



Research Article

Infection Prevention and Control Practices of Public and Private Health Facilities in Federal Capital Territory Abuja, Experience during COVID-19 Pandemic

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Citation: Abdurrahman S, Bimba JS, Olubunmi A, Gadzama D, Kefas IB, et al. (2023) Infection Prevention and Control Practices of Public and Private Health Facilities in Federal Capital Territory Abuja, Experience during COVID-19 Pandemic. J Community Med Public Health 7: 324. DOI: <https://doi.org/10.29011/2577-2228.100324>

Received Date: 19 May, 2023; **Accepted Date:** 01 June, 2023; **Published Date:** 05 June, 2023

Abstract

Background: Adherence to Infection prevention and control standard practice protocol is critical in minimizing the risk of contracting COVID-19 infection among healthcare workers. With the increasing trend of nosocomial transmission of COVID-19 among healthcare workers during the pandemic in Nigeria, we assessed the status of IPC in facilities in the Federal Capital Territory (FCT), Abuja during the COVID-19 pandemic. **Methods:** A cross-sectional study design was conducted from March to April 2020 in the Federal Capital Territory (FCT), Abuja. A semi-structured interviewer-administered checklist adapted from the World Health Organization (WHO) IPC scorecard for health facilities was used. IPC focal persons for each health facility visited were interviewed on the twelve IPC domains. Data was analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 26. A $p < 0.05$ was considered statistically significant for all statistical tests. **Result:** Four hundred fifty-eight facilities took part in the study. The majority of the facilities 320 (69.9%) were public/government owned, with more than half 315 (68.8%) being secondary health facilities. The overall IPC status was good in 408 (89.0%) of the health institutions. However, there was a statistically significant difference in IPC practices between private and public facilities in the majority of IPC domains: Functional IPC Committee ($p = 0.001$), facility triaging ($p = 0.001$), temporary holding area (THA) ($P = 0.001$), PPE ($P = 0.001$), Waste disposal ($p = 0.023$), hospital sterilization ($p = 0.008$), and hospital decontamination ($p = 0.004$). **Conclusion:** The study found a satisfactory level of IPC protocol operationalization status in mostly public health facilities in the Federal Capital Territory (FCT), Abuja. Nevertheless, there is a need for interventions targeting mostly private health facilities to address the disparity and gaps identified in IPC practices.

Keywords: Infection Prevention and Control; COVID-19; Healthcare workers; Federal Capital Territory; Abuja

Introduction

Infection prevention and control (IPC) practices in health care facilities during COVID-19 were poised with increasing challenges of ensuring optimal practices due to increased patients presenting with COVID-19 and patients with routine care needs [1]. The absence of an adequate work force to maintain a functional local response and patient care during the pandemic was responsible for a high rate of infection among Health Care Workers (HCWs) [2]. In Federal Capital Territory (FCT), Abuja a total of seven hundred and fifty-six (756) health care workers have been infected with COVID-19 in the course of duty between 20th of March 2020 to the 31st of March 2021 [3]. Health Care Workers (HCWs) are generally at risk of emerging viral diseases SARS-COV-2, due to novel nature of the disease and poor IPC practices [2,4,5].

In Nigeria, studies reported the prevalence of nosocomial infection ranging between 14%-49% [6-8]. In Wuhan, China, during the early phase of the COVID-19 epidemic about 29% of patients with SARS-CoV-2 were health-care workers and were assumed to have acquired the infection in hospital. 9 Deaths among health-care workers infected with SARS-CoV-2 were mostly among aged 50 and above [10]. With an increasing understanding of the COVID-19, the proportion of healthcare workers contracting COVID-19 infection in hospital setting has decreased, but stringent IPC measures and continued vigilance are needed. Facility-based Infection Prevention and Control (IPC) measures are fundamental to addressing this challenge while public health measures target community transmission [11].

Infection prevention and control is a proven solution that has the ability to mitigate the incalculable suffering and costs to both healthcare workers and the health system [12]. Compelling evidence shows that up to 70% of Hospital Acquired Infections (HAIs) can be prevented by scaling up an array of effective IPC interventions. Investing in IPC is one of the most cost effective interventions available. In particular, hand hygiene and environmental hygiene in health care facilities were found to halve the risk of death due to infections with AMR pathogens, and decrease the associated long-term complications and health burden by at least 40%. Improving hand hygiene in health care settings could save about US\$ 16.50 and reduced health care expenditure, while generating substantial net saving across countries worldwide [13]. During the first six months of the COVID-19 pandemic, access to appropriate personal protective equipment combined with rapid IPC training would have had the potential to avert SARS-CoV-2 infections and

related deaths among health care workers globally [13].

