Knowledge, Attitudes and Practices of Populations Towards Barrier and Preventive Measures Against COVID-19 in Two Cities in Cameroon

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Abstract: Coronavirus Disease 2019 (COVID-19) is a contagious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Since the first reported case in sub Saharan Africa, countries have struggled to respond to the pandemic despite all the barrier measures and preventions strategies put in place; amongst them, Cameroon is characterized by a large amount of contamination and an increase in death rates. The purpose of this study was to assess the knowledge, attitudes and practices (KAPs) of the Cameroonian population on barrier and preventive measures against COVID-19; the first undertaken in the cities of Douala and Banganté since the beginning of the COVID-19 pandemic. A cross-sectional study was carried out on 777 residents in the Littoral (Douala) and in the West (Banganté) regions of Cameroon from a structured, pre-tested and self-administered questionnaire (according to WHO guidelines). Data were collected and analyzed using SPSS version 18.0 software. For p=0.05, the difference was statistically significant. Out of 777 participants, 67.7% (n=526) were from Douala and 32.3% (n=251) from Banganté. Seventy percent (70%) of our participants were aware of the main

preventive measures against COVID-19 taken by the Cameroonian government. The most used preventive method was the practice of hand hygiene (88.9%); followed by social distancing (87.2%), respiratory hygiene (75.8%), and self-confinement (85.3%). The majority of our participants had a positive attitude towards hand hygiene (81.6%) and wearing a face mask (84.7%). About 52.9% wore a face mask occasionally, 66.67% always washed their hands, 53.1% always used a hand sanitizer to disinfect their hands and 65,4% regularly self-confined themselves homes. Improving behaviors / attitudes and practices remain a major challenge for our populations. It is important to integrate the community in decision-making and increase awareness among our populations. Further studies are required to assess the impact of strategies undertaken by the decision makers, to roll out the COVID-19 pandemic in Cameroon.

Keywords: Knowledge, Attitudes, Practices, Barrier and Preventive Measures, COVID-19

1. Introduction

The year 2019 ended with the presence of a new strain of the corona virus which has not been previously identified in humans [1, 2]: The SARS-COV 2, which is responsible for a worldwide pandemic called "Coronavirus Disease 2019 (COVID-19)" [3, 4]. The first case was identified in Wuhan, located in the province of Hubei, China [5]. It became an international public health emergency on January 30, 2020, then a pandemic on March 11, 2020 with 137 countries reached on all the six continents so far [6].

It has been found that the SARS-COV 2 can be directly transmitted by droplets emitted by coughing or sneezing and /or by speaking [7, 8] and indirectly through soiled hands or surfaces in contact with the face [8, 9]. The main signs and symptoms (70 to 80% of cases) of this disease are cough and fever according to several authors [8-11]. Minor symptoms such as fatigue, dyspnea, muscle pain, sore throat, nausea and vomiting may also be found [10]. The COVID-19 is most often an asymptomatic disease (in more than 85%). However, while most people have mild symptoms, some people in the contrary might develop acute respiratory distress syndrome (ARDS) [10]. The COVID-19 doesn't yet have a therapeutic issue. Even if a vaccine is at hand [10], only simple and effective barriers methods developed by WHO may guarantee its prevention and control.

Studies assessing the knowledge attitudes and practices have been carried out across the world since the start of the pandemic [3-5, 12-14]. But, in Cameroon, there is a rarity of studies until now [15]. Furthermore, thirteen essential preventive measures have been put in place by the government throughout the national territory to curb the pandemic spread [16]. Assessing the knowledge, attitudes and practices of health professionals and populations is therefore a key tool of assessment of that prevention strategy. The aim of this study is to help in optimizing adherence to barrier and preventive measures of populations in order to break down the spread of COVID-19 in Cameroon.

2. Methodology

We conducted a cross-sectional study during eight months from March 20 to October 25, 2020. Data were collected through a structured, pre-tested and self-administered questionnaire among populations of Song Mahop (in Douala)

and in Bangangté, both towns in Cameroon. The samples collection period lasted two months from May to July 2020.

In order to verify the well understanding of our questionnaire, we carried out a pretest with 30 participants in the New Bell District in Douala and 20 people in Bafoussam in the West region Cameroon. Our study population consisted of residents of the Song Mahop District, Douala and those of Bangangté. The minimum sample size was estimated at 422 participants from the Lorentz formula where we used a default prevalence of 50% with an estimated threshold of 5%. We used a non-probabilistic and accidental sampling method to reach 777 respondents. Included in our study were all the inhabitants of the Song Mahop district in Douala and those of Bangangté aged more than 18 years and who had given their consent. Statistical analyses were performed using This Stat View 5.0 analysis software. The percentages of each variable were calculated as well as the Odds Ratio, the confidence intervals and the P-Value to find association between variables. We used Mari Josée Essie's evaluation grid to define the KAP evaluation score. Thus, the KAP were bad when the percentage was less than 60, average between 60 and 80% and good at 80% and above. For p-value less than 0.05, the difference was statistically significant.

