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Measures to Curb the Spread of Covid-19 in Cameroon

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ABSTRACT

This study set out to appraise the trend of cases, recovery and death and the general population's Knowledge, Attitudes and Practices toward COVID-19 during the rise of the pandemic in Cameroon, and to recommend appropriate response strategies. The study was conceptually substantiated by the Health Belief Model. The research design is a cross-sectional survey, more specifically a community-based survey. All valid person aged 16 and above who had been residing on the national territory of Cameroon at least 4 months as from the date of data collection was eligible for the study. A total of 1125 people were validated for the study following data clean up and exploratory statistics, making a return rate of 95.7%, given that the probabilistically calculated sample size was 1176. Data were collected through face-to-face approach with participants using a semi-structured questionnaire. This was due to the fact that the internet penetration rate in Cameroon was estimated to just 23.2% and it was much lower in rural areas, which made an online survey difficult. However, those in charge of collecting data were COVID 19 negative, did not develop any of the officially recognized prelude signs over the past 14 days, and were to respect official barrier/control measures during data collection. Data were entered in an electronic database with the support of EpiData and analyzed using the process of thematic analysis with the support of Atlas ti (Atlas.ti Scientific Software Development GmbH, Berlin, Germany). The need for a vaccine was among the least emphasized suggestions on the part of the participants who instead weighed more on education and sensitization in respect to control measures, provision of materials, economic incentive and making available an efficient cure at affordable cost without neglecting the potential of local traditional medicine.

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INTRODUCTION

Coronavirus disease 19 (COVID-19) is caused by a virus called novel coronavirus. COVID-19 is an emerging respiratory disease that was first detected in December 2019 in China [1]. SARS-CoV, human coronavirus NL63 (HCoV-NL63) and HCoV-HKU1 were first described in 2003, 2004 and 2005, respectively. Nevertheless, emerging of three new coronaviruses strains in human does not necessary explain surge in emerging infections by new coronaviruses. Only SARS-CoV has of recent been transmitted to the humans, while the other two been noticed within the human's population for quite some time. HCoV-HKU1 and HCoV-NL63 are respiratory coronaviruses, and have spread worldwide, and especially during the cold season [2]. Over the last decades, many new diseases burden have surfaced in various geographical regions, with pathogens such as Nipah, Zika, coronaviruses (CoVs) and Ebola in Sub-Sahara region. Coronavirus disease 19 (COVID-19) which is our focus in this study is caused by a virus called novel coronavirus. COVID-19 is a respiratory disease caused by a new coronavirus that presents pneumonia-like symptoms. Corona Virus Disease 2019 (COVID-19) is an RNA virus, with a typical crown-like appearance under an electron microscope due to the presence of glycoprotein spikes on its envelope. SARS-CoV-2, its viral structure and genome must be considered. Coronaviruses are

enveloped positive strand RNA viruses with the largest known RNA genomes 30–32kb with a 50-cap structure and 30-poly-A tail. Starting from the viral RNA, the synthesis of polyprotein 1a/1ab (pp1a/pp1ab) in the host is realized

Corona Virus-19 is transmitted by aerosols of respiratory secretions, by the fecal-oral route, and by mechanical transmission. Growth of viruses mostly occurs in epithelial cells. The liver, kidneys, heart, or eyes are most likely to be infected, as well as other cell types such as macrophages. In cold type respiratory infections, growth appears to be localized to the epithelium of the upper respiratory tract, but there is no adequate animal model for the human respiratory coronaviruses. The incubation period is about 2 - 4 days. Communicability: COVID-19 is transmitted human-to-human possibly during the presence of infectious droplets, which can cause infection through inhalation, or through contaminated surfaces. Humans are the reservoir of the virus with no vector [4]. The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, or sore throat. These symptoms are usually mild and begin gradually [5]. COVID-19 associated symptoms are fever, cough, expectoration, headache, and myalgia or fatigue [6]. The authors however cautioned that individuals with asymptomatic and atypical clinical manifestations were also identified recently, further adding to the complexity of disease transmission dynamics. Typical clinical manifestation may only express symptoms such as fatigue instead of the respiratory signs such as fever, cough, and sputum before resolving that in such cases, the clinician must be vigilant for the possible occurrence of asymptomatic and atypical clinical manifestations to avoid the possibility of missed diagnosis [2]. According to WHO (2020) [7], most people (about 80%) recover from the disease without needing special treatment, and for the majority especially for children and young adults' illness due to COVID-19 is generally minor. However, for some people it can cause serious illness. Around 1 in every 5 people who are infected with COVID-19 develops difficulty in breathing and requires hospital care. People who are aged over 60 years and people who have underlying medical conditions such as diabetes, heart disease, respiratory disease or hypertension are among those who are at greater risk of developing severe or critical illness if infected with the virus. The virus was identified in Wuhan, China, marking the beginning of its spread across the globe. Coronaviruses (CoV), so named for their "crown-like" appearance, are a large family of RNA viruses that infect mammals (including humans) and birds and include the viruses responsible for diseases like Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS) [8]. Although Coronavirus disease 2019 (COVID-19 is postulated to be of a zoonotic origin followed by human-to-human transmission, other routes of possible transmission such as food-born cannot be over emphasized. Regarding previously known human CoVs diseases, COVID-19 seems to be of less severe pathogenesis but greater transmission capacity. When compared to other emerging viruses such as Ebola virus, avian H7N9, SARS-CoV, or MERS-CoV, SARS-CoV-2 seems to show relatively low pathogenicity and moderate transmissibility. Study such as Codon usage suggests that this novel virus may have been originated from an animal source such as bats. Real-time PCR early diagnosis and next-generation sequencing has made it easier to identify the pathogen at its incubation periods. Since there has been no confirmed antiviral therapy or vaccine to treat or prevent SARS-CoV-2, potential therapeutic strategies that are currently being evaluated predominantly emanate from previous experience with treating SARS-CoV, MERS-CoV, and other emerging viral diseases [1]. To prevent infection and to slow transmission of COVID-19, the following should be done: wash your hands regularly with soap and water, or clean them with alcohol-based hand rub, maintain at least 1 meter distance between you and people coughing or sneezing, avoid touching your face, cover your mouth and nose when coughing or sneezing, stay home if you feel unwell, refrain from smoking and other activities that weaken the lungs and practice physical distancing by avoiding unnecessary travel and staying away from large groups of people [9]. The intensification of public health interventions is necessary to flatten the epidemic curve more [10]. The results of the SIR modelling seemed to underline the value of appropriate communication campaigns from the government and the importance of the population's compliance with the public health measures recommended limiting and stopping the spread of the coronavirus disease According to WHO, (2020) there is no specific treatment for disease caused by a novel coronavirus. However, many of the symptoms could be treated and therefore treatment is based on the patient's clinical condition. Moreover, supportive care for infected persons could be highly effective [7]. Antibiotics are not effective against viral infections such as COVID-19. Researchers are testing a variety of possible treatments. The FDA granted permission for some medications approved for other diseases to be used to treat severe COVID-19 when no other options are available. Two malaria drugs;

