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Original article

# Factors associated with the acceptability of government measures to address COVID-19 in Senegal



## Facteurs associés à l'acceptabilité des mesures gouvernementales face à la COVID-19 au Sénégal

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### ARTICLE INFO

#### Article History:

Received 30 May 2021

Accepted 22 March 2022

Available online xxx

#### Keywords:

Social acceptability  
 Government measures  
 COVID-19  
 Senegal

### SUMMARY

**Introduction.** – Three months after the first appearance of the new coronavirus (COVID-19), Senegal recorded its first case on March 2, 2020. Faced with this pandemic, the State reacted quickly with public measures : instituting a curfew, placing a ban on travel between regions, and closing shops and places of worship. This research aims to study the acceptability of these non-pharmaceutical measures by the Senegalese population.

**Method.** – This study was a cross-sectional and analytical survey conducted in June and July 2020 among Senegalese over 18 years old. Sampling by the representative quota method was distributed proportionally to age, gender and region. We constructed the questionnaire using the theoretical framework of acceptability of health interventions. Through a telephone call center synchronised to an internet server, we collected data on personal characteristics, knowledge of the disease, trust in information sources, trust in government, concern about the pandemic, and the seven dimensions of acceptability. We performed descriptive analysis and structural equation with R software version 4.0.2.

**Results.** – This study included a total of 813 individuals. The average age was 34.7 years ( ± 14.2 years). They were predominantly male (54.6 %), with no education (42.6 %). The increased level of knowledge of the disease was associated with confidence in national media information sources provided by the administrative and health authorities ( $\beta=0.11$ ,  $p<0.01$ ). The increase in the level of trust in the government in response to COVID-19 was positively related to the acceptability of curfew ( $\beta=0.16$ ,  $p<0.001$ ), travel ban between regions ( $\beta=0.11$ ,  $p<0.001$ ), and closure of places of worship ( $\beta=0.1$ ,  $p<0.01$ ) and markets ( $\beta=0.09$ ,  $p<0.01$ ).

**Conclusion.** – In Senegal, the acceptability of the measures depended on knowledge of the disease, perception of the risk of the disease, and trust in the government. There is a need to strengthen awareness and risk communication of COVID-19.

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### R É S U M É

**Introduction.** – Trois mois après l'apparition de la nouvelle maladie à coronavirus (COVID-19), le Sénégal a enregistré son premier cas, le 2 mars 2020. Face à cette pandémie, le pays a réagi rapidement par des mesures publiques : couvre-feu, interdiction des déplacements entre les régions, fermeture des commerces et des lieux de culte. Cette recherche vise à étudier l'acceptabilité de ces mesures non pharmaceutiques par la population sénégalaise.

**Méthode.** – Il s'agit d'une enquête transversale et analytique réalisée en juin et juillet 2020 auprès de Sénégalais âgés de plus de 18 ans. L'échantillonnage par la méthode des quotas représentatifs a été réalisé

#### Mots clés:

Acceptabilité sociale  
 mesures gouvernementales  
 COVID-19  
 Sénégal

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proportionnellement à l'âge, au sexe et aux régions. Le questionnaire a été construit à partir du cadre théorique d'acceptabilité des interventions de santé. La collecte a été réalisée à partir d'un centre d'appel téléphonique synchronisé à un serveur internet concernant : les caractéristiques personnelles, la connaissance de la maladie, la confiance dans les sources d'informations, la confiance envers le gouvernement, l'inquiétude face à l'épidémie et les sept dimensions de l'acceptabilité. L'analyse descriptive et l'équation structurelle ont été réalisées avec le logiciel R version 4.0.2.

**Résultats.** – L'étude a porté sur un total de 813 individus. L'âge moyen était de 34,7 ans ( $\pm 14,2$  ans). Les participants étaient majoritairement de sexe masculin (54,6%) et sans instruction (42,6%). La bonne connaissance de la maladie était associée à la confiance dans les sources d'informations des médias nationaux portée par les autorités administratives et sanitaires ( $\beta=0,11$ ,  $p<0,01$ ). L'augmentation du niveau de confiance envers le gouvernement dans la riposte contre la COVID-19 était liée positivement à l'acceptabilité du couvre-feu ( $\beta=0,16$ ,  $p<0,001$ ), de l'interdiction des déplacements entre les régions ( $\beta=0,11$ ,  $p<0,001$ ), de la fermeture des lieux de culte ( $\beta=0,1$ ,  $p<0,01$ ) et des marchés ( $\beta=0,09$ ,  $p<0,01$ ).

