





BMJ Open Care seeking for under-five children and vaccine perceptions during the first two waves of the COVID-19 pandemic in Lagos State, Nigeria: a qualitative exploratory study

Ayobami Adebayo Bakare ^{1,2}, Omotayo E Olojede,³ Carina King ¹, Hamish Graham ^{3,4}, Obioma Uchendu,^{2,5} Tim Colbourn,⁶ Adegoke G Falade,^{3,7} Helle Molsted Alvesson ¹, on behalf of the INSPIRING Project Consortium

To cite: Bakare AA, Olojede OE, King C, *et al.* Care seeking for under-five children and vaccine perceptions during the first two waves of the COVID-19 pandemic in Lagos State, Nigeria: a qualitative exploratory study. *BMJ Open* 2023;**13**:e069294. doi:10.1136/bmjopen-2022-069294

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-069294>).

Received 23 October 2022
Accepted 20 February 2023



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

For numbered affiliations see end of article.

Correspondence to

Dr Ayobami Adebayo Bakare; bakare.ayobami.adebayo@ki.se

ABSTRACT

Objective To explore healthcare seeking practices for children and the context-specific direct and indirect effects of public health interventions during the first two waves of COVID-19 in Lagos State, Nigeria. We also explored decision-making around vaccine acceptance at the start of COVID-19 vaccine roll-out in Nigeria.

Design, setting and participants A qualitative explorative study involving 19 semistructured interviews with healthcare providers from public and private primary health facilities and 32 interviews with caregivers of under-five children in Lagos from December 2020 to March 2021. Participants were purposively selected from healthcare facilities to include community health workers, nurses and doctors, and interviews were conducted in quiet locations at facilities. A data-driven reflexive thematic analysis according to Braun and Clark was conducted.

Findings Two themes were developed: appropriating COVID-19 in belief systems, and ambiguity about COVID-19 preventive measures. The interpretation of COVID-19 ranged from fearful to considering it as a 'scam' or 'falsification from the government'. Underlying distrust in government fuelled COVID-19 misperceptions. Care seeking for children under five was affected, as facilities were seen as contagious places for COVID-19. Caregivers resorted to alternative care and self-management of childhood illnesses. COVID-19 vaccine hesitancy was a major concern among healthcare providers compared with community members at the time of vaccine roll-out in Lagos, Nigeria. Indirect impacts of COVID-19 lockdown included diminished household income, worsening food insecurity, mental health challenges for caregivers and reduced clinic visits for immunisation.

Conclusion The first wave of the COVID-19 pandemic in Lagos was associated with reductions in care seeking for children, clinic attendance for childhood immunisations and household income. Strengthening health and social support systems with context-specific interventions and correcting misinformation is crucial to building adaptive capacity for response to future pandemics.

Trial registration number ACTRN12621001071819.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ A key strength of this study was the inclusion of perspectives from both caregivers and healthcare providers in private and public health facilities, and the recruitment of various cadres of healthcare providers.
- ⇒ The use of semistructured interviews, conducted while the pandemic was ongoing, provided the opportunity to understand individual perspectives and experiences.
- ⇒ Perspectives captured in this study may have missed some negative impacts of COVID-19 on care seeking given caregivers were recruited from health facilities and may therefore differ from the wider community.
- ⇒ Findings from this study may not reflect all aspects considered important to the participants as communities and healthcare workers were not consulted in the design of the interview guides.

INTRODUCTION

The COVID-19 pandemic was declared a public health emergency of international concern in January 2020 by WHO.¹ Differential negative impacts have been reported across the globe due to the COVID-19 pandemic. While some countries have reported a high number of deaths due to COVID-19, others particularly in sub-Saharan Africa have reported low mortality,² but have suffered significant social and economic impacts with recovery, likely to take a protracted course.³ As of 27 March 2022, over 8 million cases and 170 000 deaths had been reported in Africa, although estimates of actual cases (505.6 million) and deaths (439 500) in the region are much higher.^{4,5} Within Africa, Nigeria reported the fourth highest number of COVID-19 cases in 2020–2021, with 215 164 reported cases