Ethical Considerations

We obtained an institutional ethical clearance from the University of Douala (N °2394 CEI-Udo/09/2020/M), an approval from authorities in Douala and Banganté. The signed informed consent of each participant was obtained and the confidentiality participant's data was respected.

3. Results

3.1. Socio-demographic Characteristics of the Study Population

Table 1 below depicts the distribution of populations by socio-demographic characteristics.

Out of 800 people surveyed, 777 (97.7%) fully completed the questionnaire. Amongst them, 67.7% (526/777) were in the urban area of Douala and 32.3% (251/777) in the rural area of Bangangté. Male were slightly predominant 55.7% (433/777) and the majority were aged 18-29 years (71.2%). In addition, about half of our participants were unemployed

(49.8%) while 22.5% were engaged in informal activities. Majority of our participants (49.3%) had a secondary level of education compared to 4.9% who had never gone to school.

Table 1. Socio-demographic characteristics of respondents.

Characteristics	Workforce (n)	Percentage (%)
Location		
Douala	526	67.7
Bangangte	251	32.3
gender		
Male	433	55.7
Female	344	44.3
Marital status		
Single	433	55.7
Married	201	25.9
Free union	110	14.1
Divorcee	16	2.1
Widow (er)	17	2.2
age range (Years)		
] 18; 29]	553	71, 2
] 29; 39]	126	16.2
] 40; 49]	62	8.0
] 49; 59]	24	3.1
> 60	12	1.5
Type of employment		
Informal	175	22.5
Formal	215	27.7
Unemployed	387	49.8
Monthly income		
] 0; 36k]	467	60.1
]36k; 100k]	179	23.0
]100k; 200k]	79	10.2
> 200k	52	6.7
Study level		
No	38	4.9
Primary	71	9.1
Secondary	383	49, 3
University	285	36.7
Religion		
Christian	676	87.0
Muslim	60	7.7
Animist	34	4.4
Atheist	7	0.9

$1k=10^3$.

3.2. Knowledge of Respondents About COVID-19

Most of our respondents (70.7%) were aware of the existence of COVID-19. The majority (83.8%) knew the causal agent (viral origin) of the disease. Most of them (76.3%) declared that the disease is transmitted by soiled hands and through droplets or aerosols from an infected patient who coughs, sneezes or speaks. Only 34.5% (268/777) of respondents provided the response that the pandemic was not yet under control in Cameroon as of (date).

Respondents could correctly identify the symptoms of COVID-19 such as fever (83.8%), cough (91.248%), runny nose (77.9%), sore throat (69.6%), shortness of breath (66.7%), and headache (72.2%). Most of them (79.8%) were aware that the COVID-19 patients most at risk of complications were older subjects. However, 79.4% thought that everyone was at risk of contracting COVID-19.

Most of our respondents declared they practiced primary prevention methods against COVID-19, such as the practice of hand hygiene (88.9%); social distancing (87.3%), respiratory hygiene (75.8%), and home confinement (85.3%) converse to others who portrayed greater trust in vaccines (27.5%), chloroquine (46.8%), antibiotics (25.3%), consumption of plants / concoctions (53.3%) and hot water (50.8%) as valid tools in the prevention of COVID-19. More than 70% of our respondents were aware of the thirteen barriers measures put in place by Cameroonian government to fight again spread the COVID-19 (table 2).

