

COVID-19 : Prevention and control measures in Cameroon

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Abstract

On January 30, 2020, the WHO declared the COVID-19 outbreak a public health emergency of international concern and, in March 2020, began to characterize it as a pandemic in order to emphasize the gravity of the situation and urge all countries to take action in detecting infection and preventing spread. Unfortunately, there is no medication that has been approved by the FDA, gone through controlled studies and demonstrated an effect on the virus for this global pandemic. Although there are cures for illnesses and developments made by leaps and bounds in our day, the strongest and most effective weapon that society has against this virus is the prevention of its spread. The main points in preventing the spread in society are hand hygiene, social distancing, and quarantine. With increased testing capacity, detecting more COVID-19 positive patients in the community will also enable the reduction of secondary cases with stricter quarantine rules. Treatment with the use of plant extracts and vaccination are also control measures that are implemented in Cameroon. This review will focus on the prevention and control measures applied in Cameroon to combat the spread of the pandemic.

Key words : COVID-19, Cameroon

Résumé

Le 30 janvier 2020, l'OMS a déclaré l'épidémie de COVID-19 une urgence de santé publique de portée internationale et, en mars 2020, a commencé à la qualifier de pandémie afin de souligner la gravité de la situation et d'exhorter tous les pays à agir dans la détection de l'infection et la prévention de la propagation. Malheureusement, aucun médicament n'a été approuvé par la FDA, n'a fait l'objet d'études contrôlées et n'a démontré d'effet sur le virus pour cette pandémie mondiale. Bien qu'il existe des remèdes contre les maladies et des progrès réalisés à pas de géant de nos jours, l'arme la plus puissante et la plus efficace dont dispose la société contre ce virus est la prévention de sa propagation. Les principaux points de prévention de la propagation dans la société sont l'hygiène des mains, la distanciation sociale et la quarantaine. Avec une capacité de test accrue, la détection d'un plus grand nombre de patients positifs au COVID-19 dans la communauté permettra également de réduire les cas secondaires avec des règles de quarantaine plus strictes. Le traitement avec l'utilisation d'extraits de plantes et la vaccination sont également des mesures de contrôle qui sont mises en œuvre au Cameroun. Cette revue portera sur les mesures de prévention et de lutte appliquées au Cameroun pour lutter contre la propagation de la pandémie.

Mots clés : COVID-19, Cameroun

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1. Introduction

There is no medication that has been approved by the FDA, gone through controlled studies and demonstrated an effect on the virus for this global pandemic. Although there are cures for illnesses and developments made by leaps and bounds in our day, the strongest and most effective weapon that society has against this virus is the prevention of its spread. The interim guidance published by the WHO on 7 March 2020, "Responding to community spread of COVID-19," states that preventing COVID-19 from spreading is through the development of coordination mechanisms not just in health but in areas such as transportation, travel, commerce, finance, security and other sectors which encompasses the entirety of society (WHO., 2020a)

Preventive measures are the current strategy to limit the spread of cases. Hand hygiene, early screening, diagnosis, isolation and treatment are necessary to prevent further spread.

Review of the different prevention and control measures applied in Cameroon to combat the spread of the pandemic

It was imperative for the Cameroon Government to implement difficult but necessary measures to ensure the protection of everyone and to limit the spread of this pandemic. On the instructions of the Head of State, **His Excellency Paul BIYA**, an inter-ministerial consultation was held this Tuesday, 17 March 2020 (Cameroon Government's Response Strategy to the COVID-19 Pandemic (2020).), to assess the situation and identify appropriate actions to be implemented. The outcome of the consultations was the implementation, by the Cameroon government, of several different containment measures. These included hand hygiene, social distancing, travel restrictions on visitors arriving from high-risk counties, quarantine for nationals returning from high-risk locations, and closure of schools and certain types of workplaces.