(3.4% of the African total) and 92 million estimated cases.⁶ Lagos State was the epicentre of the COVID-19 pandemic in Nigeria during this period, accounting for more than 30% of Nigeria's reported cases, with the first cases identified in late February 2020.^{7,8}

The pandemic has been a major stressor to health systems, exposing and exacerbating pre-existing fragility and inequities within the system.^{9,10} Given the absence of effective and widely available COVID-19 treatments during the first and second waves—February to October 2020, and November 2020 to April 2021, respectively,¹¹ containment measures were based on public health measures like movement and travel restrictions (ie, 'lock-downs'), physical distancing, personal hygiene and use of personal protective equipment.¹² Negative impacts of these containment measures on social life and mental well-being, education, economy, health service delivery and utilisation have been reported, but mostly from non-empirical data and outside the African context.^{13–18} Early predictions of Africa being hit worst by the COVID-19 pandemic did not manifest,¹⁹ underscoring the need for context-specific empirical data. While the direct clinical impact of COVID-19 has affected adults more directly in this period, children are not exempt from indirect effects of mitigations, although observed data from Africa are lacking.^{20,21}

In March 2020, the Nigerian government imposed several public health measures. The initial COVID-19 pandemic wave in Nigeria was characterised by fear, confusion and instability in the existing social structures, with misinformation fuelled by social media reports and lockdown measures imposed by the government.^{7, 22–25} These may have had knock-on effects on healthcare service utilisation and delivery. While multiple studies, largely from high-income contexts, have reported reductions in child illnesses and hospital admissions during periods of COVID-19 restrictions, fewer have explored the role of changes in care seeking behaviour for children during this period and their implications for future public health responses to disease outbreaks.^{16,26}

In Nigeria, under-five mortality remains high, and is not on track to meet the 2030 Sustainable Development Goal global target of having less than 25 deaths per 1000 live births.²⁷ Pneumonia, malaria and diarrhoea are leading causes of under-five deaths in the country, responsible for almost 40% of under-five deaths in 2018.²⁸ Nigeria also experiences multiple outbreaks of diseases of public health significance annually, including meningococcal disease, yellow fever and Lassa fever.²⁹ Given the existing burden of pneumonia, malaria and diarrhoea among children, the magnitude of the COVID-19 pandemic and response, and the frequency of disease outbreaks requiring public health response which may require mass vaccination, it is important to understand how the COVID-19 pandemic affected care seeking for under-five children as well as decision-making around vaccine introduction for outbreak control. We therefore aimed to understand care seeking practices for young children

and the context-specific direct and indirect effects of public health interventions during the first two waves of COVID-19 pandemic and decision-making around vaccine acceptance at the start of COVID-19 vaccine roll-out in Lagos State, Nigeria.

METHODS

Study design

This was an exploratory qualitative study using reflexive thematic analysis according to Braun and Clark.³⁰ We conducted semistructured interviews with caregivers of children under five and healthcare providers to gather perspectives on care seeking practices during the first two waves of the COVID-19 pandemic in Lagos State, Nigeria (February to October 2020, and November 2020 to April 2021). The study was conducted as part of the process evaluation of the Lagos INSPIRING Project, which is evaluating a child pneumonia health system intervention. We followed the Consolidated Criteria for Reporting Qualitative Research guidelines for reporting.³¹

Setting

The study was conducted in Ikorodu local government area (LGA) in Lagos State. Lagos is the most populous state in Nigeria with an estimated population of 24.6 million people in 2022,³² and is an economic hub in West Africa. Ikorodu is one of five administrative divisions of Lagos. It is a periurban area, with fishing as the predominant economic activity in the rural parts of the LGA, and small-scale and medium-scale entrepreneurship as the major economic activity in the urban parts of the LGA. The LGA is served by 2 government-owned secondary health facilities (general hospitals), 28 primary healthcare centres (PHCs) and over 100 private facilities. Of the 28 PHCs, seven are designated as 'flagship' facilities by the Lagos State government, as they have more personnel and equipment and run 24-hour services for children and adults. There is at least one flagship PHC in each of Ikorodu's six local council development areas and all of them remained open during the first two waves of the pandemic. The flagship PHCs also acted as COVID-19 vaccination centres, except one facility which did not have a medical doctor.