hydroxychloroquine and chloroquine and an antiviral drug, remdesivir, had been approved for this use [11]. The first official case of COVID-19 in Cameroon was on the 6th of March 2020. The number of cases has been growing stiffly and the cumulative epidemiological situation indicated 3285 confirmed cases, 152 deaths and 1738 recovery following the official report released on the 17 May 2020 by the Ministry of public health [12]. The political and economic capitals were the most affected. The same report revealed that 171 health personnel had been infected. As from the 8 June 2020, Cameroon was officially counting 8312 confirmed cases, thus indicating a stiff escalation in the spread of the epidemic. A longitudinal study entitled 'Simulating the progression of the COVID-19 disease in Cameroon using SIR models' investigated the evolution of COVID-19 in Cameroon over March 6 to April 2020 [10]. The results suggested that over the targeted period, the reproduction number of COVID-19 in Cameroon was about 1.5, and the peak of the infection was prospected to occur at the end of May 2020 with about 7.7% of the population infected. It was recommended that the number of deaths expressed as a percentage of the number of deaths on day 25 afafter the first reported COVID-19-related death allowed a direct comparison between countries, as they argued that the numbers of cases or deaths per 100,000 inhabitants gave severely biased comparisons between countries [13]. From their study, clear differences were observed between countries, associated with the timing of the implementation of containment measures. It was depicted that in most European countries, the early stages of the epidemic seemed to have a temporal development very similar to that in China. The curves flattened about 3 weeks after the implementation of strict barrier strategies, except for the Italian curve, which continued to follow, and possibly even exceeded the Chinese one before the situation was gradually gotten under control. The authors argued that a possible explanation could be that containment measures were taken too late in Italy which though the first European country to be affected, experienced a late awareness of the potential severity of the pandemic. In South Korea, the authors are of the opinion that early containment measures prevented the initial exponential development of the epidemic, which was seen in China and all European countries, and even USA. It was argued that for country level comparisons to be useful, they must be done using carefully controlled analysis considering confounders like population density [14]. The authors found following their retrospective longitudinal study that the initial rate of spread of COVID-19 across Western countries can be readily explained by their population-weighted density, but this factor does not appear to be as crucial for the spread of COVID-19 in East Asia and across many other countries. The same model trend, observed when controlling for country-level responses using the Hofstede cross-cultural measure of individualism, allowed a substantial proportion of the variance in the size of current COVID-19 epidemics across Western countries. The effectiveness of the prevention measures of COVID-19 still needs to be well established (total confinement being the best option) reason being that there is an increase in the number of cases regardless of a high knowledge attitude and practice score observed [15].

Theoretical background

It is important to prospect the possible relationship between the theoretical constructs of the study, which are the predictors and the outcome variables [18]. The conceptual framework is based on the Health Belief Model [6; 17] as presented on figure 1.