Hand and respiratory hygiene

There are posters and brochures prepared by many organizations on all issues related to

protection from COVID-19 and were widely used all over Cameroon and the world. The Government of Cameroon also used visual tools such as videos and posters from the WHO and other similar health organizations, to demonstrate to the population, the correct application of hand hygiene. These posters, distributed throughout different parts of society to draw maximum attention to the importance of hand hygiene, created awareness among all of them. Whereas posters were available to a large majority of the population, visual tools were only accessible to people with television sets and android phones. However, with the increase in the number of people carrying hand sanitizer with them for the application of instant hand hygiene and the spread of mask usage among people in Cameroon, the pandemic has been brought under control. Unfortunately, with relaxation in the application of control measures, the disease may witness an exponential rise in incidence.

Social distancing

As diseases transmitted by respiratory droplets require a certain proximity of people, social distancing of persons will reduce transmission. Social distancing is particularly useful in settings where community transmission is believed to have occurred, but where the linkages between cases is unclear, and where restrictions placed only on persons known to have been exposed is considered insufficient to prevent further transmission. The Cameroon Government urged people to avoid crowds and close contact with ill individuals, if possible, by practicing social distancing of at least 1m designed to reduce interactions between people in a broader community, in which individuals may be infectious but have not yet been identified hence not yet isolated (Wilder-Smith and Freedman., 2020). All residents were required to wear facemasks. Also, gatherings of more than fifty (50) persons were prohibited throughout the national territory. Under the supervision of administrative authorities, bars, restaurants, and entertainment spots were systematically closed from 6 p.m. Urban and inter-urban travels were only undertaken in cases of extreme necessity, Drivers of buses, taxis and motorbikes were urged to avoid

overloading: Public transport, including taxis, buses, and motorbikes, were restricted from taking on more passengers than they have seats. Law enforcement officers ensured compliance by the population. Private health facilities, hotels and other lodging facilities, vehicles and specific equipment necessary for the implementation of the COVID-19 pandemic response plan in Cameroon could be requisitioned as required, by competent authorities; public administrations gave preference to electronic communications and digital tools for meetings likely to bring together more than ten (10) people, missions abroad of members of Government and public and para-public sector employees were suspended (Prime Ministry). Despite all these measures, there was a disregard of the temporary ban on public gatherings.

Examples for social distancing practiced in Cameroon include:

Closure of schools but assurance of continuity of education

All public and private training establishments of the various levels of education, from nursery school to higher education, including vocational training centres and professional schools, were closed, school and university competitions, like the FENASSCO and University games were indefinitely postponed.

The government and other education stakeholders responded to the pandemic with the objective to ensure education continuity (Beche, 2020). This response consisted in setting up various distance learning platforms on radio, TV, and online. These platforms included CRTV radio and TV learning (L'École à la radio and L'École à la télévision), broadcasting lessons in both English and French to facilitate learning from home. The Ministry of Secondary Education additionally set up a unique online learning platform providing lessons to children in secondary (UNESCO, 2020). Other education stakeholders such as educational institutions (including public and private schools), IT companies, NGOs and private individuals set up different distance learning initiatives to ensure learning continuity (Beche, 2020).

Huawei for example deployed the platform "Learn On" in May 2020, to ensure the continuation of its certification programs in Cameroon (Huawei E-learning platform, 2020): another private initiative

While the world was already leaning towards digital learning and virtual education as a supplement for traditional forms of learning, the COVID-19 pandemic revealed the need for structured and suitable systems of distance learning facilitated by digital tools and technology. Cameroon's distance learning response comprising of institutional and individual initiatives, online and offline platforms has been described as "a patchwork combination of institutional and individual initiatives, learning management systems and information and communication tools" (Essissima, 2020, Beche, 2020). Although the government's immediate reaction in setting up initiatives such as School on TV was initially praised, it received mixed reactions by the conclusion of the first phase which focused specifically on examination classes. Reactions from students, teachers, and education stakeholders pointed to lack of preparedness and readiness by all stakeholders including the government and private education providers as well as the students themselves (Beche, 2020). Cameroon government's education response mirrored the response of other sub-Saharan African countries that have been generally considered to be unprepared for distance learning solutions (Haji et al, 2017). The approaches employed witnessed the shortfall of limited and difficult accessibility characterized by slow internet connectivity, frequent power failures, lack of sufficient radio and TV coverage, further exacerbated in rural enclaves. This raises the question of preparedness for unforeseen situations of such a magnitude as the COVID-19 pandemic and the global trend moving towards virtual learning methods in addition to traditional learning methods.