IPC measures are extensive in hospitals managing patients infected with SARS-CoV-2 and include rigorous cleaning and disinfection to reduce environmental contamination, use of Personal Protective Equipment (PPE), isolation, and isolation [14]. COVID-19 has stretched IPC practice in facilities both in terms of human capacity to ensure the practice and increased demand for IPC materials [2].

The COVID-19 pandemic and other recent large disease outbreaks have highlighted the extent to which health care settings can contribute to the spread of infections, to patients, health workers and visitors, are at risk of contracting nosocomial infections if little attention is paid to IPC. Good hand hygiene and other cost-effective practices can prevent up to 70% such infections [13]. The COVID-19 pandemic has exposed many existing challenges encountered in the implementation of IPC in all regions and countries, including those with the most advanced IPC programmes. It has also provided an unprecedented opportunity to take stock of the situation, rapidly scale up disease outbreak readiness and response through proper implementation of IPC practices, as well as strengthening IPC programmes across the health system [13]. The aim of the study is to determine the status of IPC in facilities during the COVID 19 pandemic.

Materials and Methods

Study settings, design, and sample size

A cross-sectional study was carried out from March 2020 to April 2020 in the Federal Capital Territory (FCT), Abuja. The Federal capital territory is a cosmopolitan city and the political capital of Nigeria, which experiences high influx of diverse people with wide diurnal nocturnal ratio. The estimated total population of the FCT is about 5,338,550 with a landmass of 1769 km². There are 6 Area Councils (AC) and 62 political wards in the FCT [13,14].

FCT operates a 3-tier health system of primary, secondary, and tertiary levels of care that spread over rural and urban areas. There are 754 accredited health facilities made up of 500 private health facilities and 254 public health facilities. The 254 public health facilities are disaggregated into 237 primary health facilities, 14 secondary health facilities, and 3 tertiary hospitals namely; National Hospital, Federal Medical Centre and University of Abuja Teaching Hospital located in Gwagwalada Area Council. The three tertiary hospitals are owned and funded by the Federal Government, while the secondary facilities are managed by the Hospitals Management Board (HMB), and the PHC facilities are managed by the FCT Primary Health Care Board (PHCB). The private health facilities consist of hospitals, maternity homes, faith-based hospitals and clinics, diagnostic centers, and pharmacies. The private sector provides healthcare for a substantial proportion

of the population [14].

The minimum sample size was calculated using the formula for a cross-sectional study. The significant level was placed at a 95% confidence interval, power of 80% using prevalence from a similar previous study.

Study population and sampling techniques

The IPC scorecard adapted from the World Health Organization (WHO) was administered to IPC focal persons in the facilities [15]. All the public tertiary and secondary health facilities were selected. The study population consisted of consenting Primary Healthcare workers 18 years and above, residing and working in the FCT for at least six months.

The list of all the private and public primary health care facilities was obtained to form the sampling frame. A proportion to size sampling technique was used to select the number of primary health facilities in the 6 Area council.

Twenty-two HCWs, twelve nurses and ten Community Health Officers (CHOs) were recruited and trained for two days as research assistants. A written informed consent was sought and obtained from each eligible participant, and a semi-structured interviewer-administered questionnaire was used to collect information from all facilities.

Study instrument and data collection

A semi-structured interviewer-administered checklist adapted from WHO core component and facilities scorecard for IPC was utilized [15]. IPC was assessed in twelve domains in all facilities. IPC committee or hygiene committee in place, Triage area in place, identification of a temporary holding area, Hand hygiene, availability and usage of PPE, waste collection and segregation, waste disposal, staff training, intra-hospital alert, sterilization, decontamination of the environment and risk assessment of healthcare worker exposed.

Each domain has set of questions and the responses are scored as 1 for a yes response and 0 for a no response. Each domain score was graded as good (75%-100%), fair (50%-74%) and poor (1%-49%). The checklist was pretested among 10% of the total

sample size in PHC facilities in Karu LGA.