**Conclusions.** – Au Sénégal, l'acceptabilité des mesures dépendait de la connaissance de la maladie, de la perception du risque liée à la maladie et de la confiance envers le gouvernement. Il est nécessaire de renforcer la sensibilisation et la communication sur les risques liés à la COVID-19.

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## 1. Introduction

On December 31, 2019, Chinese authorities notified the World Health Organization (WHO) of cases of pneumonia caused by a coronavirus in the city of Wuhan, Hubei Province [1]. On March 11, 2020, the WHO declared the outbreak of the new coronavirus (COVID-19) a pandemic and called on states to take immediate action to limit the spread of infection and to ensure compliance with international health regulations [2,3]. Lessons learned from past coronavirus outbreaks in 2003 in China [4] and 2012 in the Middle East [5] involve transmission control principles that focus on both pharmaceutical measures and non-pharmaceutical interventions such as curfews, lockdowns, closure of public places, and travel restrictions [6,7].

Non-pharmaceutical measures aim to reduce the transmission of the virus by delaying and reducing the magnitude of the peak of the epidemic, thereby buying time for the adaptation of health systems and the potential arrival of a vaccine and drugs [8]. Due to the increase in case numbers worldwide, the Senegalese authorities reacted before the first reported case on March 2, 2020 [9]. They created a multisectoral national action plan for surveillance and response to COVID-19. This plan is accompanied by non-pharmaceutical government measures to restrict movement, prohibit groupings [10], and close schools and markets [11].

Social acceptability is a collective judgement about a decision or project. The basis and influencing factors of social acceptability need to be understood [12]. During the application of containment in the European Union, studies have shown that the most approved measures were the ban on public gatherings and the closure of borders, supported by 83 % of the population. The most controversial measures were suspending public transport and implementing curfews [13]. A study in France showed that young people aged 18–25 were less in favour of containment, while those with a high level of education and households with a high level of income were more in favour [14]. Prior to its first confirmed case of COVID-19, Saudi Arabia, implemented restrictive preventive measures such as mosque closures and travel restrictions based on its experience in managing past outbreaks such as the 2012 MERS-Cov outbreak [15]. The female population, those over 38 years of age, and those with a university education were more accepting of these measures [16]. In Africa, many studies have compared the level of personal protective measures and restrictions to the number of cases and deaths [17,18]. However, there has been little research on the perception, acceptability, or adherence of populations in this regard [17,19,20].

A comprehensive understanding of public perceptions and attitudes towards non-pharmaceutical interventions is advantageous in strengthening their implementation and effectiveness. At a time

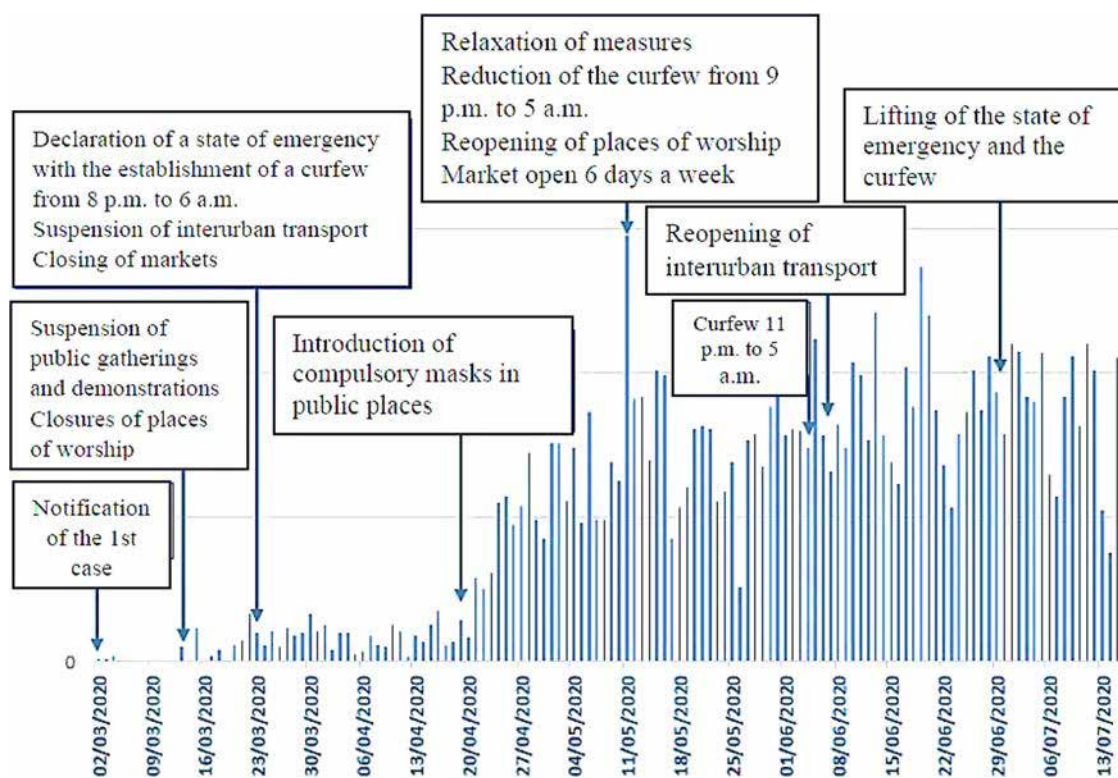
when a second wave is forcing some African countries to resume restrictive measures, it is useful to identify the factors that explain people's adherence to these measures to use them effectively. For this purpose, we studied the acceptability of government measures in Senegal concerning curfews, the prohibition of travel between regions, and the closure of markets and places of worship. The aim is to obtain knowledge that will be useful for planning and decision-making.

