

Research Article

Knowledge and Practices of Populations Concerning COVID-19 In Belier Health Region of Cote d'Ivoire in 2020

Sable Parfait Stephane^{1,2} , Aka Lepri Bernadin Nicaise^{1,2} ,
Konan Loukou Gilbert^{1,2,*} , Ilupeju Victoire^{1,2} , Ekou Franck Kokora^{1,2} ,
Bomouan Jean Fabien^{1,2} , Abinan Audrey^{1,3} , Coulibaly Amed^{1,2} ,
Konan Yao Eugene^{1,2} , Ake-Tano Odile^{1,2} 

¹Public Health Department, Felix Houphouët Boigny University, Abidjan, Cote d'Ivoire

²Nutrition Unit, National Institute of Public Health, Abidjan, Cote d'Ivoire

³Health Promotion Unit, National Institute of Public Hygiene, Abidjan, Cote d'Ivoire

Abstract

Introduction: like other African countries, Côte d'Ivoire recorded its first case on March 11, 2020. Less than a month later, the country was classified as stage 2 in the risk assessment according to WHO criteria. Faced with the real risk of the epidemic spreading, Ivorian government took emergency measures to address the challenges of an effective response. To fill the gap in the absence of studies on COVID-19 in Côte d'Ivoire and with the lifting of certain health measures, we felt it was important to conduct this study among the populations of Bédier health region, which includes transit cities. **Method:** this was an analytical cross-sectional study conducted from June 2 to 7, 2020, in Belier health region. The study population consisted of heads of households and/or their representatives. A total of 165 people was surveyed. Quantitative variables were described as means with standard deviations, and qualitative variables were described as proportions. Comparisons were made using chi-square test, and the significance level used was 5%. **Result:** the average age of respondents was 42.1 ± 13.6 . More than half were female (61.8%), were uneducated (50.9%), and lived in rural areas (50.9%). Knowledge was generally unsatisfactory, with an average and median estimated at 3.93/8 and 4.07/8, respectively. Respondents living in urban areas had a median knowledge level above those living in rural areas, at the limit of significance ($p = 0.051$). Practices were considered as good with a mean and median of 4.26/5 and 4/5 respectively but it was noted that only 6.7% wore masks regularly, while 46.7% did not. **Conclusion:** the knowledge and practices of populations in Belier health region regarding COVID-19 and measures to fight it were acceptable overall. To improve the fight against this disease, a community communication strategy should be put in place.

Keywords

Knowledge, Practices, Belier Health Region, Cote d'Ivoire, COVID-19

*Corresponding author: jaifoienjesus@gmail.com (Konan Loukou Gilbert)

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1. Introduction

Coronavirus Disease 2019, known as COVID-19, is a rapidly spreading pandemic caused by a new human coronavirus (SARS-CoV-2). Previously known as 2019-nCoV [1]. COVID-19 was first detected in December 2019 in Wuhan, China. It usually manifests itself as fever, dry cough, fatigue, muscle pain, and shortness of breath [2]. Highly contagious, it spread rapidly and, reached 26 countries at February 15, 2020, resulting in 51,857 confirmed cases and 1,669 deaths [3]. In response to this deadly epidemic, the World Health Organization (WHO) declared it as a public health emergency of international concern on January 30, 2020, and called all countries for collaborative efforts to prevent its rapid spread [4]. Despite the efforts of various states, COVID-19 pandemic was declared on March 11, 2020 [2]. Having started in Asia, the disease spread to Europe and then America, reaching African continent on February 14, 2020 [5]. Côte d'Ivoire, like other African countries, recorded its first case on March 11, 2020. [6]. Less than a month later, the country has been classified as stage 2 in the risk assessment according to WHO criteria [7].

