVID-19 is a highly contagious disease which has spread to more than 200 countries and has been declared a global pandemic by the World Health Organization (WHO) [1, 2]. To date (January 2021), it has infected nearly 86 million people, of whom 2 455 131 have died as a result of the disease [3]. COVID-19 is caused by SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), an enveloped virus with positive single-

stranded RNA belonging to the family Coronaviridae. Members of this family cause flu-like symptoms which can range from a simple cold to severe symptoms like severe acute respiratory syndrome (SARS) [4, 5]. This is the case of SARS-CoV-1 (Severe Acute Respiratory Syndrome Coronavirus 1) causing more than 8000 cases with 10% mortality and MERS-CoV (Middle East Respiratory Syndrome Coronavirus) causing 857 cases with 35% mortality [6].

There are now several vaccines with varying protection rates but none yet available in Gabon and no definitive therapy for SARS-CoV-2 has yet been developed. The application of preventive measures remains the best means of fight against SARS-CoV-2, especially in Africa where many health systems are not well equipped to face this epidemic.

Preventive measures have been promoted by the World Health Organisation (WHO) and relayed by the health authorities to curb the spread of the virus. Compliance with these control measures is essential and is heavily influenced by the knowledge, attitudes, and practices (KAP) towards COVID-19 [7, 8].

In Gabon, the first case of COVID-19 was declared on 12th March 2020, involving a Gabonese person returning from holidays in France. Since this case was declared, 14 234 cases have been confirmed, with more than 70 deaths (24/02/2021) despite the awareness campaigns implemented by the Gabonese government via the media. 'Fake news' propagated on social networks and relayed by word of mouth creates panic in the population and reduces compliance with the awareness messages communicated by authorities [9, 10]. In the media, awareness messages are generally in French, while some people in rural areas speak only their local language. This situation could impede the public health response. To adapt public health response strategies, studies of knowledge attitudes and practices can provide baseline data to determine the type of intervention that may be required to change misconceptions about the SRAS-CoV-2 in the community.

In this context, the objective of this study was to understand the knowledge, perceptions, attitudes, and practices of COVID-19 among people living in rural and urban areas in Gabon. Since the pandemic was declared, no such studies have been conducted in Gabon.

## **Methods**

### **Study area**

The study was conducted in rural and urban areas of southeast Gabon. The urban area was Franceville, the capital of the Haut-Ogooué Province, and the third largest town in Gabon in terms of population (pop. 110, 568 inhabitants) [11]. The rural areas were 9 villages in Lombo-Bouengué department of Ogooué-lolo Province: Toundi-Odounga, Dienga, Iwetsi Grand Village, Mourombo-Fouala, Maranda1 Maranda2, Siono and Isseme. These villages are situated near the border with the Republic of Congo and have in total around 2000 inhabitants.

### **Study Design and Population**

This community-based, cross-sectional, descriptive study was conducted from 7 to 11 September, 2020. The study population was composed of inhabitants aged 10 years old and older. Inclusion criteria stipulated that participants must reside in the study site during the study.

## Study tools

The survey questionnaire was designed in French, the national language in Gabon and translated into local languages by the interviewers when necessary. The surveys started with a short presentation of the project and we asked participants to say whether they agreed to participate in the study voluntarily. We conducted in person interviews, approximately 30 minutes in length. Questions covered socio-demographic characteristics of the participant, knowledge of COVID-19, attitudes to protective measures against COVID-19 and practices relevant to COVID-19. To determine the participants' level of knowledge, we asked questions about general knowledge of COVID-19, including symptoms, means of transmission, prevention measures and participants' perception of COVID-19. Answers were Yes, No or I don't know.

## Statistical analysis

We assessed each participant's knowledge of COVID-19 as described previously [12]. We gave one point for all correct responses, and zero points for unanswered questions or incorrect answers.

We conducted Student's t and ANOVA tests using R software Version 4.0.2 to test the relationship between knowledge score and socio-demographic variables. Where ANOVA tests were significant, we used the Tukey correction for multiple comparisons.

All p values were based on two-sided tests and were considered statistically significant at  $p < 0.05$ .

