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Survey of COVID-19 Knowledge by the Population of Gbado-Lite City (Nord-Ubangi) in Democratic Republic of the Congo and New Research Perspectives

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Abstract

The objective of the present study was to evaluate the knowledge of Covid-19 by the population of the city of Gbado-Lite, its prevention and management in order to guide future scientific research on this pandemic. A total of 200 people were interviewed. The majority were men (60% vs. 40%). The majority of respondents were in the age range 18-45 years (73%) followed by the age range 46-60 years (20%) and <18 years (7%) respectively. 41% of the respondents have a primary school education. Those with a university level constituted 32%. The results of the survey indicate that the majority of the population has already heard about the disease (88 vs 12%); 91.5% of the respondents believe that Covid-19 has consequences. It is a very serious disease (55%) caused by a virus (57.5%). The main source of information about this pandemic was the radio (57%), followed respectively by television (18.5%), sensitization by the multisectoral committee of response against Covid-19 (12.5%) and newspapers (3%). 17 medicinal plants (*Aframomum albobolaleum*, *A. melegueta*, *Aloe vera*, *Alchornea cordifolia*, *Annona reticulata*, *Artemisia annua*, *Cannabis sativa*, *Garcinia kola*, *Mondia whitei*, *Moringa oleifera*, *Nauclea latifolia*, *Ocimum gratissimum*, *Persea americana*, *Piper nigrum*, *Quassia africana*, *Vernonia amygdalina*, *Zingiber officinale*) were cited as having traditional antiCOVID-19 medication. The dependence of the population on Traditional Medicine is said to be the protective factor for the population of sub-Saharan Africa against COVID-19. It is therefore desirable that these plants be tested virtually to confirm this hypothesis

Keywords: COVID-19, pandemic, SARS-CoV-2, Traditional Medicine, Democratic Republic of Congo

1. Introduction

COVID-19 or Coronavirus disease 2019 is a viral disease caused by a strain of coronavirus called SARS-CoV-2 which belongs to the Beta coronavirus family [1]. This infectious pathology is characterized by a decrease in hemoglobin (anemia) and neutrophil counts; however, serum ferritin, albumin and lactate dehydrogenase levels increase significantly in many patients [2]. This pneumonia infection is also clinically characterized by the hyper-production of pro-inflammatory cytokines like IL-1, IL-6, TNF- α , etc. and reactive oxygen species (ROS) which promote a cascade of biological events that drive pathological host responses. ROS induce tissue damage, thrombosis and red blood cell dysfunction, which contribute to COVID-19 disease severity [3, 4]

The SARS-CoV-2 virus uses the angiotensin converting enzyme 2 (ACE2) as its primary cellular receptor to enter the host cell. Thus, after an incubation period of approximately five days, the majority of infected patients (70%) develop cough, fever, or shortness of breath. The viral invasion phase is followed, in some patients, by an anarchic immune reaction marked by the cytokine storm associated with a coagulopathy, all of which corresponds to viral sepsis. CoV-2-SARS is mainly transmitted by the emission of respiratory droplets. These droplets loaded with viral particles could infect a susceptible individual either by direct contact with a mucous membrane (direct transmission) or by contact with an infected surface of the nasal, oral or conjunctival mucous membranes (indirect transmission) [5]. CoV-2-SARS forms a spherical particle with a diameter of 100-160 nm composed of positively polarized single-stranded RNA and five structural proteins: the Spike protein in trimeric form that binds to the cell receptor, three other transmembrane proteins (envelope glycoprotein [E], membrane glycoprotein [M] and Hemagglutinin-Esterase [HE]) and the capsid protein (N). The nucleocapsid formed from the viral RNA complexed with the N protein is embedded within the envelope. The viral genome contains the replicase gene (orf1a and orf1b) which encodes two large

poly-proteins (pp1a and pp1b) cleaved into sixteen non-structural proteins including two proteases and one RNA-dependent RNA polymerase. The rest of the genome codes for structural proteins [6].