Faced with the real risk of the epidemic spreading, Ivorian government has taken emergency measures to address the challenges of an effective response. Numerous actions are being carried out by the Ministry of Health (establishment of a crisis committee, adoption of a response plan, public awareness campaigns). Other measures have been taken, including the introduction of a curfew, gradual lockdown, a ban on unauthorized travel between Abidjan (the epicenter of the epidemic) and the interior of the country, and the closure of all sea, land, and air borders [8]. To ensure the success of these actions, public support is essential [2]. Indeed, lessons learned from previous epidemics suggest that perceptions are linked to the level of emotion and panic among the population, which can hinder and complicate actions to prevent the spread of disease [2]. In this fight, social aspects are proving to be decisive for the success of disease prevention, treatment of patients, and response to the disease. Also, the multiple and diverse cultural context that characterizes Ivorian population must be integrated into the management of the disease.

This characteristic of Ivorian population influences social representations of the disease, which vary from one ethnic group to another. In fact, populations develop multiple constructions of the disease linked to socio-cultural and historical contexts, so that “popular knowledge is based on a complex arrangement of perceptions, beliefs, attitudes, values, and social representations related to the disease, its causes, and prevention and care techniques” [9].

Furthermore, according to WHO, factors contributing to the spread of an epidemic mainly include a lack of awareness among population and shortcomings in the response provided by the healthcare system [10]. To fill the gap in the absence of studies on COVID-19 in Côte d'Ivoire and in light of the lifting of certain health measures, we felt that it was important

to conduct a study on the knowledge and practices of Belier health region populations regarding COVID-19. Given that this region, is located in the center of Côte d'Ivoire, is composed of transit city through which almost all inhabitants pass to access other regions of the country. Furthermore, the presence of health inequalities with Abidjan, the economic capital, raise fears of the worst should this pandemic occur there. Hence the need to conduct this study, which will ultimately improve strategies to fight COVID-19 epidemic in Côte d'Ivoire. The objective of this study, based on primary data, was to examine the perceptions of belier health region population regarding COVID-19 and its response.

2. Method

2.1. Study Setting

This study was conducted in Belier health region, which is part of the 19 health regions of Côte d'Ivoire and houses the political capital (Yamoussoukro). This region, located in the center of Côte d'Ivoire, is strategic as it serves as a transit point for numerous travelers and a meeting point for several cities in Côte d'Ivoire. Furthermore, it will soon benefit from the transfer of the economic capital from Abidjan.

2.2. Type and Period of Study

This was a cross-sectional analytical study conducted from June 2 to 7, 2020

2.3. Population Study

The study population consisted of household heads or their representatives

2.3.1. Inclusion Criteria

The study included, individuals who had been living in the region for at least 6 months, who were aged 18 or more and were present during the survey period

2.3.2. Exclusion Criteria

Those who did not consent to participate in this study were excluded

2.4. Sample Size and Sampling

2.4.1. Sample Size

The sample size calculation, done with Stuart POCOCK formula [$n = \frac{pq}{i^2} \times f(\alpha, \beta)$, with $\alpha = 5\%$, $\beta = 20\%$, $f(\alpha, \beta) = 7$, $i = 0,05$ and $p = 5\%$] resulted in a sample of 150 people. By applying 10% increase coefficient on the minimum size, the

final sample size was 165.

2.4.2. Sampling

We conducted a two-stage cluster sampling. The first stage concerned the districts of the health region and the second stage concerned the residential area (urban or rural). For the first level, half of the districts were selected at random. These were the districts of Yamoussoukro and Tiebissou. For the second level, we also randomly selected two neighborhoods in each selected district, one in an urban area and one in a rural area. A total of four neighborhoods were selected: Tiebissou, Morofè Assembo, and Kongouanou. After this phase, the number of households was distributed evenly across the districts and neighborhoods. At the neighborhood level, the interviewers looked for the center and randomly selected the direction in which to begin the survey. The first household on the right in that direction was chosen, and a step of one household was applied for the following households. The interviewers moved to the right until all households in the neighborhood had been reached. If the number of households in the neighborhood was not reached, the nearest neighborhood was chosen and the same methodology was applied until the total number of households was obtained.

2.5. Data Collection

Data collection was carried out on survey sheets pre-tested during face-to-face interview with respondents. It was done in compliance with barrier measures (wearing of masks by the investigator and the respondent).