## Ethical Considerations

The Gabonese National Ethics Committee (CNER) approved our study protocol and procedures, (N°003/2020/CNER/SG/P of 01/02/2020). Respondent's anonymity and confidentiality were ensured by assigning numbers to participants. The submission of the answered survey was considered as consent to participate in the study. For children, consent was sought from their parents/ guardians, as recommended by CNER.

## Results

A total of 1016 participants completed the survey. The mean age was  $33.2 \pm 16.7$ , 535 (52.7%) were male and 476 (46.9%) were female. Of the 1016 respondents, 494 (48.6%) resided in rural areas while 522 (51.4%) resided in the urban area. Nearly two thirds (63.1%) were single. More than half (59.1%) had higher studies, 24.0% had preparatory or high school education, 11.3% were university graduates, 5.0% had no education. About one third (35.3%) of participants were students. Other demographic characteristics are detailed in Table 1.

Table 1  
Socio-demographic characteristics of the  
participants (n = 1016)

<b>Socio-demographic characteristics</b>	<b>No</b>	<b>%</b>
<b>Sexe</b>		
Men	535	52.6
Women	476	46.8
<b>Age (years)</b>		
[10–20]	223	21.9
[20–30]	293	28.8
[30–40]	198	19.4
[40–50]	142	13.9
[50–60]	80	7.8
≥ 60	79	7.7
<b>Area of residence</b>		
Town	494	48.6
village	522	51.3
<b>Town/ village</b>		
Dienga	304	29.9
Franceville	494	48.6
GV	34	3.3
Isseme	19	1.8
Iwetsi	14	1.3
Maranda 2	8	0.7
Maranda I	71	6.9
MF	8	0.7
Siono	13	1.2
Toundi-Odounga	51	5.0
<b>Profession</b>		
Student	359	35.3

<b>Socio-demographic characteristics</b>	<b>No</b>	<b>%</b>
Retired	15	1.4
Unemployed	304	29.9
Employed	337	33.1
<b>Level of education</b>		
Primary school	244	24.0
None	51	5.0
High school	600	59.0
University	115	11.3
<b>Marital status</b>		
Single	641	63.0
Cohabitation	205	20.1
Married	123	12.1
Widower	47	4.6

Almost all participants (98.1%) said that they had heard about COVID-19 and 8.3% of them believed that the disease does not exist. Only 2.8% knew the pathogenic agent of COVID-19.

More than 80% knew that the disease could be transmitted by greetings (87.3%), kissing an infected person (90.0%), touching infected doorknobs (83.5%), and attending meetings (83.9%).

Regarding the symptoms of COVID-19, the respondent's answers were: 85.1% fever, 78.6% headaches, 55.5% aches and pains, 81, 99.0% dry cough, 32.8% stomach ache, 70.3% loss of taste, 51.3% vomiting, 83.9% difficulty breathing, 74.0% throat irritation, 74.6% fatigue and 75.7% runny nose (Table 2). In terms of prevention measures, almost all participants knew that washing hands (94.5%), wearing a mask (94.7%) and maintaining an appropriate distance (1 m) between yourself and anyone with symptoms (93.0%) were the best way to prevent COVID-19, 76.0% thought that avoiding touching a contaminated surface and then touching your eyes could prevent getting COVID-19.. More than half of respondents thought that the disease could be prevented using steam baths (50.6%), 44.1% of participants thought that traditional medicines could be effective against the disease, For further details see (Table 2).

Table 2  
Knowledge about COVID-19 among the participants (n = 1016)