## 2. Method

### 2.1. Study Framework

Senegal is located in West Africa with 14 administrative regions. As of 2019, the estimated population is 16,209,125, with a female predominance (50.2 %). Nearly a quarter of the population lives in the Dakar region [21]. Ninety-four percent of the Senegalese are Muslims [22]. The gross primary school enrolment rate is 82.1 %, and the gross domestic product GDP per capita is \$1,446 combined with a poverty line of 34 % [23]. The ratio of telephone numbers per person is 1.1. The proportion of people using a mobile phone at least five times a day increased from 36.42 % in 2014 to 73.46 % in 2017 [24]. The Senegalese health system is a pyramid structure with three levels : central, intermediate, and peripheral. Services are provided in public hospitals, health centres, health posts and health centres for the public sector and private hospitals, clinics, practices and company structures for the private sector. Senegal has 1,623 doctors, two-thirds of whom work in the public sector. Nearly 40 % of paramedical staff work in the private sector [25].

In response to the increasing number of COVID-19 positive cases, the government took a series of measures to contain the epidemic (Figure 1). On March 14, 2020, it banned public gatherings and demonstrations throughout the country and closed places of worship and borders (land, sea and air) [10]. They closed schools and universities on March 16 for three weeks, then until May 4, and announced resumption for June 2 [10]. On March 23, they declared a state of emergency, accompanied by a curfew (from 8 pm to 6 am) and a suspension of inter-city transport (thus limiting travel between regions) [11]. The State renewed this package of measures on April 2 and May 11, which also corresponded to the beginning of relaxed measures including, reduced duration of the curfew from 9 pm to 5 am and reopening places of worship and markets for six days out of seven. On June 4, the State further relaxed the curfew, bringing it from 11 pm to 5 am ; on June 7, it lifted the restriction on inter-city travel ; and lifted the state of emergency and the curfew on June 30, 2020 [26].



**Figure 1.** Non-pharmaceutical measures over time and changes in the number of COVID-19 cases (Data source : MSAS)

## 2.2. Type of study

This was a cross-sectional, descriptive, and analytical study at national level done via the telephone network from a call center from June to July 2020.

## 2.3. Study population

The study population consisted of the Senegalese population aged 18 years and over, proportionally distributed according to age, sex, and regional residence.

## 2.4. Sampling

We carried out a marginal quota survey for a sample of 1,000 individuals [27]. This method is relevant in emergency situations such as COVID-19 with sample sizes below 3000 [27,28]. Appropriate choice of quotas can reduce the variance of the estimate and the size of its confidence interval. If carried out rigorously, the quota sampling method can be as accurate as random sampling [29] or even more accurate if the sample size is small [28,30]. We used the following variables to define the quotas : age, gender, and region according to the population frame of the last general census in 2013 [31].

## 2.5. Data collection

We integrated the Open Data Collet (ODK) electronic questionnaire into a networked computer program with an internet and telephone component. The program selected unique telephone numbers ( $n = 30,603$ ) randomly according to the country-wide numbering plan using the *Random Digit Dialing* (RDD) method [32]. A second computer program sent the previous list an SMS to provide information about the project (including ethical issues) and warn subscribers that they were likely to be called. This program identified valid numbers by the delivery status of the SMS. It resulted in a new list of supposedly valid numbers ( $n = 10,931$ ). We inserted this list into a Reactive

Auto Dialer (RAD) [33] to trigger calls in an automatic and optimised way ( $n = 6,576$ ). At this point, the person was put in touch with an interviewer ( $n = 1441$ ) based in Dakar who explained the research and requested consent to participate. Five interviewers carried out data collection speaking the main national languages and French after three days of training on the survey process and content.