Table 2. *Distribution of respondents according to their knowledge on COVID-19.*

Knowledge of respondents	Correct answer n (%)	Wrong answer n (%)
What do you know about COVID-19 ?		
COVID-19 is a disease made in the laboratory	309 (39.8%)	468 (60.2%)
COVID-19 does not exist	549 (70.7%)	228 (29.3%)
COVID-19 is a mystical disease	592 (76.2%)	185 (23.8%)
COVID-19 is a disease caused by a virus	616 (79.3%)	161 (20.7%)
COVID-19 is transmitted by mosquitoes	651 (83.8%)	126 (16.2%)
COVID-19 is transmitted through soiled hands	593 (76.3%)	184 (23.7%)
COVID-19 is spread by droplets or aerosols from a patient who coughs, sneezes or speaks	701 (90.2%)	76 (9.8%)
There is already a treatment for COVID 19	85 (10.9%)	692 (89.1%)
It is a pandemic already under control in Cameroon	268 (34.5%)	509 (65.5%)
Symptoms of COVID-19		
Fever	651 (83.8%)	126 (16.2%)
Cough	709 (91.2%)	68 (8.7%)
Running nose	605 (77.9%)	172 (22.1%)
Sore throat	541 (69.6%)	236 (30.4%)
Diarrhea	592 (76.2%)	185 (23.8%)
Shortness of breath	518 (66.7%)	259 (33.3%)
Aches	268 (34.5%)	509 (65.5%)
Headache	561 (72.2%)	216 (27.8%)
The most exposed are:		
Senior citizens	620 (79.8%)	157 (20.2%)
Young people	515 (66.3%)	262 (33.7%)
Men	463 (59.6%)	314 (40.4%)
The women	461 (59.3%)	316 (40.7%)
The rich	453 (58.3%)	324 (41.7%)
Poor people	465 (59.8%)	312 (40.1%)
Everybody	160 (20.6%)	617 (79.4%)
The means of prevention of COVID-19 are based on:		
The vaccine	563 (72.4%)	214 (27.5%)
Chloroquine	413 (53.1%)	364 (46.8%)
Antibiotics	580 (74.6%)	197 (25.3%)
Plants / bark / concoctions	363 (46.7%)	414 (53.3%)
Hot water	382 (49.2%	395 (50.8%)
Hand hygiene	691 (88.9%)	86 (11.1%)
Social distancing	678 (87.2%)	99 (12.7%)
Respiratory hygiene	589 (75.8%)	188 (24.2%)
Stay at home	663 (85.3%)	114 (14.7%)
Are the following measures part of the 13 measures recommended in Cameroon against COVID-19 ?		
The closure of all schools from kindergarten to higher education	744 (95.7%)	33 (4.2%)
The closure of drinking establishments, restaurants and leisure areas	710 (91.4%)	67 (8.6%)
Regulation of consumer flows in markets and shopping centers	621 (79.9%)	156 (20.1%)
Prohibition of overloading in public transport agencies	700 (90.2%)	77 (9.8%)
Use of electronic means of communication and digital tools for meetings of at least 10 people	608 (78.2%)	169 (21.7%)
Avoiding social contact (shaking hands, hugging)	722 (92.9%)	55 (7.1%)
Strict adherence to hand hygiene measures	722 (92.9%)	55 (7.1%)
Closure of national borders	709 (91.2%)	68 (8.7%)
Reporting of school and university competitions later	716 (92.1%)	61 (7.8%)
Ban on gatherings of more than 50 people	715 (92.0%)	62 (8.0%)

3.3. Respondents' Attitudes Towards COVID-19

In this study, we assessed the attitudes of our respondents. We noted that 81.6% of our respondents agreed that everyone should comply with hand hygiene recommendations versus 10.8% who were neutral. The majority (84.7%) agreed that everyone should wear a face mask. Surprisingly, 69.1% (537/777) respondents did not agree to benefit from an experimental vaccine against COVID-19.

Most of respondents (66.5%) argued that an infection with COVID-19 can be cured compared to 15.4% who disagreed. In case of the COVID-19 symptoms, 65.2% of the participants agreed to call the SOS-free number and 15.8% were reluctant to do so. Also, 80.2% of respondents agreed to

convince all suspicious people to call the free call center   (SOS number) versus 9.6% who did not agree.

Table 3. The attitudes of populations towards COVID-19.

ATTITUDES	Okay	Neutral	Disagree
Who Should Follow Hand Hygiene Recommendations?			
Only nursing staff	151 (19.4%)	84 (10.8%)	542 (69.7%)
All the sick	358 (46.1%)	78 (10.0%)	341 (43.9%)
COVID-19 patients only	163 (21.0%)	80 (10.3%)	534 (68.7%)
Everybody	634 (81.6%)	30 (3.9%)	113 (14.5%
Nobody	127 (16.3%)	102 (13.1%)	548 (70.5%)
Who should wear a face mask?			
Only nursing staff	118 (15.2%)	96 (12.3%)	563 72.4%)
All the sick	407 (52.4%)	72 (9.3%)	298 (38.3%)
Corona / COVID-19 patients only	178 (23%)	86 (11.1%)	513 (66.0%)
Everybody	658 (84.7%)	42 (5.4%)	77 (9.9%)
Nobody	122 (15.7%)	94 (12.1%)	561 (72.2%)
About the vaccine			
Would you agree to benefit from an experimental vaccine against COVID-19?	125 (16.1%)	115 (14.8%)	537 (69.1%)
I will not agree to be vaccinated because it is to contaminate or sterilize the population	264 (49.2%)	138 (25.7%)	135 (25.1%)
I will not agree to be vaccinated because it is pharmaceutical lobbying	196 (36.5%)	160 (29.8%)	181 (33.7%)
I will not agree to be vaccinated because I do not want to be the guinea pig of the pharmaceutical companies	338 (62.9%)	74 (13.8%)	125 (23.3%)
I will not agree to be vaccinated because it is useless	194 (36.1%)	152 (28.3%)	191 (35.6%)
Patients with COVID-19 are			
Sick for life	208 (26.8%)	114 (14.7%)	455 (58.5%)
Patients who will keep the consequences	210 (27.0%)	181 (23.3%)	386 (49.7%)
Patients who will be able to heal completely	517 (66.5%)	140 (18.0%)	120 (15.4%)
Patients who will surely die	205 (26.4%)	177 (22.8%)	395 (50.8%)
Attitude to the evocative signs of COVID-19?			
Call the toll-free number if I feel the suggestive symptoms	507 (65.2%)	123 (15.8%)	147 (18.9%)
Convince all suspicious people to call the toll free number	623 (80.2%)	79 (10.2%)	75 (9.6%)
Wait for the disease to get worse, then I call the toll free number	117 (15.0%)	77 (9.9%)	583 (75.0%)
Stay away from anyone suspicious	514 (66.1%)	79 (10.2%)	187 (23.7%)
Refer any suspicious person to a traditional practitioner	107 (13.8%)	185 (23.8%)	485 (62.4%)
The suspected case does not concern me, so I do nothing	77 (9.9%)	94 (12.1%)	606 (78%)