As part of the public health measures, Lagos was placed on lockdown by the Federal Government of Nigeria on 30 March 2020.⁷ The lockdown lasted 35 days and included a ban on social and economic activities, restriction of all non-essential movements, suspension of commuter services, closure of schools and retail shops and prohibition of mass gatherings except for funeral services.³³ Unlike PHCs and private health facilities, service provisions were limited to emergency cases in the public secondary-level facilities. A gradual easing of the lockdown commenced from 4 May 2020 with no reinstatement of movement restrictions during the second wave (see online supplemental appendix I).⁷ In addition, there was a period of civil unrest in Lagos, including Ikorodu

Table 1 Summary of participants' characteristics

Caregivers n=32		Healthcare providers n=19	
Gender		Gender	
Male	0 (0.0)	Male	5 (26.0)
Female	32 (100.0)	Female	14 (74.0)
Mean age (±SD)	31±5.0 years	Mean age (±SD)	38±8.1 years
Median number of children (range)	2 (1–5)	Median year of experience	11 (2–40)
Educational level		Educational level	
Primary	2 (6.3)	Diploma	9 (47.4)
Secondary	13 (40.6)	Tertiary	9 (47.4)
Tertiary	17 (53.1)	Postgraduate	1 (5.2)
Religion		Religion	
Christianity	25 (78.1)	Christianity	15 (78.9)
Islam	7 (21.9)	Islam	4 (21.1)
Occupation/cadre		Occupation/cadre	
Self-employed	21 (64.5)	Doctor	7 (36.8)
Employed	5 (16.1)	Nurse	6 (31.6)
No employment	6 (19.4)	CHEW	6 (31.6)

CHEW, community health extension worker.

LGA (the 'EndSARS' protests against police brutality³⁴), between 8 and 22 October 2020, when a curfew was imposed.

Participants and sampling

We purposively selected healthcare providers who attended to sick children from the seven flagship PHCs and six nearby private facilities (table 1). To ensure representation of each cadre of healthcare provider, the categories of staff targeted for recruitment (nurse, community health workers and doctors) were adapted to each facility. We recruited caregivers of children under 5 years presenting at the outpatient departments (ie, with an illness) or immunisation clinics (ie, healthy children) of seven flagship PHCs and one secondary hospital. Caregivers were recruited by female clinical project staff, who screened every child brought to outpatient departments of the facilities for pneumonia. In each facility, we used convenience sampling to recruit four caregivers of under-five children at random (n=32): two caregivers of an acutely unwell child (from outpatients) and two caregivers of a child with no current illness episode (from the immunisation clinic). This sample size was based on practical considerations of the time needed to recruit participants and the expectation that it would be sufficient numbers to achieve saturation. All participants approached for the study agreed to take part.

Data collection

Interviews were conducted from 10 December 2020 to 18 March 2021. The semistructured interview guides were based on the literature on care seeking practices and knowledge about COVID-19 during the INSPIRING

Project formative phase and revised to capture the emerging COVID-19 vaccine programme roll-out in Nigeria. The interview guide for caregiver interviews had three sections focused on: participants' family and sociodemographic information, their experiences of 2020 in light of COVID-19 including their perception of the illness and economic impacts, and care seeking practices for children under 5 years. The interview guide for healthcare provider interviews had three sections focused on: service provision, facility adaptation to the COVID-19 pandemic and care seeking for sick under-five children (see online supplemental appendices II–IV).

The research team comprised paediatricians, social science and public health specialists. The interviews were conducted by OEO, a male master's student from Nigeria with experience of the local context, with support from the female clinical study staff who recruited participants based at each facility. Interviews were conducted in English or Yoruba (the indigenous local language in Ikorodu LGA), depending on the participant preference. The interviewer lived in Ikorodu before and during the COVID-19 pandemic and had previously visited the participating health facilities for other data collection activities.³⁵ Caregivers' interviews were conducted at the health facility or in another convenient place agreed by the participants. Providers' interviews were held at the facility. Each interview lasted between 30 and 40 min and no repeat interviews were carried out. All interviews were voice recorded, transcribed and translated into English before being stored in a secure cloud platform with access granted to only research team members. No transcripts were returned to the participants for review.