In addition to the personal characteristics of the respondents such as age, gender, place of residence, socio-economic level, and education level, the data collected included new variables :

- *Quintile of socio-economic well-being*

It is a composite variable in the form of scores, constructed from household assets, housing characteristics, and use of basic services such as water supply. Economic well-being quintiles are obtained by ranking each person in the population according to their overall score and dividing the distribution into five categories [34].

- *Knowledge of the disease*

We assessed it using 11 items listed on the WHO COVID-19 guidelines [35]. These were divided into two broad categories : knowledge of clinical signs (fever, cough, Stiffness, runny nose, loss of taste, loss of smell, diarrhea and vomiting) and knowledge of modes of transmission (contact with droplets or sputum from a sick person, contact with saliva from a sick person and contact with a contaminated surface). When the item was mentioned, it was scored 1, otherwise 0. The overall knowledge score varied from 0 to 11.

- *Attitudes related to concern and trust in government*

We measured concern about the pandemic on a 0-10 scale ranging from not at all concerned to very concerned allowing for a broad range of responses. The assessment of confidence in the government's management of the pandemic used the same 0-10 scale with 0 not at all confident and 10 completely agreeing and confident in the government's management. This 11-unit scale is used during this pandemic to measure the level of concern and anxiety of the COVID-

19 population in opinion polls (CoviDirect OpinionWay-Square barometer) because it is easy and quick to use [36].

#### • Trust in social network information sources

We constructed two questions relating to new remote communication sources accessible to all via the internet on a four-point scale. These two questions were, "Do you trust social networks (Facebook, Twitter, Instagram, etc.) and blogs ?" and "do you trust WhatsApp messages and videos and other applications ?". This approach is based on studies that have looked at the impact of trust in information sources on the implementation of preventive measures against COVID-19 [37] and mental health status in an epidemic situation [38].

#### • Trust in local information sources

The evaluation is similar to the previous one. These questions were, "do you trust the national media (newspapers and their websites, TV, radio...) ?" and "do you trust health professionals (doctors, nurses, pharmacists, etc.) ?".

#### • The four measures of acceptability

Our study concerns the four main measures : curfew, travel ban, closure of markets, and closure of places of worship. The assessment of acceptability used Sékon's theoretical model [39] with seven dimensions (a : understanding the importance of the measure, b : going to great lengths to comply with the measure, c : feeling positive about the measure, d : reducing coronavirus-related illness, e : believing that the benefits of the measure are worth complying with, f : having confidence in one's ability to comply with the measure to the fullest extent possible, and g : the measure is consistent with one's personal values). Thus, the acceptability each of these 4 measures was constructed from the 7 dimensions evaluated with a 5-point Likert scale : 5=Strongly agree, 4=Agree, 3=Neither disagree or agree, 2=Disagree, 1=Disagree, and 0=Don't know [39].

## 2.6. Assumptions

We based the formulation of the research hypotheses on the conceptual framework of acceptability [39,40] and on previous research showing linear relationships between knowledge, trust in information sources, trust in government, and concern about COVID-19 [41,42] and also of the relation between sources of information of social networks and the confidence in the government in the management and the concern in front of the disease [43]. Thus, we formulated nine hypotheses :

- H1 : The more we have an increase in the level of knowledge of COVID-19, so does trust in national media sources
- H2 : The more we have an increase in the level of knowledge of COVID-19, the less one trusts the information sources of social networks
- H3 : The more we have an increase in the level of knowledge of COVID-19, the more you accept the four measures
- H4 : The more confidence people have in national media sources, the more confidence they have in the government's response to the epidemic
- H5 : The more you trust national media sources, the more you are concerned about COVID-19
- H6 : The more trust there is in social media sources, the less trust there is in the government's response to the epidemic
- H7 : The more you trust the networks' sources of information, the less worried you are about COVID-19
- H8 : The more people are concerned about COVID-19, the more they accept the measures
- H9 : The more confidence people have in the government's response to the epidemic, the more they accept the measures.