3.4. Respondents' Practices Towards COVID-19

In this study, we investigated the practice of barrier and preventive measures against COVID-19. We found that 52.9% of respondents said they wear a face mask occasionally against 2.4% who declared to have never wore it. The majority (66.7%) always washed their hands compared to 1.5% who never practiced it. About half of our respondents declared using a hydro-alcoholic solution to disinfect their hands and always avoiding touching their nose, mouth, eyes with soiled hands (53.1% and 56.0% respectively).

More than half of respondents (63.1%) revealed always sneezing, coughing in the fold of the elbow or in a disposable tissue and also, avoiding contact greetings (68.1%). Most of our surveyed population (61.6%) always refrained from visiting crowded places and kept children at home since the closure of schools and universities (73.4%).

Table 4. Distribution of respondents according to their practices.

PRACTICE	Always	Occasionally	Never
Are you wearing the mask (face mask)?	347 (44.7%)	411 (52.9%)	19 (2.4%)
Do you wash your hands with running water and soap?	518 (66.7%)	247 (31.8%)	12 (1.5%)
Do you have a hydro-alcoholic solution that you use to disinfect your hands?	413 (53.1%)	318 (40.9%)	46 (5.9%)
Do you avoid touching your nose, mouth and eyes when your hands are soiled?	435 (56.0%)	305 (39.2%)	37 (4.8%)
Do you sneeze and cough into the crease of your elbow or into a disposable single use tissue?	490 (63.1%)	248 (31.9%)	39 (5.0%)
Do you avoid contact greetings (shaking hands, hugs)?	529 (68.1%)	209 (26.9%)	39 (5.0%)
Do you avoid overloaded vehicles?	500 (64.3%)	232 (29.8%)	45 (5.8%)
I refrain from visiting places crowded with people (meetings, bereavements, weddings, restaurant, bar, church / mosque)	479 (61.6%)	248 (31.9%)	50 (6.4%)
I stay at home and only go out when necessary	508 (65.4%)	201 (25.9%)	68 (8.7%)
All children have been held at home since schools and universities closed	570 (73.3%)	167 (21.5%)	40 (5.1%)
The entourage influences my good practices	387 (49.8%)	185 (23.8%)	205 (26.4%)

3.5. Identification of the Determinants of the Attitude Towards a Potential Vaccine Against COVID-19

In this study, we looked for the determinants of the attitude of populations towards a potential vaccine through a multivariate analysis. Compared to respondents with no level of education, more respondents with a primary level of education had declared to agree an experimental vaccine against COVID-19 (25.3% vs. 10.5%). This association was statistically significant in multivariate polytonic logistic regression (ORa=5.77, [1.26-26.43], P=0.02).

The average knowledge score for respondents who said they disagreed to benefit from a potential COVID-19 vaccine was 72.1±10.1 compared to 69.7±12.2 among those with a neutral opinion. In multivariate polytonic logistic regression, this difference was statistically significant (ORa=1.02, [1.00-1.04], P=0.02). In addition, the average knowledge score by respondents who agreed to benefit from a potential COVID-19 vaccine was 68.63±1.68 versus 69.71±12.2 among those with a neutral opinion, p=0.67.