Despite the hygiene measures to limit the large-scale spread of the virus, there is actually no antiCovid-19 drug approved by the World Health Organization (WHO) and the prospect of developing a new drug in the short time is not possible due to many constraints.

Despite this, the evolution of Coronavirus pandemic showed that sub-Saharan Africa is the less affect continent [7].

For this reason, it is important to conduct a survey to find out how management at Gbado-Lite has been, in order to identify the factors that have protected Africans from the SARS-CoV-2 virus for which there is no vaccine or medication. The objective of this study was to assess the knowledge of Covid-19 by the population of Gbado-Lite, its prevention and management in order to guide future scientific research on this pandemic. Indeed, we believe that the dependence of the population in both rural and urban areas on Traditional Medicine would have played a beneficial role in sub-Saharan Africa in the face of this pandemic

2. Material and Methods

2.1. Site Survey

This study was carried out in the town of Gbado-Lite, capital of the North Ubangi Province in the Democratic Republic of Congo. This part of DRC belongs to the Ubangi eco-region, a subgroup of Northeastern Congolian lowland forests. This eco-region is one of the 200 globally priority terrestrial eco-regions known as the "G200" [8-13].

2.2. Methodology

2.2.1. Study Period and Sampling

A pre-survey (50 people) was carried out from July 15 to 25, 2020 and a final survey took place from July 26 to August 10, 2020. At the end of this pre-investigation, about 85% of the people surveyed have knowledge of the Covid-19. Thus, by setting the margin of error at 5%, the sample size calculated according to the Dagnelie relationship, described by Ngbolua (2020) [14], gave 196 persons, which we have rounded up to 200 persons. Dagnelie's relation is given by the formula:

$$n = \frac{p(1-p)z^2}{\varepsilon^2}$$

Where z is the normal random variable (equal to 1.96 at the 5% probability threshold); ε is the allowed margin of error (5%) and p is the proportion of people with knowledge of COVID-19 (here 0.85 according to the results of the pre-survey). The study was carried out according to the principles set out in the Declaration of Helsinki (free consent of respondents, etc.). The stratified probability sampling method (stratified proportional random sampling) was used. It consists in dividing the study area (City of Gbado-Lite) into different strata, represented here by the five districts (Camp Mbanza, Pangoma, Fondation, Taba Congo and Huit villas) and associating the same number of respondents. For this study, 40 people were interviewed per neighborhood [15].

2.2.2. Data Collection

The survey was carried out in different districts of the city of Gbado-Lite. The interview was conducted in Lingala, one of the four most widely spoken national languages in Gbado-Lite. The survey forms designed in French were used as a support for the interviews.

After obtaining verbal informed consent, the respondents shared information anonymously on aspects related to socio-demographic characteristics (gender, age and level of education, socio-cultural group and profession) as well as knowledge about COVID-19, its prevention and management..