Quarantine

Quarantine is one of the oldest and most effective tools of controlling communicable disease outbreaks. This public health practice was used widely in fourteenth century in Italy,

when ships arriving at the Venice port, plague-infected ports had to anchor and wait for 40 days before disembarking their surviving passengers. The quarantine of persons is the restriction of activities of or the separation of persons who are not ill but who may be exposed to an infectious agent or disease, with the objective of monitoring their symptoms and ensuring the early detection of cases. Quarantine is different from isolation, which is the separation of ill or infected persons from others to prevent the spread of infection or contamination.

Looking at the available studies in the literature, quarantine is the most effective method in reducing both the number of infected and dead (Pan et al., 2020; Iwasaki et al., 2020). Quarantine can reduce the number of infected at rates from 81% to 44%, and in the number of dead from 61% to 31% (Nussbaumer-Streit et al., 2020).

The WHO recommends that contacts of patients with laboratory-confirmed COVID-19 be quarantined for 14 days from the last time they were exposed to the patient (WHO, 2020b). For the purpose of implementing quarantine, a contact is a person who is involved in any of the following from 2 days before and up to 14 days after the onset of symptoms in the patient:

Having face-to-face contact with a COVID-19 patient within 1 meter and for >15 min, providing direct care for patients with COVID-19 disease without using proper personal protective equipment, staying in the same close environment as a COVID-19 patient (including sharing a workplace, classroom or household or being at the same gathering) for any amount of time, travelling in proximity with (that is, within 1 m separation from) a COVID-19 patient in any kind of conveyance.

The lack of facilities for quarantine, changes in social behavior and practices to adopt quarantine were found to be difficult coupled with financial vulnerability and fear of stigma.

Cleaning and disinfection

The Government of Cameroon allocated COVID relief funds to the different ministries

and this permitted public places such as airports, schools and hotels to be disinfected daily with regular household disinfectant containing a diluted bleach solution (that is, 1-part bleach to 99 parts water). For high-touch surfaces that cannot be cleaned with bleach, 70% ethanol was used. Toilets and bathrooms were cleaned and disinfected with a diluted bleach solution (one-part bleach to 9 parts water to make a 0.5% sodium hypochlorite solution). This action witnessed drawbacks from the notion of environmental pollution and health concerns.

Increasing testing capacity

Another important point in preventing the spread of the disease throughout society is to increase the number of tests and thus pinpoint more cases, isolate them, and trace those who have been in contact. For this reason, increasing laboratories' test capacity and developing new testing strategies are of utmost importance. Different methods such as rapid-testing kits.

A free-of -charge nationwide COVID-19 screening campaign was launched in Cameroon with the aim of flattening the curve of the pandemic in the country. In addition to health centers and research laboratories, mobile screening sites were set up with the support of administrative authorities and the locations were selected based on two criteria: epidemiological situation and population density. Mobile teams were seen in market squares, schools, churches and other public places. The teams were divided into four groups as sensitization, counseling, sample collection and testing (Ministry of Health 2020). Major challenges here were delays in sample collection and delivery, testing and test result dispatching due to inadequate well-trained human capital, lack of well-equipped health infrastructure coupled with logistics constraints and lack of data coverage, stemming from weak statistical capacity.

International Travel Restrictions

Land and sea borders were closed to international travel. However, freight transport via land and sea routes continued, subject to increased screening. Air borders remain largely

closed, but authorities permitted several flights via Douala International Airport (DLA) and Yaounde Nsimalen International Airport (NSI). Several carriers, including Air France (AF), Ethiopian Airlines (ET), and Brussels Airlines (SN), maintained routes to Cameroon.

All persons traveling to Cameroon were aublaged to present a negative result from a PCR test taken no more than 72 hours before their flight. Individuals also underwent rapid diagnostic testing upon arrival. Passengers who were Cameroonian nationals or residents, and those with visas, were allowed to enter the country. Authorities offered visas on a case-by-case basis for essential purposes (e.g., marriage, bereavement, family illness, etc.) Travelers without test documentation, those who display symptoms, or those who test positive for COVID-19 faced a 14-day quarantine period at home or a government-approved hotel. Authorities required all outbound passengers to present a negative PCR or rapid flow test result dated within 72 hours of departure.