Table 5. *Determinants of the attitude towards a potential vaccine against COVID-19 in polytonic logistic regression according to the multivariate model.*

	Would you agree to benefit from an experimental vaccine against COVID-19?				
	Total (N=777)	Disagree	ORa, 95% CI, p-value	Okay	ORa, 95% CI, p-value
Location					
Douala	526	363 (69.0%)	-	82 (15.6%)	-
Bangangte	251	174 (69.3%)	ORa=1.19, [0.73-1.92], P=0.49	43 (17.1%)	ORa=1.27, [0.70-2.30], P=0.44
Gender					
Male	432	295 (68.3%)	-	72 (16.7%)	-
Female	344	242 (70.3%)	ORa=1.03, [0.67-1.58], P=0.89	53 (15.4%)	ORa=0.97, [0.57-1.67], P=0.92
Marital status					
Single	433	296 (68.4%)	-	72 (16.6%)	-
Married	201	144 (71.6%)	ORa=1.43, [0.78-2.64], P=0.25	30 (14.9%)	ORa=0.99, [0.46-2.15], P=1.00
Free Union	110	75 (68.2%)	ORa=1.04, [0.56-1.93], P=0.91	18 (16.4%)	ORa=0.94, [0.43-2.05], P=0.88
Divorce (e) or widow (er)	33	22 (66.7%)	ORa=1.13, [0.38-3.38], P=0.82	5 (15.1%)	ORa=0.78, [0.19-3.25], P=0.73
Monthly income					
[0; 36000]	467	328 (70.3%)	-	76 (16.3%)	-
[36000; 100,000]	179	115 (64.2%)	ORa=0.68, [0.40-1.16], P=0.16	32 (17.9%)	ORa=0.72, [0.37-1.40], P=0.33
[100,000; 200000]	79	61 (77.2%)	ORa=1.15, [0.52-2.56], P=0.73	8 (10.1%)	ORa=0.63, [0.21-1.87], P=0.41
> 200,000	52	33 (63.5%)	ORa=0.66, [0.28-1.51], P=0.32	9 (17.3%)	ORa=0.75, [0.26-2.17], P=0.60
School level					
No	38	26 (68.4%)	-	4 (10.5%)	-
Primary	71	46 (64.8%)	ORa=2.47, [0.77-7.88], P=0.13	18 (25.3%)	ORa=5.77, [1.26-26.43], P=0.02
Secondary	383	268 (70.0%)	ORa=1.64, [0.67-3.98], P=0.28	60 (15.7%)	ORa=2.67, [0.73-9.77], P=0.14
University	285	197 (69.1%)	ORa=1.39, [0.56-3.45], P=0.48	43 (15.1%)	ORa=2.38, [0.6-8.97], P=0.20
Religion					
Christian	676	472 (69.8%)	-	105 (15.5%)	-
Muslim	60	37 (61.7%)	ORa=0.87, [0.40-1.91], P=0.73	14 (23.3%)	ORa=1.50, [0.61-3.73], P=0.38
Animist	34	23 (67.6%)	ORa=0.84, [0.32-2.17], P=0.71	5 (14.7%)	ORa=0.70, [0.20 -2.45], P=0.58
Atheist	7	5 (71.4%)	ORa=1.06, [0.11-9.95], P=0.96	1 (14.3%)	ORa=1.13, [0.06-20.31], P=0.93
Knowledge score (% correct answers)					
Average (DS)		72.1 (10.1)	ORa=1.02, [1.004-1.04], P=0.02	68.6 (10.7)	ORa=0.99, [0.97-1.02], P=0.66
Age (Years)					
Average (DS)		31.5 (10.6)	ORa=0.99 [0.97-1.02], P=0.53	32.1 (12.3)	ORa=1.01, [0.98-1.04], P=0.56

Table 6. *Determinants of wearing a face mask in polytonic logistic regression *: multivariate model.*

PRACTICE	Are you wearing a face mask?				
	Total (N=777)	Never	ORa, 95% CI, p-value	Always	ORa, 95% CI, p-value
Location					
Douala	526	13 (2.5%)	-	277 (52.7%)	-
Bangangte	251	6 (2.4%)	ORa: 0.675, [0.223-2.045], P=0.48	69 (27.5%)	ORa: 0.28, [0.19-0.41], P <0.0001
Sex					
Male	432	9 (20.1%)	-	179 (41.4%)	-
Female	344	10 (2.9%)	ORa: 1.872, [0.691-5.067], P=0.21	167 (48.5%)	ORa: 1.37, [0.1002-1.88], P=0.04
Age (year)					
Average (DS)	31.71 (11)	31.74 (13.2)	ORa: 0.993, [0.936-1.053], P=0.81	31.33 (10.6)	ORa: 1.01, [0.99-1.03], P=0.27
Marital status					
Single	433	9 (2%)	-	202 (46.6%)	-
Married	201	6 (3.0%)	ORa: 1.21, [0.32-4.54], P=0.76	81 (40.3%)	ORa: 0.73, [0.47-1.16], P=0.18
Free Union	110	3 (2.7%)	ORa: 1.002, [0.24-4.158], P=0.99	45 (40.9%)	ORa: 0.68, [0.42-1.09], P=0.11
Divorce (e) or widow (er)	33	1 (3.0%)	ORa: 1.028, [0.080-13.269], P=0.98	18 (54.5%)	ORa: 097, [0.41-2.30], P=0.95
Type of employment					
Informal	175	5 (2.9%)	-	69 (39.4%)	