3. Results and Discussion

A total of 200 people were interviewed at Gbado-Lite about Coronavirus disease. The majority were men (60% vs. 40%; Figure 1). The majority of respondents were in the 18-45 age group (73%), followed by the 46-60 age group (20%) and the <18 age group (7%), respectively (Figure 2). 41% of respondents had primary education. Those with a university degree made up 32 percent (Figure 3). Among the respondents, students represented 36.5% followed by farmers (16.0%), medical staff (11.6%), traders (8.8%), and teachers (8.3%), respectively, while other unspecified categories made up 18.8% of the respondents (Figure 4). Regarding the distribution of respondents according to their socio-demographic affiliation, the Ngbandi were in the majority (34%) followed respectively by the Ngbaka (18.5%), Mbanza (13.5%), Ngombe (12%) and other ethnic groups combined (22%) (Figure 5). In relation to the knowledge, attitudes and perceptions of the Gbado-Lite population regarding the COVID-19 pandemic, the survey results indicate that the majority of the population has already heard about the disease (88 vs 12%); 91.5% of the respondents believe that Covid-19 has consequences. It is a very serious disease (55%) caused by a virus (57.5%). The main source of information about this pandemic was the radio (57%), followed respectively by television (18.5%), sensitization by the multisectoral committee of response against Covid-19 (12.5%) and newspapers (3%). 48.5% of the respondents felt that the channel through which information on Covid-19 is delivered is very good, 27% felt it was good, 16% (fairly good) and 8.5% (poor). Among the remarks made, not everyone has a radio, the awareness message is not circumscribed, there is no radio station broadcasting 24 hours a day, and the psychosis created by the media in relation to this pandemic, of which 85.5% of the people surveyed think that it is fatal. Although the majority of the population of Gbado-Lite (88%) recognizes the contagiousness of the disease and is afraid of the risk of contamination (78.5%), they do not know these risks with certainty (81%), only 12% of respondents believe that COVID-19 can lead to death. 52% of the respondents believe that there is a cure for Covid-19. A Gbado-Lite, although there are structures in charge of sensitization on means of prevention or protection (74.5% vs 25.5%), these means are not effective (25.5% vs 45.5%).

As for knowledge about barrier gestures, 84.5% of respondents knew about them compared to 15.5% of those who had no idea about these gestures. In Gbado-Lite, the population believes that protective or preventive measures have not stopped the spread of the disease (54% vs. 46%). However, they are convinced that the pandemic will be eradicated (72% vs. 28%). In case of contamination, the therapeutic solution recommended by the population of Gbado-Lite is modern medicine (78.5%) versus 21.5% of respondents who think the opposite of Traditional Medicine. Almost the entire population prefers health products other than vaccines (93.5% vs. 6.5%). All of these results demonstrate the unpreparedness and failure of the system put in place at both the national and provincial levels to fight the Coronavirus pandemic. Hence the need to improve response strategies. As for the question as to why sub-Saharan Africa has not been hit by the chaos as predicted, it could be the dependence of the population in both rural and urban areas on Traditional Medicine and antimalarial drugs. Indeed, according to the WHO, more than 80% of the population in Africa relies on Traditional Medicine and medicinal plants for primary health care [16, 17]. In addition, the virucidal properties of plants and their secondary metabolites have been scientifically demonstrated by the molecular docking

technique [1, 18]. In the present survey, 17 medicinal plants were reported that may have anticoronavirus properties. These include: *Aframomum albobviolaceum*, *A. melegueti*, *Aloe vera*, *Alchornea cordifolia*, *Annona reticulata*, *Artemisia annua*, *Cannabis sativa*, *Garcinia kola*, *Mondia whitei*, *Moringa oleifera*, *Nauclea latifolia*, *Ocimum gratissimum*, *Persea americana*, *Piper nigrum*, *Quassia africana*, *Vernonia amygdalina*, *Zingiber officinale*.

In view of the evolution of the epidemiological situation of this pandemic on a planetary scale, it should be pointed out that sub-Saharan Africa has been spared from the health chaos caused by COVID-19 [7].

Indeed, plant biodiversity, through a certain number of reviewed articles [19-22], is the source of antiviral molecules that would have a protective effect against this disease. Thus, post-coronavirus Africa will have to valorize plant genetic resources by developing standardized phytomedicines based on available phytochemical data. For the Democratic Republic of Congo, this involves the creation of a phytochemical library that can serve as a database for insilico screening for COVID-19 viral targets and other endemic-epidemic diseases (UbangiBioXplore DB). Such a strategy would enable the country to be able to respond effectively to a health attack in an emergency situation.

To this end, the WHO as a global health authority will have to accompany African scientists in this new perspective that values Traditional African Medicine according to the rules of the art.