Measurement of variables

The dependent variables were the IPC status categorized as good, fair and poor while the twelve domains were independent.

Data analysis

All the data generated was entered and analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 26. A $p < 0.05$ was considered statistically significant for all statistical tests. The data analysis was stratified by facility ownership. Mean scores and standard deviations were used to summarize the quantitative variables. Chi-square test was done to describe associations between IPC domains and facility ownership.

Ethical consideration

Ethical approval for the study was obtained from the FCTA Health and Research Ethics Committee (FHERC). Written informed consent was obtained from each study participant. Respondents were free to withdraw anytime during the study if they so desired. The participants were assured of the confidentiality of their information. All methods were carried out in accordance with relevant guidelines and regulations.

Results

Most of the facilities were public government owned 320(69.9%) and majority were secondary health facilities (Table 1, Figure 1).

Characteristic	Frequency (n)	Percentage (%)
Facility ownership		
Private	138	30.1
Public	320	69.9
Facility type		
Primary	83	18.1
Secondary	315	68.8
Tertiary	60	13.1

Table 1: Characteristics of Health Facilities Assessed for IPC in Federal Capital Territory Abuja.

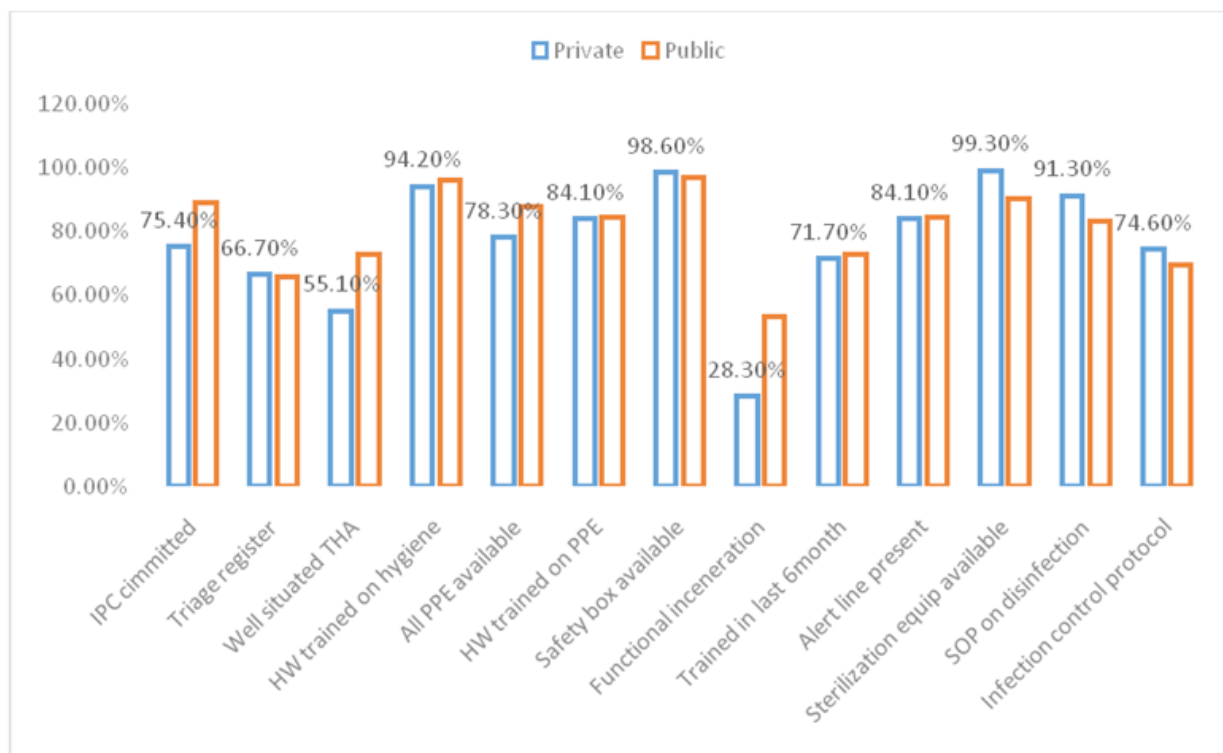


Figure 1: Respondents responses on the IPC Practices in facilities in Federal Capital Territory.

