



Discrimination of the Socio-Economic Impact of the Corona Virus Disease Pandemic in Kinshasa, in the Democratic Republic of the Congo: A Population-Based Cross-Sectional Survey

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Abstract

Background and Aim: It has been ten months since the first case of COVID-19 was reported in Democratic Republic of Congo. Since then, the households have been on finding a cure for the disease. Largely neglected is the socioeconomic impact of the pandemic on the population in the country. The aim of the study is to measure the impact of the COVID-19 pandemic on the living conditions of households in Kinshasa. **Methods:** The design of this study is a cross-sectional study. A standard questionnaire was used to collect the data. The Revised Event Impact Scale (IES-R) was used to assess the socioeconomic impact of households. Factors with significant impact were sought by Wald's discriminant and logistic regression analysis. **Results:** About four in five respondents had a significantly psychological impact (ISE-R score > 1). Serious socio-economic impact was significantly associated with women, a liberal profession, a low level of education, and attending revival churches. On the other hand, the use of a mask, regular hand washing, knowledge of the consequences of containment and knowledge of the mode of transmission of COVID-19 reduced the risk of significant impact. **Conclusion:** Approximately 85% households surveyed had a significantly socioeconomic impact due to the pandemic which highlights the need for more longitudinal studies to be conducted on this age group. Urgent care and appropriate formulation of policies are needed to address the identified problems and to

provide care to those in need.

Subject Areas

Socioeconomics

Keywords

COVID-19 Pandemic, Socioeconomic Impact, Households, Kinshasa

1. Introduction

When the health crisis linked to the coronavirus became pandemic affecting countries around the world at an incredible progression, the Congolese state immediately took measures to manage this crisis [1] [2]. These include the suspension of its air links to the rest of the world, the closure of schools and the proclamation of a state of health emergency by the President of the Democratic Republic of Congo (DRC) on Tuesday 24 March 2020 following the recording of the progression of cases since the appearance of the first on March 10, 2020 [3] [4]. From there, every two weeks, the national response plan against COVID-19 is revised to comply with the emergency situation [5].

With data reported up to Wednesday, March 13, 2021. The DRC records 21 new cases of coronavirus contamination (data from INRB laboratories and validated by the DRC's COVID-19 Multisectoral Response Committee). The total number of positive cases for the novel coronavirus in the Democratic Republic of the Congo is 26,759 (26,758 confirmed cases and 1 probable case). The total of fatal cases in the DRC as of March 13, 2021 is 712 (711 confirmed fatalities and one probable case). Lethality is 2.6%. The total number of people cured of the coronavirus, COVID-19 in the DRC is 22,432. Cure rate is 84%. Total active cases are 3615. The circulation of the SARS-CoV-2 virus continues in the DRC with still new infections every day in the active provinces. It is in this context that the Ministry of Health announced the start of the vaccination campaign against the coronavirus, COVID-19 piloted by the Expanded Program of Vaccination (EPI) from the coming days.

The DRC trades directly with countries in Europe and Asia, it suffers from the economic consequences of the COVID-19 pandemic at the international level due to the substantial severing of its trade links with the countries severely affected by Asia and Europe. At the national level, the application of restrictive measures has upset the daily lives of households both socially and economically following the confinement of the commune of Gombe, a place hosting several companies in the country [6] [7]. In fact, the peculiarity of this crisis means that it puts double pressure on both supply and national demand [8]. The purpose of the study is indeed to measure the impact of the COVID-19 pandemic on the living conditions of households in Kinshasa.

2. Methods

An analytical cross-sectional study was conducted in the city of Kinshasa province during the period from June to October 2020.