Figure 1: Distribution of Respondents by Gender

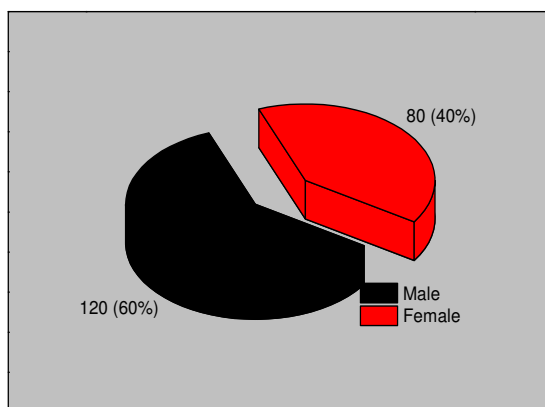


Figure 2: Age Distribution of Respondents

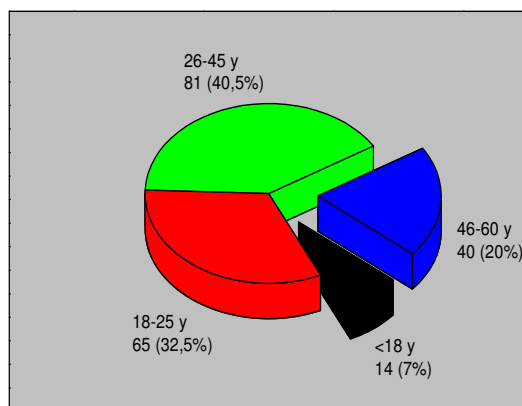


Figure 3: Distribution of respondents by level of education

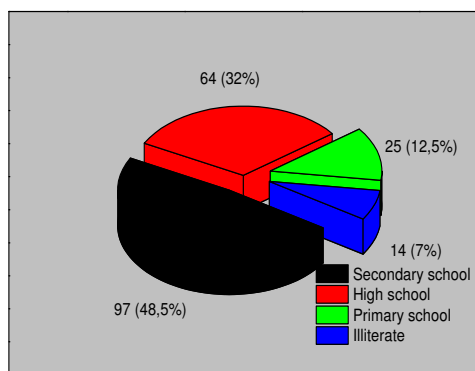


Figure 4: Distribution of respondents by occupation

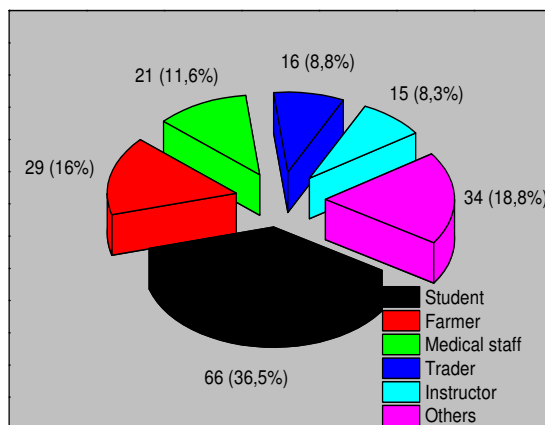


Figure 5: Distribution of Respondents by Ethnicity

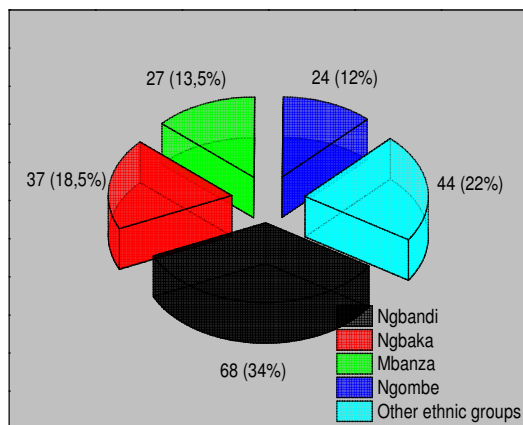


Table 1: Knowledge, attitudes and perceptions of the Gbado-Lite population regarding the COVID-19 pandemic
 No Questions & Answers Frequency