Most public facilities shows better IPC practice in compared to private facilities except for availability sterilization equipment, SOP on disinfection and the presence of infection control protocol. Only about two-third of the facilities has protocol for IPC available. Functional incineration is only available in Less than 30% of private facilities and about 50% of public facilities (Table 2).

IPC Domain	Frequency (n)	Percentage (%)
Functional IPC committee		
Good	361	78.8
Fair	25	5.5
Poor	72	15.7
Facility triaging		
Good	293	64
Fair	133	29
Poor	32	7
THA		
Good	241	52.6
Fair	49	10.7
Poor	168	36.7

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Hand hygiene		
Good	436	95.2
Fair	5	1.1
Poor	17	3.7
Personal Protective Equipment		
Good	305	66.6
Fair	106	23.1
Poor	47	10.3
Waste collection		
Good	399	87.1
Fair	41	9.0
Poor	18	3.9
Waste disposal		
Good	90	19.7
Fair	324	70.7
Poor	44	9.6
Health worker training on IPC		
Good	223	48.7
Fair	101	22.0
Poor	134	29.3
Hospital IPC alert		
Good	381	83.2
Fair	37	8.1
Poor	40	8.7
Hospital sterilization		
Good	359	78.4
Fair	64	14.0
Poor	35	7.6
Hospital decontamination		
Good	379	82.8
Fair	71	15.5
Poor	8	1.7
Hospital health worker risk assessment		
Good	180	39.3
Fair	131	28.6
Poor	147	32.1

Table 2: Assessment of IPC Domain in Health Facilities in Federal Capital Territory Abuja.

Table 2: The functional IPC committee was categories as good in only about 25 (5.5%). Most facilities had good triaging place 293 (64.0%). Half of the Health facilities have good temporary holding area 241 (52.6%). Hand washing and hygiene was optimal in most of the facilities 436 (95.2%). PPEs was available in two third of the facilities 305 (66.6%). Waste collection was good 399 (87.1%) with only 90 (19.7%) having good disposal methods. Less than half 223(48.7%) of the health care workers reported having good training on IPC. Most of the hospital 359 (78.4%) had good sterilization methods in the facilities and most of the facilities does hospital decontamination 379 (82.8%). Hospital health workers risk assessment was good in only 180 (39.3%) (Figure 2).

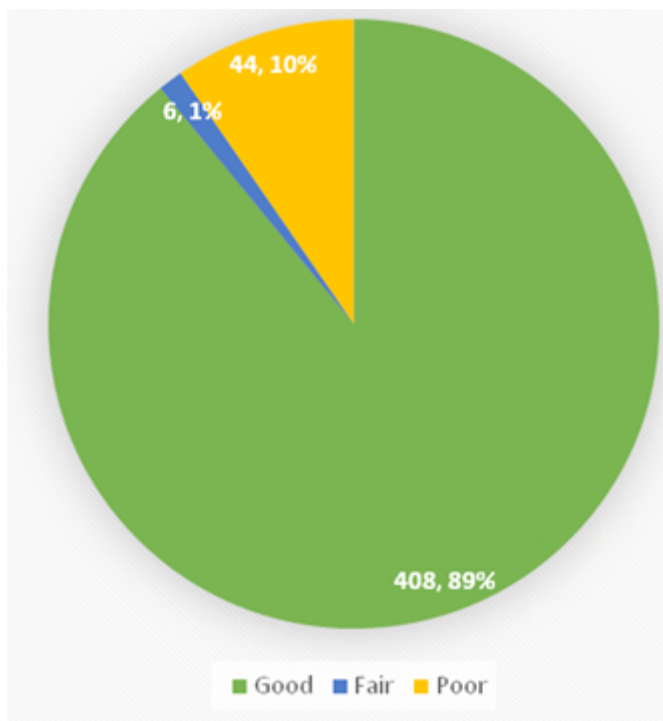


Figure 2: Overall IPC status in Health Facilities in Federal Capital Territory Abuja.

Overall IPC status in health facilities was good 408 (89.0%) and this was poor in only 44 (10.0%). There was a significant statistical difference in the IPC practices among private and public facilities in most of the IPC domains Functional IPC Committee ($p < 0.001$), facility triaging ($p < 0.001$), THA ($P < 0.001$), PPE ($P < 0.001$), Waste disposal ($p = 0.023$), hospital sterilization ($p = 0.008$), and Hospital decontamination ($p = 0.004$). No statistical difference was observed in hand hygiene ($p = 0.546$), waste collection ($p = 0.233$), health workers training on IPC ($p = 0.160$) and hospital health workers risk assessment (0.156) (Table 3).