## 2.7. Data analysis

Quantitative variables were described by the mean with its standard deviation, the median with the extremes, and qualitative variables by absolute frequencies and relative frequencies. The parametric Student's t test and the Mann-Whitney test were used with an alpha risk of 5 % to compare the differences between certain groups of personal characteristics variables and the acceptability scores of the four government measures. We performed correlations to investigate the relationships between the four measures of acceptability [44]. In order to identify the factors associated with the acceptability of government measures, we conducted structural equation modelling (SEM). We used SEM to estimate complex relationship models (multiple independent and dependent variables) that may incorporate latent variables (constructed from multi-item measurement scales) [45]. We carried them out with the Lavaan package of the R software [46]. The models fitting parameters were Chi-Square, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Residual (SRMR), and Comparative Fit Index (CFI). An RMSEA close to zero indicates a better fit as does an SRMR less than or equal to 0.08. Unlike the CFI, which is based on the average size of correlations, it should be high and at least greater than 0.9 [47,48].

## 3. Results

The study included a total of 813 individuals aged between 18 and 88 years with a mean age of 34.7 years ( $\pm 14.2$  years). Men predominated with 54.6 %, and people without instructions represented 42.6 % of the population (Table 1).

Young people under 25 years of age were less accepting of the curfew, while those over 60 were more supportive. The latter were more in favour of closing markets and places of worship (Table 1).

The female sex was more in favor of the curfew and the ban on travel between regions. For men, they accepted more the closure of places of worship. While there was no significant difference according to sex for the acceptability of the closing of the markets.

No statistically significant difference was observed between socio-economic level and government measures (Table 1).

Compared to the level of education, those with a primary level and those without instructions were more accepting of curfews and less accepting of bans on inter-regional travel and the closure of places of worship (Table 1).

The knowledge score had a mean of 2.7 ( $\pm 1.3$ ), with a median of 3 and a maximum of 6.

Confidence in the government's response to COVID-19 had a mean score of 7.1 ( $\pm 3.2$ ) and a median of 8 for extremes ranging from 0 to 10. (Table 2).

The internal consistency of the different scales of the four government measures showed that they were all acceptable with Cronbach's alpha coefficients above 0.7 (Table 3).

The study of the relationship between the four measures showed that they were all positively correlated with each other. The strongest correlation was between the ban on inter-regional travel and the closure of markets ( $r = 0.52^{**}$ ) and the weakest between the curfew and the closure of places of worship ( $r = 0.28^{**}$ ) (Table 3).

The model validation shows that the structural equation has an acceptable fit with a CFI above 0.90 and an acceptable RMSEA of 0.8 (Table 4).

The results show that people with good knowledge of the disease were more accepting of the closure of places of worship ( $\beta=0.12^{***}$ ) and markets ( $\beta=0.1^{**}$ ) than of the travel ban ( $\beta=0.07^{*}$ ). There was no significant relationship found between knowledge of the disease and acceptability of the curfew ( $P > 0.05$ ). Knowledge of COVID-19 disease was positively associated with trust in national media sources of information from medical-administrative institutions and or health