Data analysis

After cross-checking of the transcripts, the analysis team (AAB, OEO, HMA and CK) conducted a data-driven thematic analysis to develop themes and subthemes.³⁶ AAB and OEO independently reviewed all the transcripts to identify initial codes which were reconciled in NVivo.³⁷ Healthcare provider and caregiver interviews were initially coded separately, and then reviewed by the analysis team to identify common themes and subthemes, which were refined in subsequent analysis meetings. The process continued until the patterns of meaning were clear. The unit of analysis was COVID-19-related responses in the interviews.

Patient and public involvement

The overarching study was designed through a codesign workshop involving representatives from the Nigerian governments, community-based organisations, professionals, Save the Children and evaluation partners. However, patients were not involved in the design of this study. Findings from this study were not discussed with the participants, but will be incorporated into the final report that will be disseminated to the relevant stakeholders including healthcare providers and community-based organisations.³⁸

FINDINGS

We identified two overarching themes which were common to caregivers and healthcare workers: appropriating COVID-19 in the belief systems, and ambiguity towards preventive measures (table 2). When the findings differ between healthcare providers and caregivers, this is specifically noted in the text.

Appropriating COVID-19 in belief systems

This first theme elucidates plurality in the placement of COVID-19 within the context of existing belief systems. Caregivers and healthcare providers ascribed various causes to the emergence of COVID-19 including political, religious, social and geographical dimensions.

From the healthcare providers' interviews, social and political placements of COVID-19 emergence were commonly reported. To some healthcare providers, COVID-19 was not perceived as a public health problem in Nigeria.

Except that they would say that I am a medical practitioner but I still have the impression that there is no COVID in Nigeria. Don't mind me, it's just my own belief. (Doctor—male, public facility)

The COVID-19 pandemic was framed through a political lens, with distrust in the government shaping disbelief in the disease. This distrust in government provided an opening for misinformation about the virus and control measures with participants describing COVID-19 as 'a lie' and 'a deceit from the government'. The distrust also fed into caregivers' perceptions about COVID-19 surveillance, with some caregivers reportedly delaying care seeking to avoid being automatically added to the COVID-19 daily government case list. The disbelief of the existence of COVID-19 had social associations with participants believing that the disease would not affect 'the poor' or 'black man'.

There were some people that were like nothing is happening, we've not seen someone with it here, none of our relatives had it so it's just a scam. They don't believe it, most people don't believe it. (Community health extension worker (CHEW)—female, public facility)

Table 2 Summary of themes and subthemes

Organising themes	Themes	Subthemes
Appropriating COVID-19 in the belief systems	Political placement of COVID-19	Disbelief in the virus existence Misinformation and misconceptions about COVID-19
	Sociotheological placement of COVID-19	Religious explanation for COVID-19 Social placement of COVID-19
	Medical placement of COVID-19	COVID-19 infection is real Healthcare as a source of infection
Ambiguity about COVID-19 preventive measures	Unappealing lockdown experiences and associated adaptive mechanisms	Direct impact of lockdown
		Indirect impact of lockdown
		Health system adaption and its consequences
	Drivers of COVID-19 vaccine hesitancy	Misinformation and conspiracy theories about COVID-19 vaccine
		Fear and worries about COVID-19 vaccines
		Distrust in government efforts regarding COVID-19 vaccines
		Media influence on COVID-19
Drivers of COVID-19 vaccine uptake	Motivation to accept COVID-19 vaccine among healthcare providers	
	Motivation to accept COVID-19 vaccine among community members or caregivers	

To some caregivers, COVID-19 was symbolic and they offered religious explanations, describing it as a test of faith, signs of the ‘end of time’, a ‘punishment from God’ or the ‘work of the devil’, but this was not apparent among healthcare providers.