Authorities could reimpose, extend, further ease, or otherwise amend any restrictions with little-to-no notice depending on disease activity over the coming weeks (Crisis24 (2021). The measures were however compounded by the presence of porous borders, illiteracy, and weak health systems.

Binding measures also include the commutation and remission of prison sentences by a Presidential decree of 15 April 2020 based on article 8 (7) of the Constitution.

Treatment of COVID 19

Several treatment protocols including the Chloroquine-based treatment suggested by Professor Didier Raoult (Colson et al., 2020) are being tested with varying degree of effectiveness. However, since the outbreak of this disease, ethnobotanical and ethnopharmacological research geared at bringing the potentials of traditional medical knowledge into the debate over the management of this disease has been lacking. Yet Cameroon is a biologically diverse country. This country is located in Central Africa, in the heart of the Congo Basin, the world's second largest rainforest after the Amazon. Its floristic

potential scores more than 7850 plant species recorded at the national herbarium. This ranks Cameroon among the countries with the highest levels of biodiversity in Africa. Despite the inaccuracy of statistics, medicinal plants are important elements of health care services. However, access to such plants has so far been largely through traditional healers and herbal markets which are part of an informal economy.

Cameroonian medicinal plant species emerge as promising sources of ingredients for the fight against the 2019 novel corona virus. About 32 plant species have been found to contain secondary metabolites that have already been confirmed as anti-COVID-19 molecules. These are *Abelmoschus esculentus*, *Acacia Senegal*, *Allium sativum*, *Bryophyllum pinnatum*, *Camellia sinensis*, *Capsicum annum*, *Cissus quadrangularis*, *Citrus spp*, *Cola acuminata*, *C. anomala*, *C. nitida*, *Combretum glutinosum*, *Curcuma longa*, *Echinops giganteus*, *Khaya grandifoliola*, *Kigelia Africana*, *Laportea aestuans*, *Morinda morindoides*, *Occhthocosmus africanus*, *Parkia biglobosa*, *Phyllanthus spp*, *Rauwolfia sp.*, *Senna alata*, *Solanum melongena*, *Solanum torvum*, *Tephrosia preussii*, *Terminalia catappa*, *Terminalia ivorensis*, *Zanthoxylum heitzii* and *Zingiber officinale* Fongnzossie, (2021)

The Principal component analysis (PCA) separated 4 groups of medicinal plant species.

The first group consists of plants treating at least three symptoms of COVID 19, containing key phytochemicals reported as being of interest for COVID management (alkaloids, phenolics, tannins and terpenoids) and having antimalaria properties. Representative species include *Abelmoschus esculentus*, *Artemisia annua*, *Capsicum annum*, *Curcuma longa*, *Eucalyptus camaldulensis*, *Eremomastax speciosa*, *Kalenchoe crenata*, *Lippia multiflora*, *Morinda lucida*, *Senna alata*, *Solanum torvum*, etc.

The second group consists of highly promising species like *Azadirachta indica*, *Harungana madagascariensis*, *Mangifera indica*, *Momordica charantia*, *Picralima nitida*, *Trichilia emetica*. This consists of plants used to treat COVID-19 symptoms which, at the same time are sources of the key phytochemicals and also have

relevant pharmacological activities (antiviral, anti-inflammatory, immunostimulant, or containing secondary metabolites with confirmed anti-SARSCOV2 activity). Even when used alone, they can be evaluated and developed as potential remedies, while the other species may be used in association to each other for their complementary effects.

The third group consists of potential anti-malaria agents based on the species *Allium sativum*, *Psidium guajava*, *Phyllanthus muellerianus*, *Occimum gratissimum*, *Stereospermom acuminatissimum*, etc.

The fourth group consists of immunostimulants, anti-inflammatory, antiviral agents and plants containing some secondary metabolites with confirmed anti-COVID-19 properties, with representative species like *Moringa oleifera*, *Panda oleosa*, *Tapinanthus globuliferus*, *Zanthoxylum beitzii*, and *Vernonia amygdalina*.