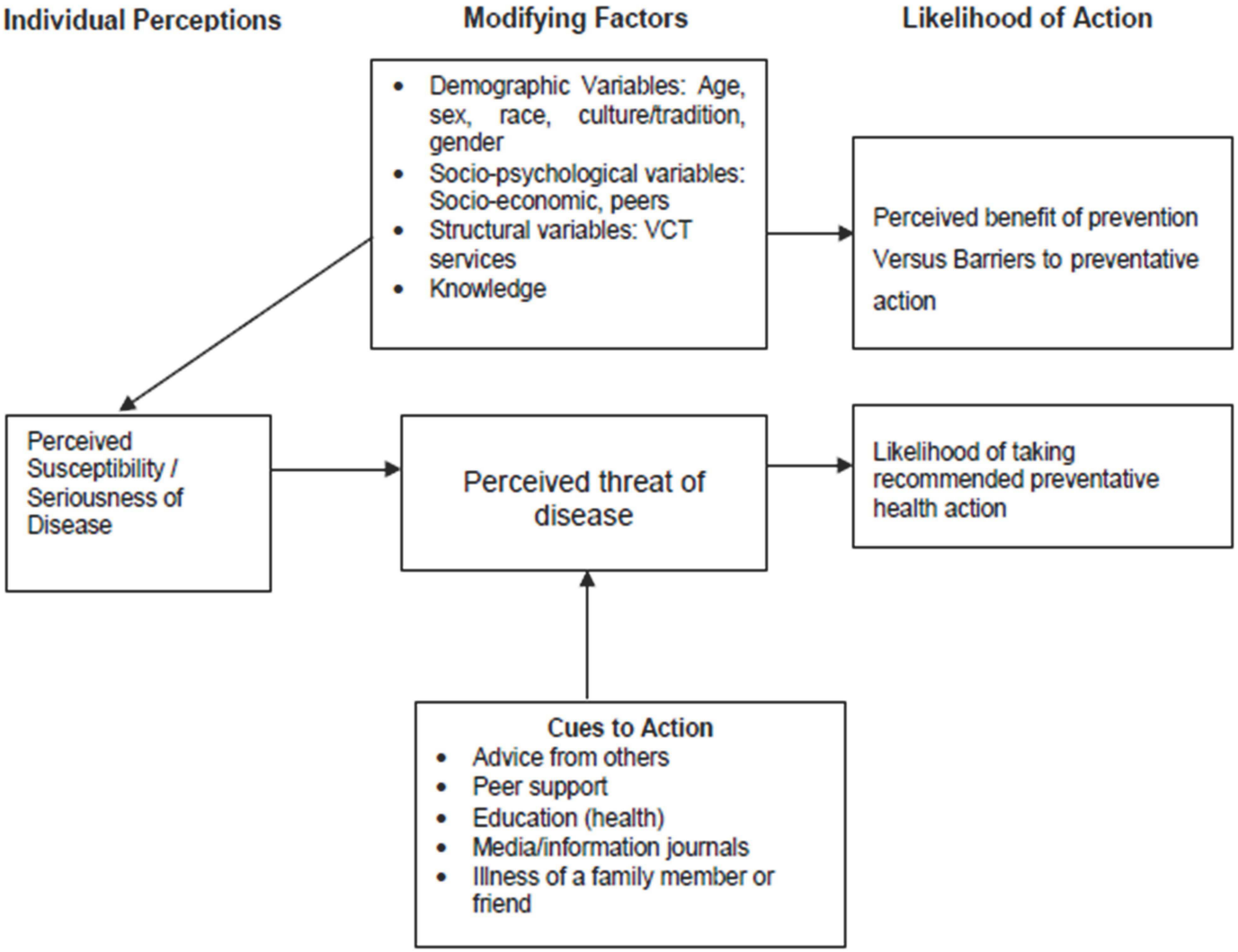

Figure 1: Conceptual Model of the HBM.

Health Belief Model is one of the most widely used models to understand health behaviours. In the context of our study, we intent to study the factors that determine knowledge, attitude and compliance to COVID 19 control measures. Health Belief Model (HBM) has been very useful in health promotion and disease prevention programs [17]. HBM focuses on individual beliefs and behaviours about a particular health policy or action, or condition. According to this model, 6 key constructs that determines an individual's health related behaviour are perceived susceptibility (perceived threat to health condition), perceived severity (belief of the consequence), perceived benefits (foreseen positive benefits of an action), perceived barriers to action, cues to action (exposure to factors that prompt action) and self-efficacy (ability to successfully carryout the action).

Methodology

Study design

The study employed a cross-sectional survey to appraise people's knowledge, attitude, and perception toward COVID-19 just for specific time without any follow up. An open-ended question was used in a concurrent inductive mixed-method approach whereby a positivism approach was employed using a representative sample of the population [16]. The study was guided by the HBM which has been very useful in health promotion and disease prevention programs [6; 17]. It is important to prospect the possible relationship between the theoretical constructs of the study, which are the predictors and the outcome variables [18].

Study area, participants, sample, and sampling technique

The study covered the national territory of Cameroon and was community-based survey. There is a high concentration of the population in the cities of Douala and Yaoundé. The North and West plateau have high population densities. With a life expectancy of 52 years, the population is composed of 43% young people under 15, and only 3.5% of people over 65 years [19]. At the institutional level, the health system is structured at three levels, namely: the central level, the intermediate level, and the peripheral level. It also has three sub-sectors: a public sub-sector, a private sub-sector and a traditional sub-sector that are all under the responsibility of the Ministry of Public Health (MOH), in accordance with Decree No. 2013/093 of 3 April 2013 on the organization of this institution. According to this document, the MOH is

responsible for the development and implementation of the Government's public health policy [20]. All valid people aged 16 and above who had been residing on the national territory of Cameroon at least 4 months as from the date of data collection were eligible. The probabilistically calculated sample size was 1176 participants. But a total of 1125 people were validated for the survey study following data clean up and exploratory statistics, making a return rate of 95.7%. Household participants were sampled conveniently. This meant that any eligible person who was willing to participate in the study was interviewed.

Measurements

Data were gathered using an open-ended question to explore people's suggestions to improve on the fight against COVID-19 disease in Cameroon.