The study population consisted of the inhabitants of the city province of Kinshasa, more specifically the heads of households or their respondents. Simple probability and random sampling with a sample step of 3 was used to collect data for these studies. The sample size was calculated from Fisher's formula: $n \geq (Z^2 \times (p) (1 - p))/d^2$ where n = Sample size, $z = 1,96$ (confidence coefficient), p = previous prevalence, $d = 0.05$ (margin of error or range of imprecision reflecting the degree of absolute precision desired). Because of the probable non-responding subjects, 10% of the number calculated at the height should be added. We estimated that the negative impact of the COVID-19 pandemic has reached 50% of households, as prescribed in the literature, in the absence of a prevalence of such a documented consequence in the country. The sample size thus calculated was $n \geq (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 384$. By including the 10% of non-respondents, we obtained 422 heads of household to question. The sample was increased to 1510 finally to increase the statistical power of the test. Given the absence of the population register, the sampling was adapted to the administrative organization of the city of Kinshasa, which is subdivided into 24 communes, neighborhoods and streets. The study focused on 1510 subjects recruited at random according to a sampling plan with several stages with sampling units constituted at the 1st stage of the municipality, at the 2nd stage of the neighborhood, at the 3rd stage of the street, at the 4th stage of the inhabited plot and at the 5th degree of the household.

The following variables were collected: the socio-demographic and economic characteristics of the respondents among which the following variables of interest were collected: sex, age, marital status, religion, level of education, family composition, socioeconomic level of households and the occurrence of an event during the pandemic (loss of employment, lack of food, forcing to stay at home, inability to access health care).

The data were collected by face-to-face interviews with heads of household or their spouses, using a pre-tested questionnaire. The face-to-face interview made it possible to reach all social layers knowing that the poorest do not have phones to reach them. Data collection was done on tablets.

The impact of the pandemic on the household of the population studied was measured using a score constructed from five questions on the occurrence of an event (loss of employment, insufficient food, drop in income in the household, forced to stay at home, inability to access health care). Each question consisted of two assertions (yes = 1 and no = 0). The score has a minimum of 0 and a maximum of 5. A less impact focus was defined when the score was between 0 - 1; medium impact, score between 2 - 3 and high impact, score between 4 - 5 [9].

3. Statistical Analyzes

The data collected was then transferred to SPSS for Windows version 21 for

processing and analysis. Categorical variables were presented as absolute and relative frequency, quantitative variables were summarized by measures of central tendency and dispersion. The mean and its standard deviation were reported for variables with a normal distribution. Comparison of proportions was done using Pearson's Chi-square or Fischer's exact test. Student's t test made it possible to compare the means. Pearson's correlation established the correlation between socioeconomic impact and the implementation of government measures. The overall score and each of the socioeconomic events were tested for internal consistency using Cronbach's alpha (α). The factors implicated in the impact of the revised socio-economic events on the household (IESE-R) were sought by discriminant analysis. The search for factors associated with the socio-economic impact was done using the logistic regression test in multivariate analysis. The calculated adjusted ORs were used to estimate the degree of association between the socio-economic impact and the independent variables. The p value < 0.05 was the threshold of statistical significance.

4. Ethical Considerations

The protocol for this research study was submitted and approved by the ethics committee of the Protestant University in Congo under Approval No. CEUPC0037. Prior to the administration of the questionnaire, each interviewer sought informed consent from the person to be investigated after a brief explanation of the study objectives. All selected subjects were told that participation in the study was voluntary, that they could stop the interview at any time, and that they were not required to answer all questions. The confidentiality of the respondent was guaranteed because no personal information that could link the respondent to their data was collected. There was no direct benefit from participating in the study but the results of the study will allow the government of the DRC to put in place interventions based on scientific evidence to cut the chain of transmission of the epidemic.

5. Results

5.1. Sociodemographic Characteristics

The interviewed population consisted of 802 men (53.1%) and 708 women (46.9%) sex ratio 1H/1F. The mean age of the respondents was 40.3 ± 16.8 years with a significantly higher mean in men ($p = 0.002$). Students were more numerous (35.9%), they were also more married (39.6%) of university level (44.8%) of Kimbanguist religion, living in families of less than 6 people; with a socio-economic lower in the majority of cases (65.8%). Compared to men and women, we found a statistically significant difference for occupation, marital status, level of education and religion ($p < 0.05$) (Table 1).

5.2. Knowledge and Application of the Measures Decried by the Government

The measures decreed by the government are illustrated in Table 2 and shows

Table 1. Sociodemographic characteristics by sex.