No	Questions & Answers	Fréquence
1.	Have you ever heard of Coronavirus or COVID -19 ? <input type="radio"/> Yes <input type="radio"/> No	176 24
2.	Does this disease have consequences? <input type="radio"/> Yes <input type="radio"/> No	183 17
3.	To which disease category do you classify COVID-19? <input type="radio"/> Very serious disease <input type="radio"/> Serious illness <input type="radio"/> Less severe disease	110 56 34
4.	To the best of your knowledge, is the officer responsible for COVID-19 a Virus? <input type="radio"/> Yes <input type="radio"/> No	115 85
5.	How did you know <input type="radio"/> Radio <input type="radio"/> Télévision <input type="radio"/> Newspapers <input type="radio"/> awareness	114 37 6 25
6.	How do you like the channel through which you were informed? <input type="radio"/> Very good <input type="radio"/> Good <input type="radio"/> Fairly good <input type="radio"/> Poor	97 54 32 17
7.	Is there a particular point to be made about this? <input type="radio"/> Yes <input type="radio"/> No	61 139
8.	In your opinion, is this Corona virus pandemic deadly? <input type="radio"/> Yes <input type="radio"/> No	171 29
9.	Is there a risk of contamination from living with a Covid-19 contaminant? <input type="radio"/> Yes <input type="radio"/> No	176 24
10.	What are the risks you are aware of? <input type="radio"/> No risk <input type="radio"/> Dead <input type="radio"/> Other risks	162 24 14
11.	Are you afraid of the risk of contamination? <input type="radio"/> Yes <input type="radio"/> No	157 43
12.	To your knowledge is there a cure for Covid-19? <input type="radio"/> Yes <input type="radio"/> No	104 96
13.	Are there structures in charge of raising awareness on means of prevention or protection? <input type="radio"/> Yes <input type="radio"/> No	149 51
14.	Are these means of protection or prevention effective? <input type="radio"/> Yes <input type="radio"/> No	91 109
15.	Do you have knowledge about barrier gestures? <input type="radio"/> Yes <input type="radio"/> No	169 31

No	Questions & Answers	Fréquence
16.	Have protective or preventive measures curbed the spread? ○ Yes ○ No	92 108
17.	In case of contamination, which therapeutic solution do you recommend? ○ Traditional medicine ○ Modern medicine	43 157
18.	If Modern Medicine? ○ Vaccine ○ Other products	13 187
19.	Are you convinced that this disease (pandemic) will be eradicated? ○ Yes ○ No	144 56

At a time when COVID-19 is rampant in the world, causing loss of human lives, and when the prospect of developing a new drug in the short and medium term is not feasible due to numerous constraints [23], it is urgent that an alternative solution be found to this major public health problem in order to save lives. In order to do so, each State is bound by the obligation to search for a cure for this pandemic disease. To this end, the Democratic Republic of Congo (DRC) has an exceptional plant biodiversity that can be used for the formulation of Improved Traditional Medicines for the alternative treatment of COVID-19 [7].

Conclusion and Suggestions

The purpose of this study was to conduct a survey to find out how care was provided in the Democratic Republic of Congo in order to identify the factors that protected Africans against CoV-2-CoVSARS for which there is no vaccine or medication. The results of the survey demonstrate the unpreparedness and failure of the system put in place at both the national and provincial levels to fight the Coronavirus pandemic. However, despite the fact that COVID-19 is not known to the African tradition, there is evidence (based on data obtained from artificial intelligence) that medicinal plants are capable of inhibiting viral proteases via a thermodynamically stable complex between the ligand (secondary metabolite) and the receptor (protease). The dependence of the population on Traditional Medicine would be the protective factor for the population of sub-Saharan Africa. Computational chemistry thus opens up new perspectives for the valorization of Traditional Medicine thanks to molecular docking and software predicting the pharmacokinetic and toxicological properties of natural substances. Hence the need for the creation of a National Research Institute for Medicinal Plants and a National Office for Disaster Prevention and Management..

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