**Table 1**  
Personal determinants of acceptability of the four measures

	Absolute frequency	Relative frequency	Acceptability curfew		Acceptability Prohibition of movement between regions		Acceptability of market closure		Acceptability Closure of places of worship	
	(n)	(%)	Average (ET)	P value	Average (ET)	P value	Average (ET)	P value	Average (ET)	P value
Age $\mu(\pm)$	34.7	( $\pm 14.2$ )	-	-	-	-	-	-	-	-
Age group by year										
18 - 24	228	28,0	28,2 (5,2)	<b>0,005</b>	27,8 (5,7)	0,054	26,1 (6,0)	<b>0,008</b>	23,8 (6,9)	<b>0,009</b>
25 - 59	515	63,4	29,1 (4,9)		28,7 (5,4)		26,7 (6,2)		24,7 (7,3)	
60 - 88	70	8,6	30,3 (5,1)		29,2 (4,9)		28,7 (4,9)		26,8 (6,4)	
Gender										
Female	369	45,4	29,9 (4,3)	<b>&lt;0,001</b>	29,1 (4,9)	<b>0,006</b>	26,9 (5,7)	0,495	24,0 (7,1)	<b>0,014</b>
Male	444	54,6	28,3 (5,4)		28,0 (5,9)		26,6 (6,4)		25,2 (7,2)	
Level of education										
Without instruction	346	42,6	29,3 (5,2)	<b>0,008</b>	28,3 (5,6)	<b>0,040</b>	26,2 (6,4)	0,123	23,9 (7,5)	<b>0,009</b>
Primary	154	18,9	29,7 (4,4)		28,8 (5,2)		26,6 (6,0)		24,4 (7,2)	
Secondary	213	26,2	28,3 (4,74)		28,1 (5,6)		26,9 (5,6)		25,1 (6,7)	
Academic	100	12,3	28,1 (5,4)		29,8 (4,9)		27,8 (6,0)		26,6 (6,7)	
Socio-economic level										
Poorer (1-20 %)	116	14,3	29,2 (5,0)	0,879	27,9 (4,9)	0,445	26,9 (5,9)	0,569	24,9 (7,4)	0,447
Poor (21-40 %)	113	13,9	28,8 (4,6)		28,1 (5,4)		26,8 (5,7)		25,6 (6,7)	
Medium (41-60 %)	165	20,3	29,2 (4,6)		28,4 (5,4)		26,6 (6,1)		24,0 (7,0)	
Rich (61-80 %)	210	25,8	28,8 (5,8)		28,9 (5,8)		26,2 (6,2)		24,5 (7,3)	
Richer (81-100 %)	209	25,7	29,0 (4,8)		28,9 (5,5)		27,1 (6,4)		24,7 (7,3)	
Region										
Dakar	247	30,4	28,6 (4,7)	<b>0,043</b>	29,1 (5,2)	0,858	26,8 (6,3)	0,841	25,0 (7,1)	<b>0,013</b>
Thies	120	14,8	29,4 (4,8)		28,4 (5,4)		26,9 (5,6)		25,0 (7,2)	
Diourbel	92	11,3	29,5 (4,9)		28,3 (5,3)		26,7 (5,6)		22,6 (7,1)	
Kaolack	58	7,1	29,7 (4,8)		28,5 (5,1)		27,1 (5,3)		23,4 (6,8)	
Saint-Louis	51	6,3	28,5 (6,1)		28,1 (5,7)		26,5 (5,7)		23,9 (7,7)	
Louga	50	6,2	28,8 (5,4)		27,3 (6,2)		25,7 (6,0)		23,1 (7,4)	
Fatick	40	4,9	29,5 (4,1)		28,2 (4,7)		27,5 (5,2)		24,9 (6,5)	
Tambacounda	33	4,1	28,6 (6,6)		27,6 (7,4)		25,3 (8,1)		24,7 (7,8)	
Ziguinchor	27	3,3	30,9 (3,7)		28,9 (5,7)		27,4 (6,3)		28,1 (6,3)	
Kolda	27	3,3	27,8 (6,0)		28,0 (6,6)		25,4 (8,9)		24,9 (8,8)	
Matam	26	3,2	26,0 (6,0)		28,2 (5,5)		25,5 (4,6)		24,7 (5,6)	
Kaffrine	25	3,1	29,7 (4,5)		29,1 (5,5)		27,3 (7,2)		27,7 (7,3)	
Sedhiou	13	1,6	30,7 (4,9)		29,4 (4,3)		28,2 (5,7)		27,9 (5,6)	
Kédougou	4	0,5	29,0 (5,5)		28,8 (3,0)		28,0 (4,7)		27,0 (5,0)	

personnel ( $\beta=0.11^{**}$ ). The more reliable these sources are, the more the population has the right information about the risks of the pandemic, the more concern about the disease ( $\beta=0.18^{***}$ ) and trust in the government's response ( $\beta=0.23^{***}$ ) increases. Confidence in the government is reflected in acceptability for all four measures taken but a lot for the curfew ( $\beta=0.16^{***}$ ) and travel ban ( $\beta=0.11^{***}$ ), and less for the closure of places of worship ( $\beta=0.1^{**}$ ), and markets ( $\beta=0.09^{**}$ ) (Figure 2).

Those concerned about the COVID-19 outbreak were more likely to accept all four measures, especially the ban on inter-regional travel ( $\beta=0.18^{***}$ ) and the closure of markets ( $\beta=0.16^{***}$ ) and slightly less likely to accept the fire ban ( $\beta=0.13^{***}$ ) and the closure of places of worship ( $\beta=0.13^{***}$ ) (Figure 2).

Of the nine hypotheses formulated, the structural equation verified six (H1, H3, H4, H5, H8, and H9) and negated three (H2, H6 and H7).

#### 4. Discussion

Although there were differences according to age, gender, and education level, the population most accepted the curfew. Older people and women were more in favour of the curfew. This favourability was also the case in Saudi Arabia regarding the population's perception of confinement [16].

On the other hand, more educated individuals were less in favour of curfew acceptability. Although the curfew is appreciated for its qualitative aspects related to security with the reduction in attacks and social / family cohesion with a significant time spent with the family [49], we could think that its restrictive conditions of individual

freedoms could be at the origin of its opposition among the educated population [50]. These results were consistent with France regarding attitudes towards restrictive measures [51].