PRACTICE	Are you wearing a face mask?				
	Total (N=777)	Never	ORa, 95% CI, p-value	Always	ORa, 95% CI, p-value
Formal	215	6 (2.8%)	ORa: 1.55, [0.39-6.125], P=0.53	93 (43.3%)	ORa: 1.21, [0.75-1.97], P=0.44
Unemployed	387	8 (2.1%)	ORa: 1.004, [0.23-4.243], P=0.99	184 (47.5%)	ORa: 1.17, [0.73-1.89], P=0.45
Monthly income					
] 0; 36000]	467	10 (2.1%)	-	213 (45.6%)	-
] 36000; 100,000]	179	6 (3.3%)	ORa: 1.51, [0.39-5.89], P=0.54	71 (39.7%)	ORa: 1.32, [0.97-1.81], P=0.91
] 100,000; 200000]	79	2 (2.5%)	ORa: 1.16, [0.17-7.725], P=0.87	35 (44.3%)	ORa: 1.32, [0.97-1.81], P=0.07
> 200,000	52	1 (1.9%)	ORa: 1.16, [0.109-12.34], P=0.90	27 (51.9%)	ORa: 1.32, [0.97-1.81], P=0.07
Study level					
No	38	2 (5.3%)	-	19 (%)	-
Primary	71	1 (1.41%)	ORa: 0.146, [0.011-1.900], P=0.14	28 (%)	ORa: 0.72, [0.30-1.73], P=0.46
Secondary	383	11 (2.9%)	ORa: 0.42, [0.77-2.29], P=0.31	168 (%)	ORa: 0.56, [0.26-1.18], P=0.13
University	285	5 (1.7%)	ORa: 0.24, [0.38-1.49], P=0.12	131 (%)	ORa: 0.73, [0.34-1.57], P=0.42
Religion					
Christian	676	16 (2.4%)	-	298 (44.1%)	-
Muslim	60	1 (1.7%)	ORa: 0.67 [0.08-5.439], P=0.708	30 (50%)	ORa: 1.24, [0.70-2.183], P=0.45
Animist	34	1 (3.0%)	ORa: 1.71, [0.201-14.644], P=0.62	16 (47.1%)	ORa: 1.37, [0.65-2.94], P=0.41
Athe	7	1 (14.2%)	ORa: 7.24, [0.54-96.043], P=0.13	3 (42.9%)	ORa: 1.13, [0.21-6.04], P=0.89
COVID-19 Knowledge Score					
Average (DS)	71.22 (10.6)	67.93 (12.1)	ORa: 0.97, [0.93-1.016], P=0.219	71.7 (10.6)	ORa: 1.01, [0.99-1.02], P=0.22
* Dependent variable reference: " Occasionally "					

Table 7. *Identification of the determinants of confinement in polytonic logistic regression *: multivariate model.*