2.6. Data Analysis

Data were analyzed using R software. To better assess knowledge and practices, each question on these aspects was scored out of 1 point. These included knowledge of COVID-19, people at risk of infection, people at risk of developing severe forms of the disease, signs of the disease, transmission of the disease, the possibility that a recovered person could infect another person, and the possibility of being infected by an asymptomatic person. Practices included hunting and consumption of bush meat, greeting habits, mask wearing, and hand washing. In each category, the total was calculated and the median was used to divide the population in order to assess differences. After this phase, we described the quantitative variables as means with standard deviations and the qualitative variables as proportions. Comparisons were made using chi-square test, and significance was confirmed for a p-value <0.05.

2.7. Ethical Considerations

Approval was obtained from the National Committee for Ethics in Life Sciences and Health. The informed consent of each participants was sought after they have been informed of

the voluntary, free, and unpaid nature of the study. The survey only began once written consent had been obtained. Anonymity and data confidentiality were guaranteed.

3. Result

3.1. Socio-demographic and Epidemiological Characteristics

The average age of the respondents was 42.1 years $\pm$ 13.6. More than half were female (61.8%), lived with a partner (married or not) (77.6%), were uneducated (50.9%), resided in a rural area (50.9%), and reported practicing Christianity (67.9%). More than one in ten households had a member affected by a chronic illness (13.3%), mainly hypertension (59.1%) (Table 1).

3.2. Knowledge about COVID-19

Almost all respondents stated that COVID-19 was a disease (92.7%), and 72.7% reported that anyone could be affected. The people most often cited as being at risk of developing severe forms of the disease were the elderly (49.7%). People with high blood pressure and diabetes were only mentioned by 13.3% and 10.3% respectively. Furthermore, 24.2% did not know who was at risk of developing severe forms of the disease and 40% did not know signs of Covid. Two main symptoms were known: cough (59.4%) and fever (57%). Breathing difficulties were cited in only 21.2% of cases. Loss of taste and smell was cited by only 2.4% of respondents. In terms of transmission, inhalation or ingestion of respiratory droplets produced by an infected person coughing or sneezing was the most widely known route of transmission among respondents (98.2%). Transmission via contaminated hands, contact with contaminated objects, and hugging were cited in only 29.7%, 21.8%, and 3% of cases, respectively. The majority of respondents stated that a person who had recovered from COVID-19 could not infect others (72.7%) and that it was possible to be infected by a person who carried the virus but did not yet show symptoms (72.1%). Regarding prevention, none of the measures were known to more than half of those surveyed. However, wearing a mask and frequent hand washing with soap and water were cited by 47.3% and 40.6% of respondents, respectively. The average and median scores for knowledge were 3.93/8 and 4.07/8, respectively (table 2)

3.3. Practices Concerning COVID-19

Almost all respondents had neither hunted (98.2%) nor consumed (90.3%) bush meat in the three months prior to the survey. Verbal greetings to relatives were the most common practice (70.9%). However, shaking hands with relatives was

practiced in 9.1% of cases. Only 6.7% regularly wore masks, while 46.7% did not. With regard to hand washing, the majority said they had been doing so frequently since the start of the pandemic, mainly with soap and water (87.9%). The use of hydroalcoholic solutions was noted in only 17.8% of cases. The average and median practices were 4.26/5 and 4/5, respectively (table 3)

3.4. Relationships Between Socio-demographic Characteristics, Knowledge, and Practices

Respondents living in urban areas had a median level of knowledge above those living in rural areas, at the limit of significance ($p = 0.051$). In terms of practices, no relationship was noted between socio-demographic characteristics, knowledge, and practices (Table 4).

Table 1. Distribution of respondents by socio-demographic and epidemiological characteristics.