Variable	Over all (n = 1510)	Male (n = 802)	Female (n = 708)	P
Age, Mean \pm SD, years	40.3 \pm 16.8	41.6 \pm 16.3	38.9 \pm 17.3	0.002
Profession				<0.001
Official	460 (30.5)	174 (21.7)	286 (40.4)	
Student	542 (35.9)	380 (47.4)	162 (22.9)	
Liberal	374 (24.8)	188 (23.4)	186 (26.3)	
Health person	134 (8.9)	60 (7.5)	74 (10.5)	
Marital status				<0.001
Single	754 (49.9)	430 (53.6)	324 (45.8)	
Married	598 (39.6)	348 (43.4)	250 (35.3)	
Windows	146 (9.7)	24 (3.0)	122 (17.2)	
Divorced	12 (0.8)	0 (0.0)	12 (1.7)	
Education level				<0.001
No	50 (3.3)	0 (0.0)	50 (7.1)	
Primary	214 (14.2)	128 (16.0)	86 (12.1)	
Secondary	570 (37.7)	184 (22.9)	386 (54.5)	
University	676 (44.8)	490 (61.1)	186 (26.3)	
Religion				<0.001
Catholic	338 (22.4)	264 (32.9)	74 (10.5)	
Protestant	290 (19.2)	176 (21.9)	114 (16.1)	
Revival Church	386 (25.6)	128 (16.0)	258 (36.4)	
Kimbanguist	496 (32.8)	234 (29.2)	262 (37.0)	
Family composition	3.94 \pm 1.94	3.95 \pm 1.91	3.92 \pm 1.97	0.71
<6 people	1166 (77.2)	621 (77.4)	545 (77.0)	0.441
\geq 6 people	344 (22.8)	181 (22.6)	163 (23.0)	
Socioeconomic level				0.315
Low	994 (65.8)	532 (66.3)	462 (65.3)	
Midle	306 (20.3)	152 (19.0)	154 (21.8)	
High	210 (13.9)	118 (14.7)	92 (13.0)	

that 39.7% of respondents adopted barrier gestures, 21.5% applied plus the hydroalcoholic solution, 17.5% no longer used the mask, 50.6% washed regularly hands. Regarding knowledge of symptoms, 33.3% had at least good knowledge; 31.5% were very informed about the consequences of confinement and 33.4% knew about the mode of contamination of COVID-19 (Table 2).

5.3. Different Socio-Economic Events of the Outbreaks during the Pandemic

The most common socio-economic consequences were low household income

Table 2. Knowledge and application of the measures decreed by the government.

Variables	n = 1510	%
Barrier gesture adoption		
Some times	40	2.6
Medlly	870	57.6
Very adopted	600	39.7
Application of hydroalcoholic solution		
Not applied	24	1.6
Some times	126	8.3
Applied	1036	68.6
Very applied	324	21.5
Mask usage		
Not applied	12	0.8
Some times	224	14.8
Applied	1010	66.9
Very applied	264	17.5
Regular hand washing		
Not at all	198	13.1
Sometimes	548	36.3
Very often	636	42.1
Always	128	8.5
Knowledge of the disease symptom		
Not at all	388	25.7
Some knowledge	618	40.9
Good knowledge	464	30.7
Very good knowledge	40	2.6
Knowledge of the consequences of confinement		
Not at all	422	27.9
I am little informed	612	40.5
I am informed	476	31.5
Knowledge of the contamination mode		
Not at all	658	43.6
A little knowledge	348	23.0
Good knowledge	490	32.5
Very good knowledge	14	0.9

(73.2%), having to stay at home (69.1%), food insufficiency (67.8%), loss of employment (64.8%) and inability to access health services (46.2%) (**Figure 1**).

5.4. Correlation between the Score of the Impact of Socio-Economic Events-Revised and the Application of Measures Decreed by the Government

A positive and significant correlation was found between the impact of socio-economic-revised events, regular hand washing ($r = 0.63$, $p < 0.001$), knowledge