IPC Domain	Facility ownership		V= χ^2	df	p-value
	Private Freq.(%) n=138	Public Freq.(%) n=320			
Functional IPC committee					
Good	92(25.5)	269(74.5)	21.284	2	<0.001
Fair	8(32.0)	17(68.0)			
Poor	38(52.8)	34(47.2)			
Facility triaging					
Good	32(24.1)	101(75.9)	6.710	2	<0.001
Fair	91(31.1)	202(68.9)			
Poor	15(46.9)	17(53.1)			

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THA					
Good	42(17.4)	199(82.6)			
Fair	27(55.1)	22(44.9)	42.540	2	<0.001
Poor	69(41.1)	99(58.9)			
Hand hygiene					
Good	129(29.6)	307(70.4)			
Fair	2(40.0)	3(60.0)	1.212	2	0.546*
Poor	7(41.2)	10(58.8)			
PPE					
Good	100(32.8)	205(67.2)			
Fair	17(16.0)	89(84.0)	15.749	2	<0.001
Poor	21(44.7)	26(55.3)			
Waste collection					
Good	115(28.8)	284(71.2)			
Fair	17(41.5)	24(58.5)	2.914	2	0.233
Poor	6(33.3)	12(66.7)			
Waste disposal					
Good	20(22.2)	70(77.8)			
Fair	98(30.2)	226(69.8)	7.584	2	0.023
Poor	20(45.5)	24(54.5)			
Health worker training on IPC					
Good	58(26.0)	165(74.0)			
Fair	33(32.7)	68(67.3)	3.665	2	0.160
Poor	47(35.1)	87(64.9)			
Hospital IPC alert					
Good	110(28.9)	271(71.1)			
Fair	14(37.8)	23(62.2)	1.781	2	0.410
Poor	14(35.0)	26(65.0)			
Hospital sterilization					
Good	120(33.4)	239(66.6)			
Fair	14(21.9)	50(78.1)	9.739	2	0.008
Poor	4(11.4)	31(88.6)			
Hospital decontamination					
Good	126(33.2)	253(66.8)			
Fair	11(15.5)	60(84.5)	11.297	2	0.004*
Poor	1(12.5)	7(87.5)			
Hospital health worker risk assessment					
Good	45(25.0)	87(66.4)			
Fair	44(33.6)	135(75.0)	3.711	2	0.156
Poor	49(33.3)	98(66.7)			

Table 3: IPC status in Public and Private Health Facilities in Federal Capital Territory Abuja.

There was no significant statistical difference in good IPC practice between private and public facilities ($p=0.085$), however most facilities in the public facilities had good IPC practice 292(91.3%) compared to private 116(84.0%) (Table 4).

IPC Domain	Facility ownership		χ^2	df	p-value
	Private Freq (%) n=138	Public Freq.(%) n=320			
Overall IPC status					
Good	116(84.0)	292(91.3)	4.934	2	0.085
Fair	6(4.4)	3(0.9)			
Poor	16(11.6)	25(7.8)			
Total	138(100.0)	320(100.0)			

Table 4: Comparison of overall IPC status in Public and Private Health Facilities in Federal Capital Territory Abuja.

Discussion

The COVID-19 pandemic has tested the strength of the health systems globally, and has impact on the health system, including human resource and training needs, monitoring and provision of resources. This has led to improvement in Health Care Workers (HCWs) IPC capacity and behaviors [11]. Thus, efforts to improve IPC activities need to continue beyond acute response effort. IPC implementation at the national level need to be comprehensive well funded to protect HCWs, patients they serve, community and ultimately to contribute to safe health services deliver [13].

In this study, an assessment of IPC implementation and practice was carried out in private and public healthcare facilities in FCT using the twelve components of the WHO infection prevention and control assessment tool. This study found no significant difference in the overall IPC practice of private and public owned facilities [15]. This is above the average of 80% required for the control epidemic diseases [16,17]. Similar findings was reported in a study conducted in Tanzania after an IPC intervention [15]. This finding was also corroborated in done in Kenya, that shows weak association between private and public facility ownership [18]. The high proportion of good IPC in this study may be due to the effect of intervention activities in both the private and public facilities, facilities now have a better understanding of IPC, in what combination, and in what context, implementation strategies should be best utilized to ensure their safety and that of their patients [19].