		Number	Percentage
Age [mean = 42,1 ± 13,6]	< 20 years	3	1,8
	20 – 29 years	29	17,6
	30 – 39 years	37	22,4
	40 – 49 years	53	32,1
	50 – 59 years	20	12,1
	60 – 69 years	16	9,7
	≥ 70 years	7	4,2
Sex	Female	102	61,8
	Male	63	38,2
Marital status	In relationship	91	55,2
	Single	37	22,4
	Married	30	18,2
	Widowed	6	3,6
Education level	Separated	1	0,6
	None	84	50,9
	Primary	43	26,1
	Secondary	25	15,2
Place of residence	Higher	13	7,9
	Rural	84	50,9
	Urban	81	49,1
	Farmer	57	34,5
	Informal sector	45	27,3
	Housewife	37	22,4
Occupation	Private sector employee	7	4,2
	Unemployed	6	3,6
	Student	6	3,6
	Public sector employee	5	3,0
	Retired	2	1,2
Religion	Christian	112	67,9
	Animist	32	19,4

		Number	Percentage
Presence of person with chronic illness in the household	Muslim	13	7,9
	None	8	4,8
	No	143	86,7
	Yes	22	13,3
Types of illness (n = 22)	Hypertension	13	59,1
	Diabetes	5	22,7
	Asthma	2	9,1
	Kidney failure	1	4,5
	Prostate	1	4,5

Table 2. Distribution of respondents according their knowledge on COVID-19 and its control measures.

		Number	Percentage
What is COVID-19	A disease	153	92,7
	A rumor	3	1,8
	An invention	3	1,8
	A spell	2	1,2
	Don't know	4	2,4
	Everyone	120	72,7
People at risk of developing COVID-19	Elderly people	19	11,5
	Adults	5	3,0
	Children	4	2,4
	People with high blood pressure	4	2,4
	Diabetics	3	1,8
	Teenagers	1	0,6
	Asthmatics	1	0,6
	Don't know	15	9,1
	Elderly people	82	49,7
	Children	24	14,5
People at risk of developing severe forms of COVID-19	People with high blood pressure	22	13,3
	Everyone	21	12,7
	Diabetics	17	10,3
	People with heart disease	7	4,2
	Adults	6	3,6
	Asthmatics	3	1,8
	Teenagers	2	1,2
	Obese people	1	0,6
	Pregnant women	1	0,6

		Number	Percentage
Signs of Covid-19	Don't know	40	24,2
	Cough	98	59,4
	Fever	94	57,0
	Breathing difficulties	35	21,2
	Headaches	22	13,3
	General fatigue	7	4,2
	Sneezing	7	4,2
	Muscle pain	4	2,4
	Loss of taste and smell	4	2,4
	Don't know	66	40,0
How is COVID-19 transmitted	By inhaling or ingesting respiratory droplets produced by an infected person who coughs or sneezes	162	98,2
	By shaking hands with an infected person	49	29,7
	Contact with contaminated objects	36	21,8
	Hugs	5	3,0
	Don't know	40	24,2
A person who has recovered from COVID-19 can affect others	Don't know	21	12,7
	No	120	72,7
	Yes	22	13,3
Is it possible to be infected by someone who already has COVID-19 but has not yet shown signs	Don't know	20	12,1
	No	25	15,2
	Yes	119	72,1
What should be done to avoid Copvid-19 ?	Wear a mask	78	47,3
	Wash your hands frequently with soap and water	67	40,6
	Keep a distance of at least 1 meter from others	43	26,1
	Avoid crowds	36	21,8
	Do not hug	36	21,8
	Do not shake hands	23	13,9
	Cough or sneeze into your elbow	10	6,1
	Don't know	7	4,2

Table 3. Distribution of respondents according their practices regarding COVID-19 and its control measures.

		Number	Percentage
Consumed bush meat in the last 3 months	No	149	90,3
	Yes	16	9,7
Hunted bush meat in the last 3 months	No	162	98,2
	Yes	3	1,8

		Number	Percentage
Greetings	Verbally	117	70,9
	With a sign of the hand	78	47,3
	With a handshake	15	9,1
	With elbow	6	3,6
	With a hug	5	3,0
	With a bow	1	0,6
Since the declaration of the COVID-19 epidemic, do you wear a mask?	No	77	46,7
	Yes, sometimes	55	33,3
	Yes, rarely	22	13,3
	Yes, all the time	11	6,7
More frequent hand washing during the day	No	8	4,8
	Yes	157	95,2
Hand washing product (n = 157)	Water and soap	138	87,9
	Hydroalcoholic solution	28	17,8
	Water only	24	15,3

Table 4. Relationship between socio-demographic characteristics, knowledge and practices regarding Covid and its control measures.