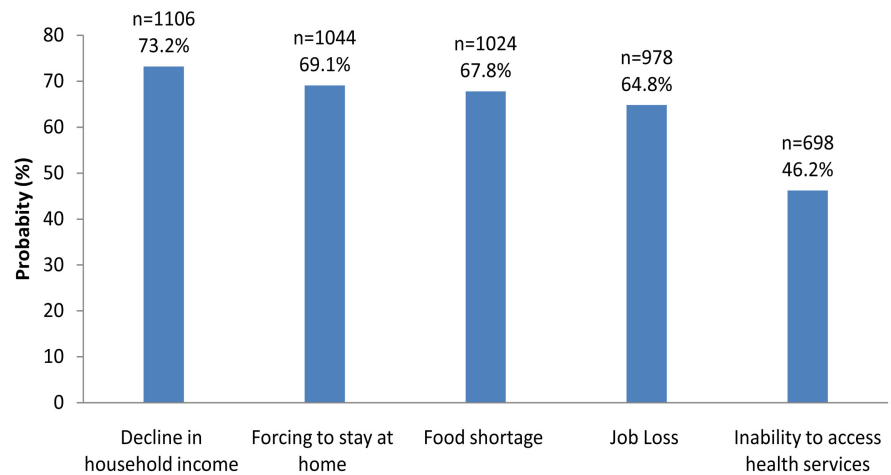


Figure 1. Different socio-economic events of the outbreaks during the pandemic.

about symptoms ($r = 0.55$, $p < 0.001$), knowledge of the consequences of confinement ($r = 0.57$, $p < 0.001$) and knowledge of the mode of transmission of COVID-19 ($r = 0.77$, $p < 0.001$). On the other hand, a negative and significant correlation was found between the impact of socio-economic events-revised the adoption of barrier gesture ($r = 0.64$, $p < 0.001$) and the application of hydroalcoholic solutions ($r = 0.66$, $p < 0.001$) (Table 3).

5.5. Impact of Socio-Economic Events on Households

The IESE-R has been consistently used in several studies and is considered a good measure of the socio-economic impact of an event. The scale revealed a mean score of 3.2 (SD = 1.5) with a median of 3. Testing the overall reliability of the revised Socio-Economic Event Impact Scale revealed good internal consistency. ($\alpha = 0.764$).

Each participant was grouped into a separate category based on their IESE-R score. The pandemic had a significant impact on the outbreak of 1272 participants (84.5%). As shown in Figure 2, 674 outbreaks (44.6%) had a severe socio-economic impact due to the pandemic (Figure 2).

5.6. Predictors of the Impact of Socio-Economic Events in Households

In Table 4, 72.3% of the variables are correlated with 58.8% of the socio-economic impact of households ($R^2 = 0.588$).

5.7. Coefficients of Classification Functions

The combined intra-group correlations between discriminant variables and the variables of the standardized canonical discriminant functions are ordered by absolute sizes of the correlations within the function. Variables with a larger absolute correlation size in function 3 were discriminated against as factors in the socio-economic impact of COVID-19 on households (Table 5).

Table 3. Correlation between the score of the impact of SEE-R and the application of measures.

Variable	β	r	p
Barrier gesture adoption	-0.275	0.64	<0.001
Application of hydroalcoholic solution	-0.252	-0.66	<0.001
Mask usage	0.050	0.19	0.461
Regular hand washing	0.213	0.63	<0.001
Knowledge of the disease symptom	0.296	0.55	<0.001
Knowledge of the consequences of confinement	0.177	0.57	0.001
Knowledge of the contamination mode	0.240	0.77	<0.001

Table 4. Coefficients of the classification of the socio-economic impact function.

Function	Eigenvalue %	% of variance	% cumulative	Canonical correlation
1	0.529	72.3	72.3	0.588
2	0.203	27.7	100.0	0.411

Table 5. Coefficients of classification functions.

Factors	Impact level		
	Low Impact	Moderate Impact	High Impact
Sex	8.155	9.273	9.180
Mask usage	9.164	8.729	8.086
Educational level	5.792	7.503	7.273
Application of hydroalcoholic solution	4.926	5.533	4.588
Knowledge of the consequences of confinement	3.010	1.974	2.620
Profession	2.673	1.237	1.799
Knowledge of the disease symptom	-0.524	2.813	1.216
Religion	0.751	1.363	0.827
Age	0.141	0.203	0.206
Knowledge of the contamination mode	-2.399	-3.184	-2.404
Regular hand washing	-2.937	-5.495	-3.593
(Intercept)	-42.094	-46.040	-44.455

*Fisher linear discriminant functions.