Validity and Reliability of Instrument Construct validity was check by ensuring that the terminology used were appropriate and suited the study context. To ensure content validity, the interview guide was checked by three specialists in educational psychology. Generally, above 0.75, CVI is satisfactory [16] and in the context of this study, all the three experts validated the final instrument making a CVI of 1. During the Pilot study, the questionnaire was trial-tested using 30 participants from the North West region for the English version of questionnaire and 30 from the West region for the French version of the questionnaire. These two regions were not part of the sample. The pilot study equally helped to substantiate face validity.

Ethical consideration

Data were anonymous and participation was voluntary. It was a face-to-face interview whereby the interviewers agreed to be Corona negative, to not have developed any of the officially recognized prelude signs 14 days before, wore protective mask homologated by the Government of Cameroon, had their hand sanitizer, and kept social distance during the interview. If new official control/barrier measures arose, they were taken into consideration as data collection was going on. This data collection approach stemmed from the fact that the internet penetration rate in Cameroon was estimated to just 23.2% and it was much lower in rural areas [21], which made an online survey with a representative sample considering characteristics of the population difficult. The research protocol was validated by the Texila American University and the home-based supervisor attached to the School of Health Sciences Yaoundé before the beginning of data collection. It appeared that cumulatively 72.3% (814) of participants were satisfied or very satisfied with the respect of COVID-19 barrier measure by the data collector, 16.8% (189) mildly satisfied while just 2.8% (32) were not satisfied at all and 4.0% (45) did not make judgment. This trend indicated that barrier measures were well respected during the administration of the questionnaire and participants were generally satisfied with it. The necessary methodological technical requirements were abided to as to capitalize external validity.

Data management and analysis

These qualitative data were analyzed following the process of thematic analysis whereby ideas or viewpoint were grouped under umbrella terms or key concepts with the support of Atlas.Ti 5.2 software (Atlas.ti Scientific Software Development GmbH, Berlin, Germany). Precautions were taken to clearly determine the meaning of themes or umbrella term and what they stood for. In the context of this study, to satisfy this requirement, findings were organized in code-grounding-quotation tables whereby themes or codes were clearly explained or described, followed by their grounding or frequency of occurrence following the positivism principle, and at the same time backed by their related quotations. Though having a qualitative background but involved essentially an open-ended question and textual data, the theoretical perspective was dominantly quantitative in a concurrent-inductive theoretical consideration given that a representative sample was used, and the positivism principle applied. The code-quotation table ensures the objectivity and reliability of qualitative analysis in the sense that if code/concepts/umbrella terms and their descriptions can be subjective to relative error, the quotations are grounded and real as they are reported verbatim, expressing the original idea or viewpoint without any distortion or manipulation, thus helping in compensating for potential bias [16].

Findings

Table 1: Demographic characteristics of participants

Setting ty pe	Frequency	Percent
Urban	668	59.4
Rural	457	40.6
Age	Frequency	Percent
16-24	441	39.2
25-54	500	44.4
55-64	124	11.0
65+	60	5.3
Gender	Frequency	Percent
Male	568	50.5
Female	557	49.5
Religion	Frequency	Percent
Christian	825	73.3
Ancestority / African Traditional Religion (ATR)/ Kamitism Muslim	132 155	11.7 13.8
Others	13	1.2
Level of school attainment	Frequency	Percent
Never went to school	128	11.4
Primary	79	7.0
Secondary	457	40.6
Tertiary/University	461	41.0
Literacy	Frequency	Percent
Can read only or can read and write	976	86.8
Cannot read and cannot write	149	13.2
Marital status	Frequency	Percent
Married	346	30.8
Single	701	62.3
Divorced	16	1.4
Separated	20	1.8
Widowed	42	3.7
Principal occupation	Frequency	Percent
Farming	123	10.9
Hinting	6	.5
Craft work	14	1.2
Small trade	101	9.0
Business	60	5.3
Exploitation of natural resources (Artisanal Mining e.g., sand, stones; wood, NTFPs— Non-Timber Forest Products) Skilled worker (Engineer, lawyer, consultant, administrator, etc.) Semi/Unskilled Worker (technician, hairdresser, tailor/seamstress, etc.) Housewife	10 146 110 83	.9 13.0 9.8 7.4
Unemployed	442	39.3
Retired	30	2.7
Category of work	Frequency	Percent
Paid government employee	71	6.3
Paid employee from private employer	72	6.4
Self-employed	427	38.0
Retired	30	2.7
Unemployed	442	39.3
Housewife	83	7.4
Is living alone	Frequency	Percent
Yes	306	27.2
No	819	72.8

Have people under one's care	Frequency	Percent
Yes	637	56.6
No	488	43.4
Have a COVID-19 case in one's neighborhood Yes	Frequency 165	Percent 14.7
No	929	82.6
Don't know	31	2.8
Ability to finance health care for the family Not able at all & a bit able	Frequency 736	Percent 65.4
Fairly able	178	15.8
Able & very able	211	18.8
Ability to finance education for the family Not able at all & a bit able	Frequency 719	Percent 63.9
Fairly able	180	16.0
Able & very able	226	20.1
Ability to provide food for the family	Frequency	Percent
Not able at all & a bit able	644	57.2
Fairly able	209	18.6
Able & very able	272	24.2
Possession of assets	Frequency	Percent
Car	319	28.4
Motorcycle	326	29.0
Bike	216	19.2
TV	764	67.9
Land/Farm	714	63.5
Housing status Own house in which we live	Frequency 340	Percent 30.2
Rent	533	47.4
Help Own house somewhere else	183 69	16.3 6.1
Development Index / Livelihood status Below median (Low livelihood) Median and above (High livelihood)	Frequency 480 645	Percent 42.7 57.3

Setting type

Participants from both setting types were well represented with proportions of 59.4% (668) and 40.6% (457) for those from urban and rural area respectively.