		knowledge		Practices		p
		< 4,07	≥ 4,07	< 4	≥ 4	
Age	≤ 40 years	34	40	8	66	0,385
		45,9%	54,1%	10,8%	89,2%	
	> 40 years	48	43	13	78	
		52,7%	47,3%	14,3%	85,7%	
Sex	Female	56	46	12	90	0,089
		54,9%	45,1%	11,8%	88,2%	
	Male	26	37	9	54	
		41,3%	58,7%	14,3%	85,7%	
Marital status	Single	22	22	6	38	0,963
		50,0%	50,0%	13,6%	86,4%	
	In relationship	60	61	15	106	
		49,6%	50,4%	12,4%	87,6%	
Education level	None	45	39	14	70	0,492
		53,6%	46,4%	16,7%	83,3%	
		21	22	3	40	
	Primary	48,8%	51,2%	7,0%	93,0%	
		12	13	3	22	
		48,0%	52,0%	12,0%	88,0%	

		knowledge		Practices		p
		< 4,07	≥ 4,07	< 4	≥ 4	
Place of residence	Higher	4	9	1	12	0,051
		30,8%	69,2%	7,7%	92,3%	
	Rural	48	36	14	70	
		57,1%	42,9%	16,7%	83,3%	
	Urban	34	47	7	74	
		42,0%	58,0%	8,6%	91,4%	
Religion	Animist	20	20	8	32	0,661
		50,0%	50,0%	20,0%	80,0%	
	Christian	54	58	13	99	
		48,2%	51,8%	11,6%	88,4%	
	Muslim	8	5	0	13	
		61,5%	38,5%	,0%	100,0%	
Knowledge on COVID-19	< 4,07			10	72	0,838
				12,2%	87,8%	
	≥ 4,97			11	72	
				13,3%	86,7%	

4. Discussion

This study gave us an overview of the knowledge and practices of populations in Belier health region of Côte d'Ivoire concerning COVID-19

In terms of socio-demographic characteristics, our participants were relatively young (average age of 42.1 ± 13.6). This finding could be explained by the youthfulness of Ivorian population. According to the general population and housing census (RGPH-2014), 55.7% of Ivorian population is between 15 and 64 years old [11]. A similar study conducted in India on a sample of 662 participants noted an average age of 29.09 ± 8.83 [12]. In Philippines, the study conducted by Lau et al noted an average age of 41 ± 14.6 [13].

Concerning gender, we noted a predominance of women in our study, while the general population and housing census (RGPH-2014) noted a male predominance of 51.7% [11]. This finding could be explained by the fact that women are generally, and particularly in Africa and Côte d'Ivoire, responsible for household management and care activities. As a result, they are more present in the household during the day while their partners are at work. Our findings are consistent with the results of studies conducted in India [12], which reported a proportion of 51.2% of women.

With regard to education level, the high proportion of un-

educated people should lead to pay attention to raising awareness among populations of Belier region. Seen that there are already inequalities in healthcare system between Belier region and Abidjan, the economic capital of Côte d'Ivoire, in terms of prevention and treatment of infectious diseases, as several studies have shown [14, 15]. The low level of education in Belier region may exacerbates the health situation of this population, exposing them to a higher risk of contracting COVID-19 and developing its severe forms if it spreads there. Noting that, 13.3% of households had members affected by chronic disease, while COVID-19 is particularly serious for these individuals. Furthermore, the predominance of rural population in this region highlights the significant risk that COVID-19 could pose there. Indeed, Curley and Williams revealed in their studies a very high risk of developing COVID-19 and its consequences in rural areas [16, 17].