Question	Yes		No		No Idea	
	Number	%	Number	%	Number	%
<b>Covid-19</b>						
Have you ever heard of Covid-19?	997	98.13	11	1.08	8	0.79
Does it exist?	803	79.04	84	8.27	129	12.70
Pathogenic agent?	28	2.76	5	0.49	983	96.75
<b>Means of transmission</b>						
Salt water	186	18.31	629	61.91	201	19.78
Greetings	887	87.30	86	8.46	43	4.23
Kissing	914	89.96	52	5.12	50	4.92
Sexual relationships	461	45.37	346	34.06	209	20.57
Goods from China	494	48.62	285	28.05	237	23.33
Bushmeat	260	25.59	577	56.79	179	17.62
handshake	848	83.46	70	6.89	98	9.65
Faecal/urinary	311	30.61	475	46.75	230	22.64
Meetings	852	83.86	74	7.28	90	8.86
Closed space	293	28.84	598	58.86	125	12.30
Animals	338	33.27	467	45.96	211	20.77
Symptomatic person	464	45.67	383	37.70	169	16.63
<b>Symptoms of Covid</b>						
Fever	865	85.14	81	7.97	70	6.89
Headaches	799	78.64	133	13.09	84	8.27
Curvatures	564	55.51	320	31.50	132	12.99
Dry cough	833	81.99	98	9.65	85	8.37
Stomach aches	333	32.78	505	49.70	177	17.42
Loss of taste	714	70.28	181	17.81	121	11.91
Vomiting	521	51.28	332	32.68	163	16.04
Difficulty breathing	852	83.86	74	7.28	90	8.86

Question	Yes		No		No Idea	
	Number	%	Number	%	Number	%
Sore throat	752	74.02	153	15.06	111	10.93
Tiredness	758	74.61	152	14.96	106	10.43
Runny nose	769	75.69	105	10.33	142	13.98
<b>Prevention measures to avoid Covid</b>						
Wash hands	960	94.49	17	1.67	39	3.84
Wear a mask	962	94.69	21	2.07	33	3.25
Remain 1 m away from other people	945	93.01	44	4.33	26	2.56
Antibiotics	325	31.99	453	44.59	238	23.43
Traditional medicines	448	44.09	393	38.68	174	17.13
Steam bath	514	50.59	342	33.66	160	15.75
cover the nose / eyes	772	75.98	134	13.19	110	10.83
Infusions	452	44.49	335	32.97	229	22.54
Vaccine	212	20.87	470	46.26	334	32.87
Treatment	505	49.70	271	26.67	239	23.52

Concerning participant's perceptions of and attitudes to COVID-19, 91.9% of participants thought that it is dangerous, 90.7% thought it could kill, 46.3% thought it is a laboratory invention, 63.3% thought that it affects only white people. Of people interviewed, 29.1% still continued to greet people with a handshake, 90.1% said they wore mask in public places, 88.1% said they washed their hands regularly, and 62.2% were informed about the progress of the pandemic, 77.0% accepted the quarantine measures, 52.0% were in favor of vaccination but only 20.9% thought vaccination would protect them. Also, 81.3% of participants said to use protective and control measures to limit the spread of the disease. Further aspects of participant perceptions and attitudes are reported in Table 3.

Table 3  
Perceptions and attitude of the participants about COVID-19 (n = 1016)

Question	Yes		No		I don't know	
	Number	%	Number	%	Number	%
<b>Participants' perception of COVID-19</b>						
A dangerous disease	934	91.93	35	3.44	47	4.63
Kills	921	90.65	45	4.43	50	4.92
A shameful disease	312	30.71	609	59.94	95	9.35
Stigmatizing	547	53.84	332	32.68	137	13.48
Exaggerated	502	49.41	380	37.40	133	13.09
Manufactured in the lab	470	46.26	265	26.08	279	27.46
Can infect several times	436	42.91	306	30.12	274	26.97
A disease that affects white people	643	63.29	246	24.21	127	12.50
promoted by the cold	650	63.98	172	16.93	194	19.09
slowed down by the heat	636	62.60	204	20.08	176	17.32
<b>Attitude of participants to COVID-19</b>						
Greet people	296	29.13	7	0.69	713	70.18
Wear mask in public place	917	90.26	92	9.06	7	0.69
Wash hand regularly	895	88.09	116	11.42	5	0.49
Progress of the pandemic	632	62.20	379	37.30	5	0.49
Quarantine	782	76.97	229	22.54	5	0.49
Wear mask as reflex	676	66.54	336	33.07	4	0.39
Contact with health authority	840	82.68	172	16.93	4	0.39
Get vaccinated	528	51.97	483	47.54	5	0.49
Respect protective measures	826	81.30	185	18.21	5	0.49

Knowledge scores were significantly different across genders, age groups, area of residence, occupation groups and level of education (Table 4). Knowledge scores for men and women were very similar, but were significantly higher for men than women. Age class significantly affected knowledge scores, with

significant differences between ... [list all significant differences here – it would be better to plot these data]. Respondents living in urban area had a significantly higher knowledge score than rural residents, although the difference was small. Participants with higher or university education had significantly higher knowledge scores than those with lower levels of education. Employed participants had higher scores than unemployed participants.