Age

The mode age was 25-54 years with proportion of 44.4% (500), followed by those aged 16-24 years, 39.2% (441), 55-64 years, 11.0% (124), while the least represented were those aged 65 years and above with proportion of 5.3% (60). Cumulatively, 83.6% of participants were aged 54 years and below, thus indicating a young population.

Gender

Male and female were well represented in the sample whereby male were 50.5% (568) and female 49.5% (557), not too far from the national distribution as female are slightly more than male.

Religion

The mode was Christianity with proportion of 73.3% (825), followed by Islam 13.8% (155), 11.7% (132) practiced Ancestority / African Traditional Religion (ATR)/Kamitism while 1.2% (13) practiced other religious beliefs. All the main religions in Cameroon were represented and this was good for the representativeness of the sample.

Highest level of school attainment

The distribution was almost bimodal, Tertiary/University 41.0% (461) and secondary 40.6% (457), followed by those that never went to school 11.4% (128) while those that had attained primary education were 7.0% (79). All the levels were represented, and this was an asset for the representativeness of the sample. The low representation of those that have attained primary education could be justified by the fact that the study targeted those aged 16 years and above coupled with a high literacy rate in Cameroon.

Literacy

Those that could read only or could read and write were 86.8% (976) while those that could not read and could not write was 13.2% (149).

Marital status
The mode was the single with proportion of 62.3% (701), followed by the married 30.8% (346), the widowed 3.7% (42), the separated 1.8% (20) and the divorced 1.4% (16).

Principal occupation
The Mode was made of the unemployed 39.3% (442), followed by the skilled workers (Engineer, lawyer, consultant, administrator, etc.), 13.0% (146), farmers, 10.9% (123), the

Semi/Unskilled workers (technician, hairdresser, tailor/seamstress, etc.), 9.8% (110), small traders, 9.0% (101), housewife, 7.4% (83), business men and women, 5.3% (60), the retired were 2.7% (30), those involved in craft work 1.2% (14), while those doing hunting were 0.5% (6).

Category of work
The unemployed were 39.3% (442), self-employed 38.0% (427), paid employee from private employer 6.4% (72), paid government employee 6.3% (71), housewife 7.4% (83), then the retired 2.7% (30).

Is living alone
Those living alone were 27.2% (306) while those living with someone were 72.8% (819). This status was important to induce whether people were more epidemiologically aware when living with someone.

Have people under one's care
Those having people under care were 56.6% (637) and those that did not were 43.4% (488) This status was important to induce whether family responsibility could make people to be more careful with their life or health care specifically.

Have a COVID-19 case in one's neighborhood
Those that said to have had a COVID-19 case in their neighborhood were 14.7% (165). This indicator could give us an idea of the geographical epidemiological coverage of COVID-19 and induce how the experience of COVID-19 cases in the neighborhood could influence people's attitude and practice.

Livelihood
Ability to finance health care for the family Most participants were not able to finance health care 35.0% (394), 30.4% (342) were a bit able, 15.8% (178) 'fairly able', 14.8% (166) able while only 4.0% (45) said to be very able. Cumulatively, 65.4% (736) were either not able at all or a bit able, 15.8% (178) 'fairly able' and 18.8% (211) able or very able.

Ability to finance education for the family
Most participants were not able to finance education 36.7% (413), 27.2% (306) were a bit able, 16.0% (180) 'fairly able', 15.6% (175) able while only 4.5% (51) said to be very able. Cumulatively, 63.9% (719) were either not able at all or a bit able, 16.0% (180) 'fairly able' and 20.1% (226) able or very able.

Ability to provide food for the family
Most participants were not able to provide for food 28.6% (322), the same proportion 28.6% (322) were a bit able, 18.6% (209) 'fairly able', 17.6% (198) able while only 6.6% (74) said to be very able. Cumulatively, 57.2% were either not able at all or a bit able, 18.6% (209) 'fairly able' and 24.2% (272) able or very able.

Housing status
Most participants were renting 47.4% (533), 30.2% (340) owned the house in which they were living, 16.3% (183) were helped, while 6.1% (69) owned house somewhere else.

Possession of assets
Those that possessed a car were 28.4% (319), 29.0% (326) possessed a motorcycle, 19.2% (216) a bike, 67.9% (764) a TV (television) while 63.5% (714) possessed a land/farm.

Development Index
Majority fell above the societal living standard. The other good information from this distribution is that this variable has a good internal variability with enough cases in the two categories, thus making it suitable for modeling. This indicator was good to induced how living standard could influence knowledge, attitude, and practice towards COVID-19.

With respect to the demographic characteristics of the participants, it can be concluded that they were really diversified, which is an added value to the representativeness and validity of the data.