The awareness that older people are at a higher risk for COVID-19 infection [52] could explain why people over 60 years old in Senegal more easily accepted measures to limit contact and social gatherings.

Studies have shown that knowledge and good sources of information about CHD could contribute to adopting preventive behaviours

**Table 2**  
Description of score parameters

	Average	Standard deviation	Median [Extremes]
Knowledge of COVID-19	2,7	1,3	3 [0-6]
Trust in social network information sources	3,3	2,0	3 [0-8]
Trust in local media sources	6,8	1,6	7 [0-8]
Concern about the COVID-19 epidemic	7,4	3,3	9 [0-10]
Confidence in the government to manage the COVID-19 pandemic	7,1	3,2	8 [0-10]
Curfew	29,0	5,0	30 [0-35]
Prohibition of travel between regions	28,5	5,5	29 [7-35]
Market closures	26,7	6,1	28 [0-35]
Closure of places of worship	24,7	7,2	26 [0-35]

**Table 3**

Rating scales and correlation matrix of the four government measures

	Curfew	Travel ban	Market closures	Closure of places of worship
<b>Cronbach's alpha coefficient</b>	<b>0,77</b>	<b>0,81</b>	<b>0,83</b>	<b>0,86</b>
<b>Correlation between measurements</b>				
Curfew	-			
Prohibition of travel between regions	0.40**	-		
Market closures	0.38**	0.52**	-	
Closure of places of worship	0.28**	0.44**	0.47**	-

 $\alpha$  = Cronbach's alpha coefficient\*\*  $p < 0,01$ **Table 4**

Structural equation model fit index

	Chi2	p-value	RMSEA	CFI	TLI	SRMR
<b>Model</b>	85,22	< 0,001	0,08	0,92	0,76	0,058

RMSEA = root mean square error of approximation

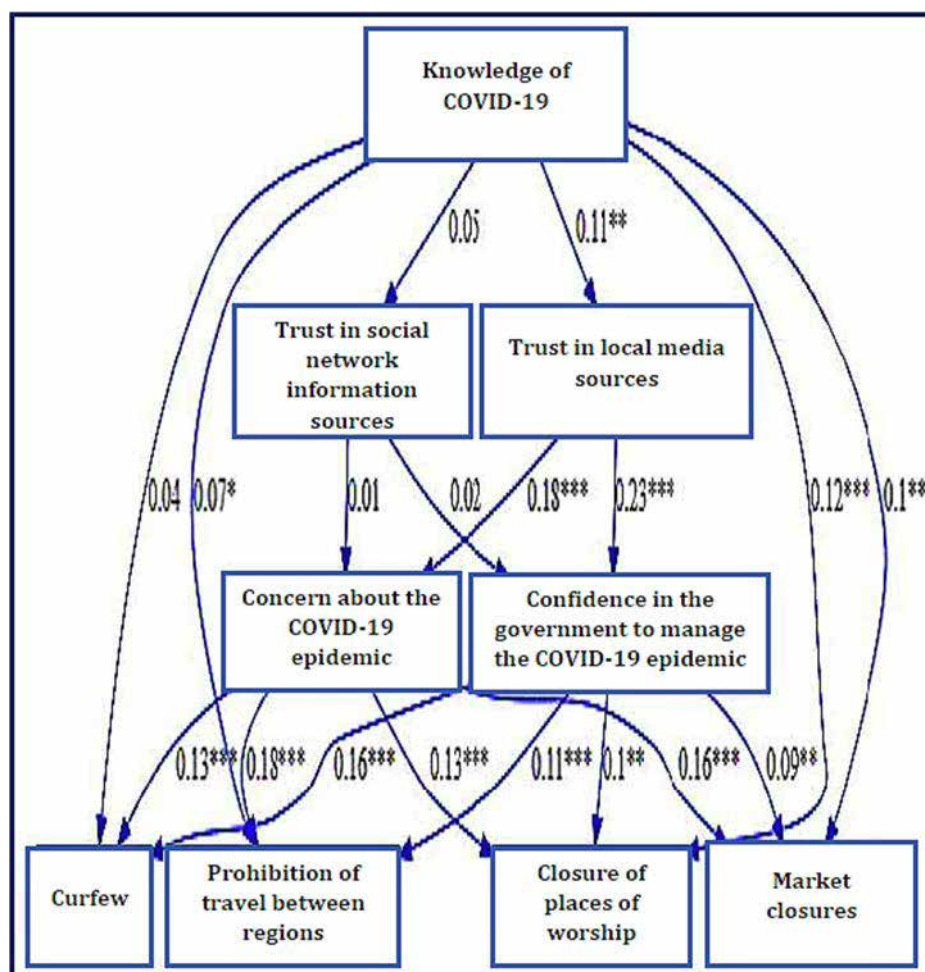
CFI = comparative fit index

TLI = Tucker-Lewis index

SRMR = standardized root mean square residual

related to personal protective measures and contact limitation [53]. Therefore, in our study, we sought to provide an overview of the sources of information that people trusted in order to inform policy-makers on the best strategy for information dissemination. Improved