Table 4

Relation between socio-demographic characteristics of the participants and their knowledge scores in questions about COVID-19 (n = 1016)

Socio-demographic characters	Category	Knowledge score		Test of significance (p)
		Min-max	Mean ± SD	
<b>Gender</b>				<b>t = -4.14 (&lt; 0.001)</b>
Men		0–33	21.1 ± 5.0	
Women		0–33	20.0 ± 5.0	
<b>Age (years)</b>				<b>F = 10.57 (&lt; 0.001)</b>
[10–20]	a	0–31	21.4 ± 4.1	e vs f = 0.05, c vs f = 0.0006
[20–30]	b	1–33	21.4 ± 4.1	b vs f = 0.00000, a vs f = 0.00000
[30–40]	c	0–33	20.3 ± 5.6	b vs d = 0.001, a vs d = 0.003
[40–50]	d	0–28	19.4 ± 6.0	
[50–60]	e	1–27	20.0 ± 5.0	
≥ 60	f	0–28	17.6 ± 6.0	
<b>Are of residence</b>				<b>t = -5.94 (&lt; 0.001)</b>
Urban		2–33	21.4 ± 4.4	
Rural		0–29	19.6 ± 5.4	
<b>Profession</b>				<b>F = 15.56 (&lt; 0.001)</b>
Student	a	1–33	22.0 ± 4.0	d vs c = 0.0005, a vs c = 0.0000
Retired	b	17–28	21.0 ± 3.0	a vs d = 0.001
Unemployed	c	0–28	19.0 ± 6.0	
Employed	d	0–33	20.4 ± 5.0	
<b>Level of education</b>				<b>F = 40.2 (&lt; 0.001)</b>
Primary school	a	0–29	19.4 ± 5.0	a vs b < 0.001, c vs b < 0.001
None	b	0–27	15.0 ± 8.4	d vs b < 0.001, c vs a < 0.001
<b>t</b> Student's t test, <i>F</i> analysis of variance (ANOVA) test				
*Statistically significant at p < 0.05				
# Categories of variables with significant ANOVA results. Multiple comparisons between each 2 categories are done by post hoc analysis (Tukey)				

Socio-demographic characters	Category	Knowledge score		Test of significance (p)
		Min-max	Mean ± SD	
High school	c	0–31	24.0 ± 4.3	d vs a < 0.001, d vs c < 0.001
University	d	14–33	23.1 ± 4.0	
<b>Marital status</b>				<b>F = 12.24 (&lt; 0.001)</b>
Cohabitation	a	0–28	19.4 ± 6.1	b vs d < 0.001, b vs c < 0.001
Single	b	0–33	21.2 ± 4.4	b vs c < 0.001
Married	c	1–28	19.5 ± 5.0	
Widower	d	0–26	18.4 ± 6.0	
† Student's t test, F analysis of variance (ANOVA) test				
*Statistically significant at p < 0.05				
# Categories of variables with significant ANOVA results. Multiple comparisons between each 2 categories are done by post hoc analysis (Tukey)				

Comparison of knowledge scores by questionnaire item shows that the urban population as better informed about COVID19, symptoms and preventive measures than the rural population, but there was no difference in the level of knowledge about the means of transmission (Table 5).

Table 5  
Comparison of knowledge scores between rural and urban residents

Topic	Knowledge score				Test of significantce (p)
	Rural		Urban		
	Min-max	Mean ± SD	Min-max	Mean ± SD	
Existence of COVID19	0–3	1.7 ± 0.5	0–3	1.8 ± 0.4	t = -3.27 (< 0.001)*
Means of transmission	0–10	6.4 ± 2.2	0–11	6.7 ± 1.9	t = -1.93 (0.053)
Symptoms	0–10	5.9 ± 2.1	0–11	6.3 ± 1.8	t = -3.19 (0.001)*
Prevention measures	0–10	5.0 ± 1.9	0–10	6.0 ± 1.7	t = -8.34 (< 0.001)*

## Discussion

Even if Africa has been relatively less affected than the other continents [13, 14], The disease continues to spread and remains the primary health concern of continent. In Gabon, various awareness programs have been put in place (television, radio, social networks, internet) by the health authorities and measures including a ban on grouping, curfews and mask-wearing have been put in place to prevent the disease. However, no study has yet been carried out on the level of knowledge and good practices towards COVID-19. We present and discuss here the results of a survey of the knowledge, perceptions and attitudes of people in of south-eastern Gabon towards the disease.