Overall, the recorded medicinal plant species offers an array of possibility of using individual species or combinations of species for their complementary effects, based on the clinical symptoms showed by the patients and the therapeutic objective to be achieved.

A Catholic archbishop, Kleda of Douala diocese, in has developed two plant-based remedies for COVID 19 which are given free to those who test positive for the respiratory disease. The Archbishop has declined to give the composition of the two products, called 'Elixir Covid' and 'Adsak Covid'. The WHO has said plant-based therapies touted as possible treatments must be tested for efficacy and side effects, and has urged caution over misinformation, especially on social media, about the effectiveness of certain remedies.

Despite the WHO's cautions, so-called natural cures are already widely distributed in Cameroon.

Apart from the Catholic archbishop, Kleda of Douala diocese who used 'Elixir Covid' (from *Trichilia emetica* « *Mafura* » and Adsak Covid (A variety of *Aloe vera*), other herbalist such as Euloge Yiagnigni Mfopou, a cardiologist and researcher, presented the new package of

'Corocur': a powder of *Thymus vulgaris*, Soudicov Plus (antibiotic & antimalaria) of Imam Modibo, Palubek's (antimalaria powder) of Madame Christine Bekone (native doctor) are prominent herbal remedies.

COVID-19 treatment is still solely based on clinical management through supportive care. In addition, WHO has neither approved the chemical protocol nor any of the different herbal remedies because the mechanism of action is unknown.

Use of vaccines to prevent COVID in Cameroon

The list of WHO approved vaccines is presented in Table 1 (WHO 2022). The Government of Cameroon approved COVID-19 vaccines for use and available vaccines are indicated in asterisk.

Table 1 : World Health Organization (WHO)-approved COVID-19 vaccines

No.	Name	Description/ Platform	Country of origin
1	Moderna. mRNA-1273	Messenger RNA	USA
2	Pfizer BioNtech. BNT162B2*	Messenger RNA	USA/ Germany
3	Janssen (Johnson & Johnson). Ad26CoV2.S*	Adenovirus. (non- replicating viral vector)	USA
4	Oxford/ ASTRA/ Zeneca. AZD1222*	Non- replicating viral vector	UK/ Sweden
5	Serum Institute of India. Covisheld (Astra Zeneca Formulation) *	Non- replicating Viral Vector	UK/Indi a
6	Sinopharm (Beijing). BB1Bp- CorV*	Inactivated virus	China
7	Sinovac. (Corona Vac)	Inactivated virus	China

Because of vaccine hesitancy due to controversies regarding vaccine safety, the

Government embarked on a broad-based aggressive campaign in order to break the yoke of reluctance that hindered the vaccination against Covid 19. Joint explanatory press conferences were organized by Minister of communication and public health to create awareness and explain the importance of the vaccination. Community, religious and association leaders were also involved in the campaign. These campaigns were to debunk the disinformation that was vital on social media networks that had caused the reluctance of the population.

Locally developed devices and technologies to combat COVID 19.

For economic reasons, it was recommended to use locally-available material to develop devices and technologies that could combat the spread of COVID 19:

These Pedal-driven water dispenser to facilitate hand washing.

The pedal operated handwashing station helped in sanitizing hands without physically touching the water tap and soapy water or other liquid soap dispensers, thereby making it least potential for contamination at public and common places usage. The device is mechanically operated by foot.

Locally-made face masks were introduced to combat droplet transmission

With COVID-19 cases soaring, doctors, nurses and other frontline health workers confronted a severe shortage of masks. An aggressive measure taken to prevent the spread of COVID-19 was taken to encouraging citizens to use home-made masks. Unfortunately, the effectiveness of locally-made face mask could not be verified.

A summary of Cameroon's responses to COVID 19 and challenges witnessed is presented in Table 2.