It’s just like God wanted to deliberately punish people for their bad behaviours [...]. Before, when one is sick, they’ll say they should carry the individual, if it’s our governors, they’ll take flight and fly them out of the country. But when COVID-19 came, no one can come inside or go outside. Everyone is static (immobile in lockdown), so it’s not COVID-19 again. It’s God’s judgement on us. (Mother—sick child, one child)

Other participants believed that COVID-19 existed as a symptomatic disease caused by a medical germ. Healthcare facilities were described as ‘contagious’—a source of infection, and hospital avoidance during the acute phase of the pandemic was reported by both caregivers and healthcare providers. Given health facilities were considered high-risk places, this perception resulted in (1) no care seeking practices for some sick under-five children as caregivers resorted to self-treatment of their child’s illness by seeking care from drug sellers instead, and (2) delayed presentation at health facilities when the child’s condition had worsened. Similarly, when caregivers identified COVID-19 signs in their child they avoided hospital for fear of COVID-19 diagnosis or referral to isolation.

They didn’t come. A lot of people were practicing self-medication. People who had cough for example, they didn’t come for treatment for fear of being told they had COVID. They kept managing it at home. (CHEW—female, public facility)

Like one of my neighbours when her baby was running a temperature, she could not bring the baby to the hospital because she said when she goes to the hospital - now they will say her baby have this thing high fever, they should take him to isolation center. Because of that she now went to the pharmacy and brought some (medicine). (Mother—healthy child, three children)

Both caregivers and healthcare workers reported being extra careful in hospital settings, and sometimes this led to inaccessibility of care if healthcare providers suspected COVID-19 or had inadequate protective equipment. In contrast, one healthcare provider noted that service delivery for children did not change, stating that COVID-19 infections in children are not as severe as that of adults, and it would be unethical to deny children access to healthcare.

Ambiguity about COVID-19 preventive measures

This theme details various responses, experiences and effects of recommended COVID-19 preventive measures and associated adaptations.

The lockdown was perceived as an unpleasant and difficult period as participants were restricted to indoor livelihoods with little or no access to transportation. Caregivers reported indirect effects of lockdown that could affect care seeking, including diminished household incomes which necessitated loan acquisition or seeking help from family members. Household food insecurity was exacerbated, and caregivers reported reducing their consumption to save food for their children. There was avoidance of social functions, mental health challenges and a focus on basic needs:

I have two teachers in my compound, not government teachers but private teachers. When the lockdown started then, the man is a teacher in private school, the woman is a teacher in a private school. As the school was not open, no salary, no money, nothing, nothing. For them to feed was problem, [never mind] if the baby falls sick, and now there is no money to take the baby to hospital. Sometimes, they will go and do herbal, this thing agbo (herbal concoction). (Mother—healthy child, three children)

Health facilities made adjustments to ensure continuous service delivery without undermining safety. Face masking, physical distancing and improved personal hygiene were adopted; however, they created additional problems such as discomfort (face masking), denied access to care or seeking medical advice from people without medical training. Caregivers complied with the rule although there were reports of anger and verbal assaults on healthcare providers when these measures were enforced at the health facilities.

There was a continuation of routine vaccination services during the lockdown, but caregivers’ incorrect assumption of PHC closures during the lockdown (secondary facilities were closed to non-emergency cases), compliance with the lockdown order and fear of COVID-19 partly contributed to reduced attendance at the immunisation clinic as reported by a CHEW:

If you remember even on social media (mass media), it was broadcasted that if what you want to do at the hospital is not very important, stay indoors and stay safe. So people adhered to that rule, to the extent that when we went for outreach services, we asked them why they haven’t been coming for immunization. Then they will say it’s because of the lockdown, and then ‘corona’ stopped us from coming out. They would also claim they don’t know that the facility still runs its services. (CHEW—female, public facility)

When COVID-19 vaccines became available in Nigeria, there were mixed perceptions and ambiguity towards them. Among some caregivers, the vaccine was regarded as ‘a mark of the beast’, or a depopulation strategy from Western countries. Religious belief, misinformation and fear of side effects were reasons identified by caregivers for COVID-19 vaccine hesitancy. Healthcare providers, in contrast, expressed distrust in the government and were



concerned about vaccine safety, quality, short timeline for vaccine development and the government's aggression towards COVID-19. They believed the vaccines were not tested very well in Nigeria before being approved.