PRACTICE	I stay at home and only go out in case of necessity?				
	Total (N=777)	Never	OR, 95% CI, p-value	Always	OR, 95% CI, p-value
Location					
Douala	526	39 (7.4%)	-	349 (66.3%)	-
Bangangte	251	29 (11.5%)	ORa=1.47, [0.78-2.79], P=0.23	159 (63.3%)	ORa=0.90, [0.60-1.34], P=0.60
Sex					
Male	432	44 (10.2%)	-	262 (60.6%)	-
Female	344	24 (7.0%)	ORa=1.04, [0.56-1.92], P=0.90	245 (71.2%)	ORa=1.89, [1.31-2.72], P=0.007
Age (year)					
Average (DS)	31.71 (11)	33.40 (9.1)	ORa=1.02, [0.98-1.05], P=0.30	31.51 (11.4)	ORa=1.02, [1.00-1.05], P=0.05
Marital status					
Single	433	35 (8.1%)	-	303 (70.0%)	-
Married	201	20 (9.9%)	ORa=0.61, [0.26-1.41], P=0.25	123 (61.2%)	ORa=0.49, [0.29-0.83], P=0.008
Free Union	110	10 (9.1%)	ORa=0.75, [0.32-1.80], P=0.52	62 (56.4%)	ORa=0.50, [0.30-0.83], P=0.008
Divorce (e) or widow (er)	33	13 (9.1%)	ORa=0.59, [0.12-2.91], P=0.43	82 (57.3%)	ORa=0.37, [1.40-0.98], P=0.04
Type of employment					
Informal	175	20 (11.4%)	-	88 (50.3%)	-
Formal	215	19 (8.8%)	ORa=1.07, [0.47-2.48], P=0.86	149 (69.3%)	ORa=1.99, [1.18-3.36], P=0.009
Unemployed	387	29 (7.5%)	ORa=1.30, [0.58-2.94], P=0.53	271 (70.0%)	ORa=2.45, [1.47-4.09], P=0.0006
Monthly income					
[0; 36000]	467	39 (8.3%)	-	310 (66.4%)	-
[36000; 100,000]	179	17 (9.5%)	ORa=1.041, [0.45-2.38], P=0.92	106 (59.2%)	ORa=1.21, [0.72-2.05], P=0.47
[100,000; 200000]	79	9 (11.4%)	ORa=1.49, [0.48-4.59], P=0.48	54 (68.3%)	ORa=1.43, [0.67-3.04], P=0.35
> 200,000	52	3 (5.8%)	ORa=0.63, [0.14-2.84], P=0.55	38 (73.1%)	ORa=1.44, [0.61-3.41], P=0.40
Study level					
No	38	10 (26.3%)	-	22 (57.9%)	-
Primary	71	5 (7.0%)	ORa=0.13, [0.30-0.56], P=0.006	45 (63.4%)	ORa=0.65, [0.22-1.93], P=0.43
Secondary	383	27 (7.0%)	ORa=0.15, [0.05-0.48], P=0.014	244 (63.7%)	ORa=0.52, [0.19-1.37], P=0.18
University	285	26 (9.1%)	ORa=0.24, [0.07-0.79], P=0.02	197 (69.1%)	ORa=0.68, [0.25-1.85], P=0.45
Religion					
Christian	676	59 (8.7%)	-	438 (64.8%)	-
Muslim	60	6 (10.0%)	ORa=1.44, [0.50-4.15], P=0.50	41 (68.3%)	ORa=1.62, [0.82-3.20], P=0.16
Animist	34	2 (5.9%)	ORa=1.14, [0.22-5.79], P=0.88	25 (73.5%)	ORa=2.31, [0.94-5.70], P=0.07
Atheist	7	1 (14.3%)	ORa=1.80, [0.14-23.93], P=0.65	4 (57.1%)	ORa=1.37, [0.21-8.74], P=0.74
COVID-19 Knowledge Score					
Average (DS)	71.22 (10.61)	68.88 (9.7)	ORa=0.99, [0.96-1.01], P=0.40	72.1 (10.3)	ORa=1.02, [1.004-1.04], P=0.01
* Dependent variable reference: " Occasionally "					

3.6. Identification of the Determinants of Wearing a Face Mask

In this study, there was a better usage of face masks in Douala when compared to Bangangte (52.7% vs. 27.5%, ORa: 0.28, [0.19-0.41], P <0.0001). Similarly, more men, wore facemasks compared to females (48.5% vs. 41.4%, ORa: 1.37, [0.1002-1.88], P=0.04) (table 6).

3.7. The Determinants of Confinement

We noted that more women than men self-confined (71.2% versus 60.6%, ORa=1.89, [1.31-2.72], P=0.007). Also, married (61.2%), people of the formal sector (70.0%) were the most confined at home (ORa=1.99, [1.18-3.36], P=0.009; ORa=2.45, [1.47-4.09], P=0.0006) than other groups of people.

4. Discussion

Out of 800 people targeted, 777 (97.7%) filled the questionnaire following the prescribed guides. amongst which 67.7% (526/777) lived in Douala urban area while32.3% (251/777) in Banganté rural area. The age of respondents ranged from 18-29 years; the male gender was predominance in both the urban and rural setting (71.2% and 55.7% respectively). Several studies across the world found similar results of male predominance amongst respondents [16-19] for instance in China (54%) [17], 59.6% in Nigeria [18], 57.9% in India [19], 56% in the South-West region of Cameroon [16]. However, other studies rather found a majority in female respondents [20] and 58.9% in Pakistan [21]; 92.7% at the Philippines [22], 76.6% in Serbia [23]. This predominance in male participation to this study could be explained by implementation of home confinement which keeps men in their homes. We also think the sudden onset of the pandemic that resulted in record deaths across the globe made our study a "hot topic" and increased both participation to the study and overall awareness about the disease.

In our study, the most represented age group was 18 to 29 (71.2%). Similar findings have been reported in Serbia [23], Egypt, [15], and Indonesia [24]. This age bracket superposes that the demography of Cameroon. Furthermore, in terms of level of education, the majority of respondents had secondary education (49.3%). Paradoxically, the majority of respondents in a similar study from the South-West (Buea) region of Cameroon were university students and graduates (55.6%) [16]. In fact, Buea is known as a university town.