knowledge about COVID-19 was a factor in explaining trust in traditional national media sources of information. In contrast, trust in social media sources was not associated with knowledge of the disease. Social media sources may be the site of messages that reduce public confidence in shared scientific knowledge and implemented health policies [54] with misinformation noted at the start of the pandemic on COVID-19 [55]. This confidence in the national media (institutional communication) proves the relevance of the efforts made by the Senegalese authorities on the communication strategies put in place [56]. These strategies focused on raising awareness of the warning signs and modes of transmission, individual protection measures and collective measures to restrict movement, or on the crisis communication instituted with press briefings in the official language and in local languages that are accessible to the community [57]. The

**Figure 2.** Structural equation of the acceptability model for the four government measures \*  $P < 0.05$ ; \*\*  $P < 0.01$ ; \*\*\*  $P < 0.001$

acceptability of government measures was positively associated with trust in the government to manage the pandemic. The interactions leading to these associations through structural analysis showed correlations between knowledge of COVID-19 disease, trust in local media sources, trust in the government's response to COVID-19, and acceptability of non-pharmaceutical government measures. Researchers found similar relationships in China, where trust in official information sources increased participants' awareness of COVID-19, and that awareness was associated with the implementation of measures such as social distancing [41]. In Italy, trust in local and European institutions and the government's management of the pandemic contributed to the public's willingness to comply with the implementation of containment [58]. Personal feelings about the epidemic, such as concern about the disease, were also factors in the acceptability of government measures. This was noted in Brazil, where those who felt most vulnerable to the COVID-19 epidemic supported the implementation of protective and restrictive measures by the authorities [59].

This study, carried out with quotas, at a distance, and by telephone, may have some limitations. Some personal information on age, region of residence, and ownership of assets in the household, which can be used to create the socio-economic level, is not verifiable and may contribute to a bias in representativeness. In addition, self-reported responses on the acceptability of past measures could be influenced by the health and socio-economic situation at the time of the interviews. It was also possible that there was a social desirability bias secondary to political affiliation in favor of the ruling party. We believed that this bias would have been limited by the individual and remote nature of the interviews with respect for anonymity. The use of an assessment from opinion surveys may be limited in assessing concern for disease in the absence of validation of this tool in studies with randomized approaches.

A Tucker-Lewis TLI (TLI) of 0.76 obtained in this study, i.e., less than 0.90 suggests a poor fit of the structural equation model, but one or the other of the parameters  $d$  can be used. Adjustment to make the interpretation of the validation of the model. All the more, among the three most used (CFI, RMSEA, TLI), the two CFI and RMSEA were acceptable, which pushed us to carry out the validation and conclude with a model adjusted from them.

## 5. Conclusion

The study showed that the acceptability of government measures in Senegal depended on knowledge of the disease, the perception of risk associated with it, and confidence in the government's management of COVID-19. It is essential to increase awareness and risk communication about this virus. Public attitudes towards restrictive interventions and the extent to which any intervention is likely to be acceptable, is a consideration for governments when deciding to act. It is important, not only because levels of acceptability can critically affect the effectiveness of an intervention, but also because governments need to be aware of public attitudes to maximize the expected effect on breaking the chain of transmission of COVID-19.

## Ethical approval

The research was approved by the National Health Research Ethics Committee of Senegal (SEN/20/23).

## Author contributions

All the authors participated throughout the process of writing the protocol, collecting, analyzing the data and writing the article.

## Funding

This research was conducted as part of the ARIACOV program (Appui à la Riposte Africaine à l'épidémie de Covid-19), which receives funding from the French Development Agency through the "COVID-19 - Santé en commun" initiative.

## Declaration of Competing Interest

The authors have no conflicts of interests regarding the publication of this paper.

## Acknowledgements

We would like to thank the five interviewers who participated in the data collection : Tabaski Diouf, Coumba Sow, Fatoumata Dieme, Rokhaya Gueye and Mafoudya Camara. To our technical partner Cloudlyours, who have been able to put in place all the necessary tools for data collection.

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