Table 2: Summary of responses to COVID 19 and challenges in Cameroon

Event	Action identified	Response (Implementation)	Challenges
<p>On the instructions of the Head of State, His Excellency Paul BIYA, an inter-ministerial consultation was held on Tuesday, 17 March 2020 [2], to assess the COVID-19 situation and identify appropriate actions to be implemented.</p>	Hand hygiene	Visual tools such as videos and posters from the WHO and other similar health organizations were used to demonstrate to the population, the correct application of hand hygiene.	Whereas posters were available to a large majority of the population, visual tools were only accessible to people with television sets and android phones.
	Social distancing	Bars, restaurants, and entertainment spots were systematically closed from 6 p.m. Urban and inter-urban travels were only undertaken in cases of extreme necessity, Drivers of buses, taxis and motorbikes were urged to avoid overloading. Public administrations gave preference to electronic communications and digital tools for meetings. Missions abroad of members of Government and public and para-public sector employees were suspended (Prime Ministry).	Disregard of the temporary ban on public gatherings. The economic hardship faced by many Cameroonians especially made the imposition of a social distancing difficult, if not unbearable.
	Travel restrictions on visitors arriving from high-risk counties.	Land and sea borders were closed to international travel. However, freight transport via land and sea routes continued, subject to increased screening.	The presence of porous borders, illiteracy, weak health systems were some of the drawbacks.
Quarantine for nationals returning from high-risk locations	Contacts of patients with laboratory-confirmed COVID-19 are quarantined for 14 days from the last time they were exposed to the patient.	The lack of facilities for quarantine, changes in social behavior and practices to adopt quarantine were found to be difficult, coupled with financial vulnerability and fear of stigma.	

Closure of schools Closure of certain types of workplaces	Setting up various distance learning platforms on radio, TV, and online. These platforms broadcasted lessons in both English and French to facilitate learning from home.	Limited and difficult accessibility characterized by slow internet connectivity, frequent power failures, lack of sufficient radio and TV coverage, further exacerbated in rural enclaves.
Cleaning and disinfection	The Government of Cameroon allocated COVID relief funds to the different ministries and this permitted public places such as airports, schools and hotels to be disinfected daily with regular household disinfectant	Environmental pollution and health concerns were the unfortunate consequences.
Increasing laboratory testing capacity	Free-of -charge nationwide COVID-19 screening campaign was launched. In addition to health centers and research laboratories, mobile screening sites were set up. Mobile teams were seen in market squares, schools, churches and other public places for sensitization, counseling, sample collection and testing.	Delays in sample collection and delivery, testing and test result dispatching due to inadequate well-trained human capital, lack of well-equipped health infrastructure coupled with logistics constraints and lack of data coverage, stemming from weak statistical capacity.
Treatment of COVID 19	Several treatment protocols ware being tested with varying degree of effectiveness: Chloroquine-based treatment, 'Elixir Covid' and Adsak Covid by A Catholic archbishop, Kleda of Douala diocese, 'Corocur' by a cardiologist Euloge Yiagnigni Mfopou, Soudicov Plus of Imam Modibo; Palubek's of Madame Christine Bekone (native doctor), Star Yellow from a team of researchers in university of Yaounde.	COVID-19 treatment is still solely based on clinical management through supportive care. In addition, WHO has neither approved the chemical protocol nor any of the different herbal remedies because the mechanism of action is unknown.
Introduction of anti COVID 19 vaccines in Cameroon.	Anti COVID 19 vaccines in Cameroon: Pfizer BioNtech. BNT162B2;	Vaccine hesitancy due to controversies regarding vaccine safety

	<p>Janssen (Johnson. & Johnson). Ad26CoV2.S;</p> <p>Oxford/ ASTRA/ Zeneca. AZD1222</p> <p>pharm (Beijing). BB1Bp-CorV.</p> <p>Broad-based aggressive campaign by community, religious and association leaders in favour of the vaccine.</p>
Development of local health technologies.	<p>Development of pedal-driven water dispenser to facilitate hand washing and locally-made face masks were introduced to combat droplet transmission.</p> <p>The effectiveness of locally-made face mask could not be verified.</p>

Conclusion

Despite numerous challenges, Cameroon mounted a response proportional to its available means. Nonetheless, a more appropriate response imposes the need to improve on its health systems and digital educational tools, develop a better transboundary control strategy, strengthen its statistical capacity in data coverage and break the yoke of vaccine hesitancy.

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