However, we found 11.6% of private and 7.8% of public facilities with poor IPC is similar to a finding in a study done in Ghana that reported 12.5% and 19.2% in Kenya [18,20,21]. This implies that HCWs working in those facilities are more likely to be exposed to nosocomial infections and are at more risk of COVID 19 infection [21]. There is a need to strengthen governance and leadership at health facilities to promote adherence to IPC policy and SOPs, which will mitigate the risk of spread of infections and promote hygiene [22].

In this, study more than two-third of the facilities in both private and public facilities had functional IPC committee. This finding was in congruence with studies carried out in River and Ghana [21,23] where there was IPC program in greater than fifty percent of facilities. The World Health Organization reiterates that establishing IPC programmes are vital for limiting the spread of infectious diseases in the hospital setting [24]. When there are no clearly stated goals for programme implementation activities, achieving the programme goals becomes difficult. The finding indicates that further improvement is expedient to ultimately achieve quality IPC practice [21].

We found that most of the healthcare facilities had a copy of the IPC protocol, but adherence to implementation of IPC activities was insufficient. It was reported that evidence-based guidelines' on IPC practices and procedures can effectively reduce hospital-acquired and antimicrobial resistance especially when combined with healthcare workers education and training [23]. A local adjustment and application of the IPC protocol can warrant and sustain good IPC practices in healthcare facilities [25].

We also found that most health care workers in both private and public facilities had training on IPC in the last 6 months. Disparity in IPC training and education among health workers on infection prevention and control has been reported [11]. Training of health workforce should be supported through inclusion of IPC in training curricula at all levels, rather than within individual disease-specific programmes [15]. There is a need to develop an integrative nationwide trainings and similar learning strategies among health workers to allow for uniformity in IPC knowledge and practice [23].

In this study, more than two third the number of facilities assessed had IPC protocol without clearly stated objectives and plan of activities. Similar result was observed in a study conducted in Ghana [18] were more than fifty percent of the health facilities had IPC program but without clearly defined objectives.

We observed that most Health facilities both private and public had most health workers trained on hand hygiene. This is important in ensuring monitoring of adherence to the implementation of IPC activities and the adaption of the IPC in the local context to guarantee sustain good IPC practice. This observation clearly indicates the need for awareness creation, information, education and periodic training of health care workers on infection prevention and control [23].

We found that less than one-third of facilities had good waste disposal methods and less than half had incineration to treat waste. Most facilities used mixed method of waste disposal including a combination of incineration, open burning, disposal at a general dumpsite and burying.

This is important in prevention of infection of health workers, patients and members of the community. Variety of safe waste disposal methods were recommended by World Health Organization in health facilities and resource poor settings, such as thermal, chemical and containment processes [23].

The COVID-19 pandemic has caused significant disruption of health systems, stressing the importance of effective IPC programmes. The importance of monitoring and supervision in contributing to improved IPC practices at healthcare facilities cannot be overemphasize [27] and improved IPC practices play a key role in the reduction in the proportion of HCW infections [11]. There is a need for training and education of HCWs on IPC as this was shown to decrease the risk of SARS-CoV-1 and MERS-CoV infection among HCWs [28]. All the health facilities in this study are supported by NGOs for the implementation of IPC; therefore, the findings cannot be generalized for the nation as this support is in selected facilities and states.

Availability of Data

The dataset generated or analyzed during this study is included in this published article and its supplementary information files uploaded.

Sources of Support

The research work is completely sponsored by the authors.

Authors' Contributions

AS, BJS JD, LEC and OA contributed to the conceptualization and design. GD acquired articles for review, abstracted findings to tables, and contributed to analysis and interpretation. KIB carried out data analysis. All the authors participated in the review and critique process and revised it critically for intellectual content. All the authors read and approved the final manuscript.

Acknowledgment

We are grateful to Institut d'Investigació Germans Trias i Pujol; CIBER Enfermedades Respiratorias, Instituto de Salud Carlos III; and Genetics and Microbiology Department, Autonomous University of Barcelona (Barcelona, Spain)" and FCT Public Health Department which provided technical directives and guidance for the COVID 19 response in the territory.

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