Most of our respondents knew that COVID-19 exists (70.7%). In a similar study in Pakistan, 80% of respondents were aware of the existence of COVID-19 [22]. Most of our respondent could identify the origin of the disease (83.8%), its modes of transmission such as by soiled hands (76.3%), by nasal droplets or saliva (90.2%) and, even the associated signs and symptoms of the disease (70%). These results are similar to those of LIU et *al* who had respondents identifying a droplet transmission at 98.9% and soiled hands at 0.3% [25]. Similarly, Narayana et al described 90.8% of the transmission through droplets in India among elderly and respondents with chronic diseases such as high blood pressure, cardiovascular and respiratory diseases [11, 19, 26]. Furthermore, in this study, we found that 79.4% believed that everyone was at risk of contracting severe forms of COVID-19, which suggests that they had limited knowledge about people at risk of the disease [27].

Most of respondents could clearly tell that COVID-19 disease can be prevented by practicing hand hygiene (88.9%), social distancing (87.2%), respiratory hygiene (75.8%), and home confinement (85.3%). Previous studies found similar results. For instance, in Nigeria a study revealed that prevention through hygiene (96.4%), social distancing (93%) and wearing a face mask (92%) was most understood and communicated [18]. In Indonesia; the populations could list some primary prevention methods of COVID-19 such as physical distancing (78.6%); wearing a mask (92.5%) and washing hands (92.5%) [19]. In India, respondents were more versed with COVID-19 preventive measures such as social distancing (91.1%) and hand washing (96.5%) [24]; these results could be justified by the fact that these methods are standard preventive measures used across several diseases that share similar modes of transmission.

Attitudes encompass the methods of prevention and fight against COVID-19 embedded in the lifestyle of the entire population without any distinction. According to the WHO and the CDC, the wearing of a face mask is reserved for suspects and confirmed cases of COVID-19 [28]. In our study, 69.7% respondents agreed that only health professionals should practice hand hygiene compared to 81.6% who argued that everyone should practice hand hygiene (washing or disinfecting hands) [29]. Also, 84.7% of respondents agreed that everyone should wear a face mask in order to protect itself against the COVID-19 virus. This result is greater than that obtained by Xiaopen et Al where 65% of the participants agreed to wear a face mask [25]. Moreover, regarding the vaccine, only 16.1% of respondents agreed they would receive a potential anti-COVID-19 vaccine. This result seems close to that of Reuben et *al* where only 29% people accepted a vaccine against COVID-19 although about (61.8%) declared not having enough confidence to doctors [18].

Regarding practices, the majority supported that consistently wearing a face mask provides a more efficient protective effect against COVID-19 than occasionally wearing them (84.7% vs. 52.9%). This result is similar to that obtained in a study in India where 73% reported regularly wearing a face mask [19]. This finding could be justified by the presence of individuals from the lower socioeconomic bracket of society amongst the respondents as found by the study carried out in the South-West region of Cameroon. Only 21.7% of the respondents had bought a mask while 95% knew that the wearing of a face mask could prevent the disease [16]. Moreover, most respondents (66%) always washed their hands as did those in India (86%) [19] who also always use a hydro-alcoholic solution to disinfect the hands (53.1%); always avoid touching their nose, mouth and eyes with soiled hands (55.9%); always sneezing and coughing into the crease of the elbow or into a disposable tissue (63.06%) and who always avoid contact greetings (68.1%). In addition, 64.35% of our respondents said they always avoided overloaded vehicles; always refrain from visiting crowds people 61.5%; always stay at home (65.4%); always keep children at home since the closure of schools and universities (73.4%); and 49.8% stated that they were always influenced by those around

them with regard to their practices. These results are similar to the study from India where 87% reported washing their hands with soap and water regularly and (73%) reported regularly wearing a face mask [19]. These practices corroborates advertisements on social media and elsewhere since the start of the pandemic.

5. Conclusion

All in all, our investigation which consisted in assessing the knowledge, attitudes and practices of populations on barriers and preventives measures against COVID-19 in two cities of Cameroon, portrayed that that, most of the respondents had a good knowledge of the origin of the disease, its modes of transmission, its signs and symptoms and the people at risk and the barrier and preventive measures. Respondents' attitudes were good vis-à-vis the existing barrier measures prescribed by the government. However, few respondents with a primary level of education agreed to benefit from a possible vaccine (P=0.02). Practices varied from low to moderate depending on the determinants (sex, marital status, level of education, etc.). Our findings show room for sensitization geared towards encouraging the population to comply all strategies put in place to fight against the adverse effects of the pandemic. Further studies are required to assess the impact of strategies undertaken by the decision makers, to roll out the COVID-19 pandemic in Cameroon.

List of Abbreviations

ARDS: Acute Respiratory Distress Syndrome
ORa: Odds Ratio
WHO: World Health Organization

Conflict of Interest

Authors declare no competing interest

Authors' Contributions

DIC, VTN and RKW conceived the idea and designed the study. DIC, ML, AMA, and OTN scrutinized all relevant information and draft the manuscript. RKW, EL, conducted the field study. GT, EN, ANN, YVYVMM, HMM and CAO analyzed the data. All authors read and approved the final manuscript.

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