Population's suggestions to curb the spread of COVID-19 in Cameroon

Table 1: Thematic analysis depicting participants' suggestion to the government of Cameroon with respect to the fight against COVID-19

Code	Code description	Grounding		Quotations
		n	%	
Improving the livelihood of people*	Improving the livelihood of people by providing water, food, price reduction, financial support, etc.	477	42.4	*"Améliorer les conditions vie des Camerounais"* *"By giving money to the population"* *"Running water made available for all especially common man"; "Rendre l'eau et la lumière gratuit par exemple"*
Provision of control materials	Provision of materials such as face mask, soap, hand gel, buckets, handkerchief	394	35.0	*"Distribution gratuite des masques"* *"To provision of face mask to any individual and hand sanitizer"* *"Make efficient provision of face mask and sanitizers"*
Ensuring respect of control measures	The government to ensure the respect of control measures such as wearing of face mask, social distance, hand disinfection, avoiding crowding places, etc.	330	29.3	*"Veiller au respect des mesures barrières"* *"Tous les Camerounais doivent suivre les instructions"* *"Avoiding crowding places"* *"The government should ensure that individuals take precaution"*
Confinement	Confinement, restricting travelling	299	26.6	*"Arrêter les voyages"* *"Interdire les voyages interurbains"* *"Total confinement with food provided to the population"*
Cheaper good	reducing the price of common commodities, providing food, financial support	292	26.0	*"Baisser les prix de produits de premières nécessitées"* *"Le gouvernement baisse le prix des marchandises et des médicaments"* *"Reduce price on the market"*
Helping people	Helping the population in various ways, such as food, finance and others means of subsistence	260	23.1	*"Venir en aide à la population en ce moment difficile"* *"Total confinement with food provided to the population"* *"Approvisionner les ménages afin que tout le monde reste chez soi"*
Valorizing African Traditional Medicine	The government to valorize African Traditional Medicine in the treatment of COVID-19, subsidize it	245	21.8	*"Accorder plus de moyen tradipracticiens"* *"Valoriser la médecine traditionnelle Africaine"* *"Full integration of African traditional medicine"* *"Traiter les 30 million d'habitants au médicament Cléda"*
Affordable treatment	Making treatment and test affordable to the population	210	18.7	*"Baisser le prix de l'examen"* *"treatment more affordable"* *"Réduire les coûts de traitement"*
Sensitization	Sensitizing the population on the diseases, control measures and treatment, for them to be conscientious about the disease	202	18.0	*"Sensibiliser" ; organiser les meetings de causerie éducative"* *"Door-to-door campaign"* *"d'éveiller une prise de conscience massive "* *"Community health workers should sensitize the community"*

Banning public events	Banning public events like meetings, church, markets, drinking parlors, etc.	186	16.5	*"Ban all public events " "Ban all social gathering" "Bars and markets should be closed" "Fermeture des lieux ou plusieurs personnes se regroupent"*
Adequate treatment centers	Providing adequately equipped treatment centers	160	14.2	*"Accès possible aux soins médicaux" "Améliorer des équipements dans des hôpitaux" "Création de centre de traitement approprié"*
COVID-19 test	More COVID-19 test should be done	126	11.2	*"Faire beaucoup de test de dépistage" "Test systématique de la population" "Provide rapid testing and carrying out massive screening"*
Financial support	Providing financial support to the population	125	11.1	*"Apport d'un appui financier à la population" ; "Provide financial assistance to the population"*
Closing borders	Avoiding migrants or those from foreign countries, closing borders	123	10.9	*"Avoid crowding and migration of people" "Il doit fermer les frontières jusqu'à ce que l'épidémie finisse"*
Adequate care	Adequate treatment of infected persons, free and quick access to health care	120	10.7	*"Avoir un accès rapide aux soins médicaux en cas d'infection" "Avoir un libre accès aux soins médicaux rapide" "Avoir un libre accès aux soins"*
Proper management of funds	Proper management of funds allocated for COVID 19, proper follow up and audit	120	10.7	*"Utilisation rationnelle des fonds alloués aux mesures" ; "Verifier que ces fonds soient bien utilisés" "Stop embelzelment of funds" "Tous les arrondissements n'ont pas reçu l'aide du gouvernement"*
Environmental hygiene	Sensitizing on environmental hygiene and sanitation	85	7.6	*"Apprendre les règles d'hygiène concernant le COVID 19" "desinfection de l'environnement" "Keep environment clean"*
Free treatment	Providing treatment for free to the population	84	7.5	*"Treat the covid 19 patients freely" "Traitement gratuit"; "Provide free treatment to infected persons"*
Reliable statistics	The government to provide reliable and updated statistics	80	7.1	*"Update statistics" "Afficher les vraies chiffres" "Continuously giving statistics on the development of covid 19"*
Paying attention to remote areas	Paying attention to remote areas such as rural setting and enclave localities	63	5.6	*"Accès d'eau dans les coins reculés" "Appui important au personnel de santé dans les villages" "Encourage people in the rural area "*
Training of actors	Training of health personnel, community workers, and other actors	63	5.6	*"formations politiques qui eux aussi se mobilisent" ; "Former des agents communicateurs" ; "Former les infirmières à travers les séminaires"; "Former les jeunes dynamiques pour sensibiliser la population"*
Helping the vulnerable	Helping the vulnerable people, that is the poor, old, the handicaps, pregnant women and the sick	60	5.3	*"Venir en aide aux populations les plus vulnérables"; "To share face mask to underprivileged people in town"; "Aider les personnes agées et les pauvres à respecter": "Aider les pauvres"*