## Knowledge of means of transmission, symptoms and prevention measures

The surveys show that people we interviewed had a good general knowledge of COVID-19, almost the entire sample had heard of COVID-19 and the majority were aware of the prevention measures, mode of transmission and most of the symptoms. This good general knowledge is consistent with other studies in the world [15–18] and may be due to efforts by the government via awareness campaigns and daily warning messages sent from the government and the Ministry of Health to everyone's mobile telephones and awareness campaigns on national media channels. The result may also be explained by the relatively young age of the majority of the study population and their frequent use of social media platforms, knowing that in 2020 the internet represented the most important information source (citation missing). However, *(i)* less than 3% of respondents knew the pathogenic agent and those who did were from urban areas and had a high level of education. This may be because awareness campaigns are focused on prevention and people usually called the disease coronavirus rather than COVID-19, so they did not know that SARS\_COV-2 is the virus responsible for COVID-19. *(ii)* 32.0% of respondents thought that antibiotics can combat COVID-19 and 23.4% did not know if antibiotics can cure covid-19. Purchase of non-prescribed antibiotics is a common practice in Sub-Saharan Africa [19], and the panic caused by the COVID-19 pandemic [9] may lead to consumption of antibiotics, which is known to be a major driver of antimicrobial resistance [19]. *(iii)* Only 20.9% of the sample think that the vaccine can stop the disease and 46.26% think that the vaccine will not protect against the disease. This result could be explained by the misinformation that has circulated in social networks about vaccines that are harmful to the reproduction of the African population and that vaccination would allow the control of populations. Specific immunization awareness programs should be conducted by the authorities to address this. *(iv)* Urban populations have better knowledge of COVID-19, symptoms and means of prevention. These results could be explained by the limited access to the media in rural areas, whereas in urban areas there are diverse sources of information. Women have lower scores than men and educated people have better levels of knowledge than uneducated people. However, these differences are very small, although significant. As envisaged by Zhang et al., specific outreach programs could be designed to target particular demographic social groups [20], such as villagers, women, or uneducated or poorly educated populations.

## Perceptions of participants

Almost all (91.9%) of respondents believe that COVID-19 threatens life and it can kill (90.7%). These results show that populations have understood the dangerousness of the disease. However, nearly than half (49.4%) considers that the effects of the disease are exaggerated. These perceptions may be due to media pressure. At the beginning of the pandemic, the media covered it intensely. Almost half of the people interviewed thought that COVID-19 was manufactured in lab and more than half thought it is a disease of “white people” and that a hot climate could stop the spread of the disease. This pattern may be because people’s major source of information is social media. Fake news, misinformation and rumor-mongering are common due to a surge in the use of the internet and social media [15, 21, 22]. Unfortunately, information from social networks seems to circulate more easily in the general population than the scientific information which rejects this hypothesis [23].

## **Attitudes of participants towards control measures**

The majority of respondents took the precautions necessary to avoid contracting COVID-19. More than three-quarters of participants said they wear a mask in public places, wash their hands regularly, respect protective and control measures, will accept quarantine if they test positive and will contact the health authorities if they test positive. More than half say that they are informed about the progress of the pandemic. This positive attitude may result from information about the disease being regularly updated on various mass media channels and the government ensuring that its measures are enforced by the presence of military personnel in public places.

More than half of the study population was willing to get the vaccine once it is available, consistent with a study in Egypt [15]. These results show people's confidence in vaccines but this result contrast with vaccine perception because only 20.9% of respondents think that vaccination can protect them. This contradiction illustrates the ambiguity around the covid-19 vaccine. This ambiguity is illustrated by nearly 47 percent of the population who are not ready to be vaccinated if the vaccine is available. This reluctance, already expressed in other studies in Israel or Pakistan [24, 25] could be a barrier and a substantial challenge in the fight against the pandemic.