Regarding knowledge about COVID-19, the mean and median was 3.93/8 and 4.07/8 respectively. This finding could be explained by the early awareness campaign launched by the government and the early implementation of administrative measures to fight the disease. These measures, such as curfews, bans on gatherings, and the closure of entertainment venues and places of worship, immediately encouraged population to seek information. However, information acquired by population was not complete. In fact, 24.4% of our population was unaware of who was at risk of severe forms of the

disease. Only 13.4% and 10.4% of respondents cited hypertension and diabetes, respectively, as risk factors for severe forms of the disease. Only fever and cough were known to more than half of those surveyed as signs of COVID-19. Breathing difficulties were known by only 21.3% of respondents, and loss of taste and smell were cited by 2.4%. Direct transmission through inhalation or ingestion of respiratory droplets produced by an infected person coughing or sneezing were more widely known (98.2%), transmission via contaminated hands, contact with contaminated objects, and hugging were cited by 29.7%, 21.8%, and 3% of respondents, respectively. None of the preventive measures were known to more than half of those surveyed. Wearing a mask and frequent hand washing with soap and water were cited by 47.3% and 40.6% respectively. These findings could be explained by the low level of education (50.9% of people were uneducated) of our population and the communication style adopted by the government. Communication has focused on the mass media at the expense of community communication strategies, often using language that is inaccessible to the population. As a result, some aspects of the disease were not understood during the awareness campaigns. On the other hand, this low level of education limited their ability to analyze health information, especially in a context where rumors and false information were rife. Abel et al., in their studies on the critical analysis of health literature and the COVID crisis, also pointed to the impact of the low level of literature on the limited ability to analyze information in the context of COVID-19 [18]. Yang et al. also noted that poor information evaluation skills were associated with a poor attitude toward prevention and a low intention to adopt recommended practices [19]. Similarly, Cheng et al. showed that a high level of education was significantly associated with high knowledge, preventive attitudes, and the use of multiple sources of information [20].

Still in terms of knowledge, we noted that respondents living in urban areas had a higher median level of knowledge than those living in rural areas, even though this finding was borderline significant ($p = 0.051$). Chen et al. also showed in their studies of rural populations that they had a lower level of information evaluation skills than those living in urban areas [20]. As a result, they were more likely to have inaccurate information and to be poorly or poorly informed, as we found in our study.

Practices regarding COVID-19 were generally good. They focused on not consuming or hunting bush meat, as well as good greeting habits. However, the proportion of people who wore masks frequently was low, with only 6.7% doing so, while 46.7% did not wear them. This low rate of mask wearing was explained in part by the unavailability and high cost of surgical masks, which until then were the only masks approved and recommended by the Ministry of Health, while 62.5% wore cloth masks and lacked instruction on how to use them. On the other hand, our respondents had no experience of respiratory disease epidemics, unlike in certain cities such as Hong Kong, where mask-wearing prevalence was esti-

mated at 94.2% during the COVID-19 pandemic [21]. This high prevalence of mask-wearing in that country was associated with their experiences of previous SARS epidemics, where mask-wearing was a preventive measure [22], which was not the case in Côte d'Ivoire, where no respiratory disease epidemics were reported.

This work has limits. Its transversal nature prevents establishing the causal link, the temporal sequence between explanatory variables and knowledge and practices regarding COVID-19. Also, subjectivity and memory biases were identified. However, it should be noted that these limitations do not alter the informative nature of this study.

5. Conclusion

Knowledge and practices of the populations in the Bélier health region regarding COVID-19 and measures to combat it were acceptable and lower among those living in rural areas. To ensure effective control, communication strategies should be adapted to the level of education of the population and their area of residence. To this end, a community-based strategy is a very effective method in this context, where rumors and misinformation about COVID-19 are rife.

Abbreviations

WHO	World Health Organization
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
COVID-19	Coronavirus Disease 2019

Author Contributions

Sable Parfait Stephane: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Aka Lepri Bernadin Nicaise: Conceptualization, Formal analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Konan Loukou Gilbert: Investigation, Methodology, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing

Ilupeju Victoire: Investigation, Methodology, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing

Ekou Franck Kokora: Visualization, Writing – original draft, Writing – review & editing

Bomouan Jean Fabien: Visualization, Writing – original draft, Writing – review & editing

Abinan Audrey: Visualization, Writing – original draft, Writing – review & editing

Coulibaly Amed: Visualization, Writing – original draft, Writing – review & editing

Konan Yao Eugene: Visualization, Writing – original draft, Writing – review & editing

Ake-Tano Odile: Visualization, Writing – original draft, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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