Provision of water	Provision of water for public consumption	60	5.3	*"Accès d'eau dans les coins reculés" "l'eau potable"; "Running water made available for all especially common man"*
Sustained effort	Sustaining efforts for the fight against COVID-19	60	5.3	*"Continue the fight against the COVID 19"; "Continuer à lutter contre le COVID 19"; "Continuer à oeuvrer pour lutter contre le COVID 19" "Put more effort in"*
Adequate information	Providing adequate or more precise information on COVID-19	56	5.0	*"Apporter plus de précisions sur cette pandémie" ; "Arrêter de mentir ou de tromper les Camerounais" "Avoir un éclaircir sur les suspicions de contaminations" ; "Stop politics in Covid 19"; "Stop lies and misleading "*
Adequate funding	Adequate funding for the fight against COVID-19	56	5.0	*"Debloquer des fonds pour achat du materiel necessaire" "Mettre des fonds pour la lutte contre cette pandemie" "Disposer des fonds necessaires pour le traitement"*
Definite cure	Finding a definite solution or cure against COVID-19	54	4.8	*"Trouver une solution définitive pour radier cette maladie" "Trouver un traitement contre le covid" "Keep on putting research for the cure "*
Motivating the actors	Motivating health personnel and all those involved in the fight against COVID-19	54	4.8	*"Augmenter le budget des gens qui luttent contre" "Courage aux personnels de santé qui luttent contre ça" "Encourager les efforts de la médecine traditionnelle" "Encouraging community health wrokers for their work"*
Compulsory test	Compulsory test for citizens	42	3.7	*"Dépistage obligatoire" "General test of the whole population" "Le gouvernement devrait faire tester tout le monde"*
Research	More research to handle the pandemic	39	3.5	*"Keep on putting research for the cure" "Concentrate on the research for a treatment"; "Faire des recherches sur le traitement"*
Repressive measures against defaulters	The government to track and undertake repressive measures against defaulters (no-respect of control measures)	30	2.7	*"Amend those who are caught not having mask"; "Enforcing measures like obligation to wear mask and punish defaulters" " Punir les contrevenants aux mesures barrières"*
Quarantine	The quarantine of infected people, the provision of adequate quarantine centers	30	2.7	*"Veiller à la mise en quarantaine des personnes qui sont " ; "Trouver des centres adéquats pour l'isolement" "Que le gouvernement mette toutes les infectées en quarantaine"*
Reassuring people	Reassuring people and reducing fear as to make them more confident	19	1.7	*"Amener les populations à moins douter d'eux" ; "Inviter la population à être patiente" "The government should encourage the population "*

Avoiding fund raising dishonesty	Avoiding fund raising dishonesty, not taking advantage of the pandemic to extort money from people and stakeholders	17	1.5	*"Ne pas utiliser cette pandémie comme un business". "Ne pas utiliser la situation pour extirper de l'argent" "Penser à l'intérêt générale que de songer à se remplir"*
Local production materials	Local massive productions of mask, hand sanitizers, chloroquine	17	1.5	*"Production abondante des masques" "Augmenter la production de la chloroquine sur tout" "Augmentation de la production des gels hydroalcolique"*
Providing thermo flash	Providing thermos-flash to all health facilities and public places	9	0.8	*"Tous les centres de santé doivent avoir des thermo flash" "Distribuer les thermo-flash dans chaque région"*
Revisiting health policy	The whole health policy for the management of COVID-19 must be revisited	6	0.5	*"Tout est à faire" "Améliorer le system de santé"*
Financing research	Financing research on COVID-19	6	0.5	*"Financer la recherche du vaccin et du traitement de la Financer l'aide à la recherche médicale" "Intensifier l'investissement sur la recherche médicale"*
Authentification of test	Authentication of tests to be sure that they are accurate and fair	5	0.4	*"Authentifier les appareils prévus pour la maladie" "Ensure proper testing"*
Organizing the traditional sector	Organizing and empowering traditional practitioners	5	0.4	*"Organiser les séminaires des guérisseurs traditionnels" "Le gouvernement doit accompagner la médecine tradition"*
Fake news	Fake news, the perception that the disease does not exist	3	0.3	*"La maladie n'existe pas" "parce que le virus n'existe pas"*
Research for vaccine	Research for a vaccine	3	0.3	*"Effort à la recherche du vaccin" "recherche plus rapide du vaccin"*
Financial support to industries	Subsidies or financial assistance to home industries	3	0.3	*"Subsidie or financial assistance to home industries" "Mettre des fonds à la disposition du secteur privé"*
Being closer to the people	Being closer to the people, showing concern for their welfare	2	0.2	*"Venir aux populations"*
Treatment in all health centers	Making provision for the treatment of COVID-19 in all health centers	2	0.2	*"Treatment of COVID in all health centres in the country" "Equipment de tous les centres sanitaires"*
No favoritism	Stop favoring some people during health care	2	0.2	*"Arrêter le favoritisme lors des traitements de cas"*
Population survey	Population survey to identify the vulnerable groups and those more affected by confinement	2	0.2	*"Faire un recensement pour identifier ceux les plus touchées par le confinement"*