5.8. Canonical Discriminant Functions

In the canonical function of variables, the abscissa represents the socio-demographic variables and the measures decreed by the government (independent variables) and the ordinate the socio-economic impact of COVID-19 on households (dependent variable). The figure, the factors associated (red color) with the severe impact are mostly located in the first quadrant, meaning when these values increase, there is a significant increase in the severe impact in the outbreaks (Figure 3).

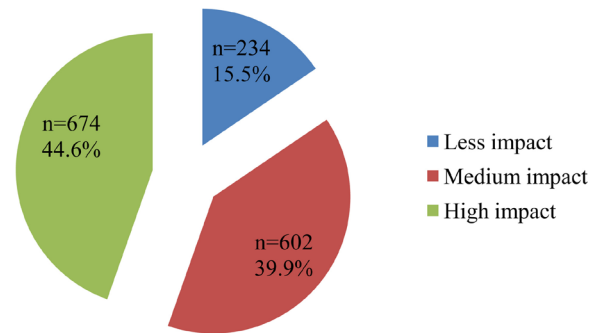


Figure 2. Level of socio-economic impact in households.

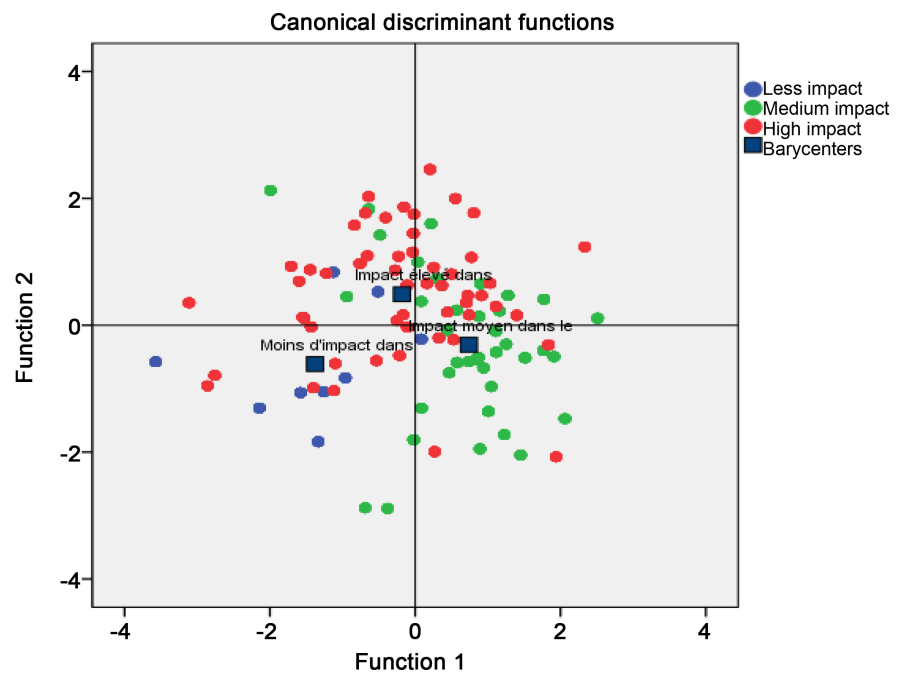


Figure 3. Canonical discriminant functions.

5.9. Independent Factors Associated with Socio-Economic Impact

Adjusting the factors that discriminate against the socio-economic impact of COVID-19 in the household showed that the household whose head of household exercised a liberal profession, had a low level of education and attended revival churches, had respectively 5, 7 and 3 times the risk of serious socio-economic impact. On the other hand, the use of a mask, regular hand washing, knowledge of the consequences of confinement and knowledge of the mode of transmission of COVID-19 reduced this risk by 10, 50, 5 and 3 times respectively (Table 6).

6. Discussion

The present study examined the impact of the COVID-19 pandemic on households in Kinshasa.

Among the 1510 respondents studied, the pandemic had a significant impact

Table 6. Independent factors associated with socio-economic impact.