The fight against the pandemic must also include the fight against false information and conspiracy theories circulating in social networks on the quality of vaccines which would represent a health risk because they have been developed rapidly, the presence of active virus in the vaccines or nano-chips imbedded to control the population with the 5G towers telephone network [26].

## **Conclusion**

This study is the first to examine the knowledge, attitudes and practices of Gabonese people to COVID-19. In general, respondents had good knowledge of COVID-19, and a positive attitude towards using protective measures. More than half would agree to be given a COVID-19 vaccination. These results are encouraging in the fight against the spread of COVID-19 in Gabon. However, efforts are needed to improve the knowledge level of older participants, those living in rural area and those with a low education level.

# Abbreviations

COVID-19: Coronavirus Disease-19; KAP: Knowledge Attitude and Practice; WHO: World Health Organization; SARS-COV1, 2: Severe Acute Respiratory Syndrome Coronavirus 1, 2; MERS: Middle East Respiratory Syndrome Coronavirus.

# Declaration

- Ethics approval: The study was approved by the Gabonese National Ethics Committee N°003/2020/CNER/SG/Pof 1/02/ 2020
- Consent to participate: Not applicable
- Availability of data and material: Not applicable
- Conflicts of interest/Competing interests: The authors have no competing of interests to report.
- Funding (This study was funded by the *Centre International de Recherches Médicales de Franceville*)
- Authors' contributions: RKIL, JBLD and NB participated in the conception and design of the study. RKIL, SED, SLOL and NB participated in data analysis, interpretation of results, drafting and revision of the manuscript. WRM and FM participated in data entry. RKIL, LCK, SO, NCMM contributed to the acquisition of data in the field. JBLD is the guarantor of this paper. All authors read and approved the final manuscript.
- Acknowledgements: We would like to express gratitude to all the participants for undertaking this survey. We acknowledge Professor J Setchell for the English revision of the manuscript.

# References

1. WHO: **Director-General's opening remarks at the media briefng on COVID-19 11 March 2020.** . from <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020>) 2020.
2. Spychalski P, Błażyńska-Spychalska A, Kobiela J: **Estimating case fatality rates of COVID-19.** *The Lancet Infectious Diseases* 2020.
3. World Health Organization W: **WHO Coronavirus Disease (COVID-19) Dashboard.** 2021.
4. Cheng VC, Lau SK, Woo PC, Yuen KY: **Severe acute respiratory syndrome coronavirus as an agent of emerging and reemerging infection.** *Clin Microbiol Rev* 2007, **20**:660-694.
5. Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R: **Features, evaluation and treatment coronavirus (COVID-19).** In *Statpearls [internet]*. StatPearls Publishing; 2020
6. Drosten C, Gunther S, Preiser W, van der Werf S, Brodt HR, Becker S, Rabenau H, Panning M, Kolesnikova L, Fouchier RA, et al: **Identification of a novel coronavirus in patients with severe acute respiratory syndrome.** *N Engl J Med* 2003, **348**:1967-1976.
7. Ajilore K, Atakiti I, Onyenakeya K: **College students' knowledge, attitudes and adherence to public service announcements on Ebola in Nigeria: Suggestions for improving future Ebola prevention**