Oxygen supply equipment	Providing more oxygen supply equipment	1	0.1	*"Oxygen cans"*
More classrooms	Building more classrooms to adhere to social distance	1	0.1	*"Construire des salles de classes pour mieux respecter"*
Killing the infected	Killing all those infected by COVID-19	1	0.1	*"Tuer toutes les personnes infectées du COVID 19"*
Prayers	Prayers to God or supreme beings	1	0.1	*"Any suggestion is that let the government go for god in prayer"*
Financial support to African Traditional Medicine	Financial support to African Traditional Medicine	1	0.1	*"Encourager et subventionner le traitement du Monseigneur"*

Participants made number of suggestions to the Government of Cameroon with respect to the fight against COVID-19, ranging from: Improving the livelihood of people by providing water, food, price reduction for basic commodities, financial support, etc.; provisions of materials such as face mask, soap, hand gel, buckets, handkerchief; the government to ensure the respect of control measures such as wearing of face mask, social distance, hand disinfection, avoiding crowding places, confinement, restricting travelling and others; the government to valorize African Traditional Medicine in the treatment of COVID-19, subsidize it; making treatment and test affordable to the population; sensitizing the population on the diseases, control measures and treatment so that they should be conscientious about the disease; banning public events like meetings, church, markets, drinking parlors, etc.; providing adequately equipped treatment centers; more COVID-19 test should be done; providing financial support to the population; avoiding migrants or those from foreign countries, closing borders; adequate treatment of infected persons, free and quick access to health care; proper management of funds allocated for COVID-19, proper follow up and audit; sensitizing on environmental hygiene and sanitation; providing treatment for free to the population; the Government should provide reliable and updated statistics; paying attention to remote areas such as rural setting and enclave localities; training of health personnel, community workers, and other actors; helping the vulnerable people, that is the poor, old, the handicaps, pregnant women and the sick; provision of water for public consumption; sustaining efforts for the fight against COVID-19; providing adequate or more precise information on COVID-19; adequate funding for the fight against COVID-19; finding a definite solution or cure against COVID-19; motivating health personnel and all those involved in the fight against COVID-19; compulsory test for citizens; more research to handle the pandemic; the quarantine of infected people, the provision of adequate quarantine centers; the Government to track and undertake repressive measures against defaulters, those that do not respect official control measures; reassuring people and reducing fear as to make them more confident; avoiding fund raising dishonesty, not taking advantage of the pandemic to extort money from people and stakeholders; local massive productions of mask, hand sanitizers, chloroquine; providing thermo flash to all health facilities and public places; the whole health policy for the management of COVID-19 has to be revisited; financing research on COVID-19; authentication of tests to be sure that they are accurate and fair; organizing and empowering traditional practitioners; preventing fake news, the perception that the disease does not exist; research for a vaccine for COVID-19; subsidies or financial assistance to home industries; being closer to the people, showing concern for their welfare; making provision for the treatment of COVID-19 in all health centers; stop favoring some people during health care; population survey to identify the vulnerable groups and those more affected by confinement; providing more oxygen supply equipment; building more classrooms to adhere to social distance; Killing all those infected by COVID-19; prayers to God or supreme beings, and financial support to African Traditional Medicine. It clearly appeared that participants laid emphasizes on the intensification of public health intervention, thus supporting the other scholars who at the onset of the pandemic stressed the importance of the population's compliance with the public health measures recommended to limit and stop the spread of the coronavirus disease at least, while waiting for possible preventive and/or curative treatments to be found [10]. These authors equally placed special attention on the intensification of public health

intervention. In the same vein, in the Uganda context found that there was a lack of knowledge, attitudes, and practice among a certain group of population (driver and security agents) and urged for special attention to be paid to this group of people

These authors equally emphasized on mobilization and sensitization using among others health personnel, media, and community workers, thus supporting the findings of this study. The problematic of communication was also highlighted by other researchers [23] who in the context of Saudi Arabia urged for increased access to internet and social media as well as television but in the context of this study, internet was less emphasized. The need for finding an effective vaccine and the best practice for the management and treatment of symptomatic cases was earlier highlighted [24]. Though the need for vaccine was suggested in this study, it was among the least emphasized recommendations from the participants.

General conclusion

To consolidate the drop in the number of cases of COVID-19, there is need for more public health intervention, notably sensitization on the respect of barrier measures, making treatment more affordable and economic incentives. Some local traditional medicines were reported to be efficient in the treatment of COVID-19 and this could have prompted the participants to urge the government to support this branch of medicine. The need for a vaccine was among the least emphasized suggestions on the part of the participants who instead weighed more for education and sensitization on the respect of control measures, provision of materials, economic incentive and making available an efficient cure at affordable cost without neglecting the potential of local traditional medicine. Based on the findings, the following recommendations were made: (i) Sustaining education and sensitization on the respect of control measures using mainly television, radio, and health personnel; (ii) Making available treatment and test at affordable cost; (iii) enhancing the potential of traditional medicine to fight against COVID-19. Limitation to this study could be explained by the fact that it was a cross-sectional study in a context were COVID-19 pandemic continued to be a major public health concerned, and population attitude and response measures keep changing.

Contribution to Knowledge

Concurrent inductive mixed-method approach was employed with a positivism approach using a representative sample of the population to explore qualitative textual data. This approach helps in capturing a representative perception of the population on a given issue using unstructured questions, thus contrasting with the general usage of nominal samples for qualitative studies. In this context, it inferred not inducing in a qualitative background study or theoretical perspective [16].

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Conflict of interest

There is no conflict of interest. This work has no prior financial engagement warranting a conflict of interest.

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