Facteurs	β	aOR (95% CI)	p
Sex (Male vs female)	0.677	1.97 (0.99 - 3.88)	0.051
Profession (liberal vs others)	2.975	5.10 (2.90 - 8.90)	<0.001
Educational level (Low vs High)	4.674	7.14 (3.43 - 9.16)	<0.001
Religion (Revival Church vs traditional)	0.955	2.60 (1.94 - 3.47)	<0.001
Application of hydroalcoholic solution (No vs Yes)	0.072	1.08 (0.58 - 1.99)	0.819
Mask usage (No vs yes)	-2.275	0.10 (0.05 - 0.22)	<0.001
Regular hand washing (No vs yes)	-6.012	0.02 (0.01 - 0.08)	<0.001
Knowledge of the disease symptom (No vs yes)	9.246	10.36 (2.38 - 14.47)	<0.001
Knowledge of the consequences of confinement (No vs yes)	-1.588	0.20 (0.08 - 0.51)	0.001
Knowledge of the contamination mode (No vs yes)	-0.924	0.39 (0.21 - 0.74)	0.004
Intercept	2.672	14,476	0.068

(moderate/severe) in 1272 participants (84.5%). These results join other studies conducted in the same in other countries such as that of Varshney *et al.* in early March in India which showed that the pandemic had a significant impact on a third of participants [10]. Another study conducted in China reported that 53.8% of participants had a significant impact, while another reported that only 7.6% of participants had a significant impact [11] [12]. This significant socio-economic impact could be explained in our context of confinement of the commune of Gombe, a place hosting the majority of the country's commercial activities. The limitation of population movements by the government and the technical team of the response against COVID-19 with the slogan stay at home is one of the reasons for this harmful socio-economic consequence of the households in Kinshasa. Along the same lines as our study, Young Minds found that 83% of its respondents reported declining health care, disruption of household income, loss of employment, and school/university closures [13].

The socio-demographic variables discriminating the socio-economic impact show that women tended to have a significantly greater socio-economic impact than men. These results are similar to the results of several studies conducted in the general population in 2020 [10] [11] [14].

Respondents with a liberal profession and those with a low level of education were more likely to have a significantly severe socio-economic impact from the pandemic. This finding is similar to those noted by researchers in Bangladesh and Spain [15] [16]. This finding may be due to the fact that a greater income of people comes daily from odd jobs they do in the commune of Gombe which was at the time confined.

Respondents with knowledge of the consequences of confinement and the mode of transmission had significantly reduced their significant impact in their home. These results are similar to the results of Zhang & Ma and Plomecka *et al.*

[12] [17]. This is because knowledge increases vigilance and prudence in anticipating the effect that may occur in the future.

The increase in barrier gestures such as mask use and regular hand washing among respondents had also reduced the significant severe impact of outbreaks in this study. These measures allow the people who applied them to no longer fear contamination of the virus and to manage differently to prevent the consequences of households. For these people, applying these measures allowed them to go out without conforming to the slogan stay at home. So applying the barrier measures gave increased confidence and self-esteem and as a result many could no longer stay at home and believe that applying the barrier measures can be a simple strategy to build resilience to the pandemic [18].

Limitations of the study: certain limitations must be taken into account when analyzing the results. Collecting data from a population limited to a single city does not therefore make it possible to generalize the results in all the cities of the DRC. The study involved self-report measures where the respondent might not have any data about their situation, which could not establish the causal link. Despite the limitations, this study provides cross-sectional data on the economic impact of the pandemic in the Kinshasa focus. Further longitudinal studies should be conducted to confirm the results and formulate guidelines for the population of Kinshasa during the next pandemic.

7. Conclusion

The COVID-19 pandemic has raised several concerns for homes in the city of Kinshasa. This survey is one of the first to examine the socio-economic impact of the COVID-19 pandemic on households in Kinshasa. The study reported that the pandemic had a significant impact on the lives of households. Households with a liberal professional head of household, with a low level of education, attending revival churches and having knowledge of the symptom of COVID-19, tended to have a greater socio-economic impact. Certain measures such as the application of a barrier gesture, regular hand washing, knowledge of the consequences of containment and the mode of contamination significantly reduced the socio-economic impact of the outbreaks. The results of the study should be used by stakeholders to formulate policies and help households adapt in the event of a pandemic of another disease.

Authors' Contributions

ANN and CMN designed and analyzed the statistical data for the study. HATK contributed to the data collection. PLN, GLM and BLM supervised the study. All authors have read and approved the final and revised version of the manuscript.

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Conflict of Interest Disclosures

The authors declare no conflicts of interest regarding the publication of this paper.

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