- education programmes. *Health Education Journal* 2017, **76**:648-660.
8. Tachfouti N, Slama K, Berraho M, Nejari C: **The impact of knowledge and attitudes on adherence to tuberculosis treatment: a case-control study in a Moroccan region.** *Pan African Medical Journal* 2012, **12**.
  9. Zhong B-L, Luo W, Li H-M, Zhang Q-Q, Liu X-G, Li W-T, Li Y: **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* 2020, **16**:1745.
  10. Person B, Sy F, Holton K, Govert B, Liang A: **Fear and stigma: the epidemic within the SARS outbreak.** *Emerging infectious diseases* 2004, **10**:358.
  11. Direction générale de la statistique D: **Résultats globaux du recensement général de la population et des logements de 2013 du Gabon (RGPL-2013).** 2015: p. 11, tableau 19.
  12. Abdelhafiz AS, Mohammed Z, Ibrahim ME, Ziady HH, Alorabi M, Ayyad M, Sultan EA: **Knowledge, perceptions, and attitude of egyptians towards the novel coronavirus disease (COVID-19).** *Journal of Community Health* 2020:1-10.
  13. Hardy ÉJ, Flori P: **Spécificités épidémiologiques de la COVID-19 en Afrique: préoccupation de santé publique actuelle ou future?** In *Annales Pharmaceutiques Françaises* Elsevier; 2020
  14. Lo M, Sy A, Yade S: **La COVID-19 en Afrique: Bilan D'étape et Perspectives/COVID-19 in Africa: Progress Report and Prospects.** 2020.
  15. Abdelhafiz AS, Mohammed Z, Ibrahim ME, Ziady HH, Alorabi M, Ayyad M, Sultan EA: **Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavirus Disease (COVID-19).** *J Community Health* 2020, **45**:881-890.
  16. Ngwewondo A, Nkengazong L, Ambe LA, Ebogo JT, Mba FM, Goni HO, Nyunai N, Ngonde MC, Oyono JE: **Knowledge, attitudes, practices of/towards COVID 19 preventive measures and symptoms: A cross-sectional study during the exponential rise of the outbreak in Cameroon.** *PLoS Negl Trop Dis* 2020, **14**:e0008700.
  17. Puspitasari IM, Yusuf L, Sinuraya RK, Abdulah R, Koyama H: **Knowledge, Attitude, and Practice During the COVID-19 Pandemic: A Review.** *J Multidiscip Healthc* 2020, **13**:727-733.
  18. Van Nhu H, Tuyet-Hanh TT, Van NTA, Linh TNQ, Tien TQ: **Knowledge, Attitudes, and Practices of the Vietnamese as Key Factors in Controlling COVID-19.** *J Community Health* 2020, **45**:1263-1269.
  19. Mate I, Come CE, Gonçalves MP, Cliff J, Gudo ES: **Knowledge, attitudes and practices regarding antibiotic use in Maputo City, Mozambique.** *PloS one* 2019, **14**:e0221452.
  20. Zhang X, Sun Y, Ye D, Sun Z, Su H, Ni J: **Analysis on mental health status of community residents in Hefei during SARS spread.** *Chin J Dis Contr Prev* 2003, **7**:280-282.
  21. Lazer DMJ, Baum MA, Benkler Y, Berinsky AJ, Greenhill KM, Menczer F, Metzger MJ, Nyhan B, Pennycook G, Rothschild D, et al: **The science of fake news.** *Science* 2018, **359**:1094-1096.
  22. Lee JJ, Kang KA, Wang MP, Zhao SZ, Wong JYH, O'Connor S, Yang SC, Shin S: **Associations Between COVID-19 Misinformation Exposure and Belief With COVID-19 Knowledge and Preventive Behaviors:**

**Cross-Sectional Online Study.** *J Med Internet Res* 2020, **22**:e22205.

23. Kristian G, Andersen K, Rambaut A: **The proximal origin of SARS-CoV-2.** *Nat Med* 2020, **26**:452.
24. Dror AA, Eisenbach N, Taiber S, Morozov NG, Mizrahi M, Zigran A, Srouji S, Sela E: **Vaccine hesitancy: the next challenge in the fight against COVID-19.** *Eur J Epidemiol* 2020, **35**:775-779.
25. Khan YH, Mallhi TH, Alotaibi NH, Alzarea AI, Alanazi AS, Tanveer N, Hashmi FK: **Threat of COVID-19 Vaccine Hesitancy in Pakistan: The Need for Measures to Neutralize Misleading Narratives.** *Am J Trop Med Hyg* 2020, **103**:603-604.
26. Khan YH, Mallhi TH, Alotaibi NH, Alzarea AI, Alanazi AS, Tanveer N, Hashmi FK: **Threat of COVID-19 vaccine hesitancy in Pakistan: the need for measures to neutralize misleading narratives.** *The American journal of tropical medicine and hygiene* 2020, **103**:603-604.