That thing (COVID-19 vaccine) is not well tested that's my point. It's supposed to go through a series of tests before allowing it to come into this country. So I cannot even advise anyone to take it. (Nurse—female, private hospital)

Social media (WhatsApp, Facebook, Instagram) was identified as a source of misinformation about the vaccine. One healthcare provider queried the decision of the government to accept donated vaccines that are being rejected by other countries, as reported on social media. Similarly, vaccines sent to Nigeria were presumed to be of suboptimal quality compared with the ones used abroad but this was linked to distrust in governments.

Some people (healthcare providers) don't want to take it because of the things we have seen on social media that if you take it, it can cause this and that. (CHEW—female, public facility)

However, some healthcare providers and caregivers had positive perceptions of the vaccine, describing it as beneficial to the recipients, such as preventing sudden death and protecting against the virus. Others also showed trust in the government believing that the government cannot bring vaccines if they are harmful. Some caregivers also expressed willingness to receive the vaccine given that they are using an existing routine immunisation programme.

If the vaccine comes, we know there's a reason why the government brought it. It has a work it wants to accomplish, which is why they want to bring it; we will take it. (Mother—sick child, four children)

Perceived higher risk of infection, the possibility of vaccines becoming scarce, a sense of responsibility to clients, motivation from senior colleagues or health managers and later positive testimonies from recipients were identified as drivers of uptake among healthcare providers. Being a requirement for overseas travel or pilgrimage, counselling and public awareness were reported by healthcare providers as drivers of vaccine uptake among community members. Few healthcare providers who had taken the vaccine identified self-reflection and personal inquiry as ways they dealt with the misinformation about the vaccine.

I heard they were cloning the vaccine in some European countries. That was my fear but when I did my own research. I found out that there is no issue. (Doctor—female, public facility)

Despite the fear and negative perceptions, community members turned out en masse to receive the vaccine, and turnout exceeded expectations, making the supply inadequate.

We were even surprised. I wasn't expecting people to come out. It was supposed to be a 10-day program [...] but we extended further for four weeks or thereabout. People were still coming, we had to tell them that there was no more vaccination. (Doctor—male, public facility).

DISCUSSION

It is important to understand both community and healthcare workers' perceptions and experiences during the initial COVID-19 waves to adapt the provision of healthcare services to children during future pandemics. In the Nigerian context, participants reported both direct and indirect effects on care seeking for children, especially during the acute lockdown periods. Both groups of participants interpreted the COVID-19 pandemic through medical, political, social and economic lenses; however, religious interpretation of the pandemic was more prominent among caregivers. Care seeking for children under five was affected in part due to the perception of healthcare settings being contagious, fear of COVID-19 diagnosis and limited access to transportation. Adapting to seek care from alternative sources for sick children was reported by both groups. COVID-19 vaccine hesitancy was a major issue among healthcare providers, but less so among community members at the time of vaccine roll-out in Lagos. The motivations for vaccine uptake differed between the groups, and social media seemed to play a crucial role in shaping acceptability of the COVID-19 vaccine.

Our study suggests that COVID-19-related misinformation, rooted in a general distrust of government and cutting across every aspect of the COVID-19 response (including vaccine roll-out), had negative influences on care seeking for children. This resonates with findings elsewhere in Africa and globally that misinformation and misleading interpretations of health information (eg, daily reporting of cases and deaths from COVID-19 and fear of being counted as a COVID-19 case, assumption of facility closure during the lockdown) contributed to hospital avoidance,^{16 39 40} and therefore require consideration and active management in future outbreaks.⁴¹ Conversely, the diversity in COVID-19 placement could conceivably have positive influences on care seeking. For instance, religious beliefs relating to COVID-19 may provide emotional resilience and motivate caregivers to do everything possible to protect their children.⁴² Fear of COVID-19 may similarly motivate caregivers to seek care early and get vaccinated, and even a disbelief in COVID-19 may motivate caregivers to go about business as usual.

While there were people who did not believe in COVID-19 and/or did not seek care to avoid being caught up in the response (eg, wanting to avoid isolation centres), some took it seriously and many integrated religious interpretations into their understanding of the disease. A study conducted in Nigeria found that religion

and religious institutions, focused on Christianity, could have a negative influence on illness perception and behaviour, but that most Nigerian Christians comfortably integrated religious and physical health domains.⁴³ Additionally, some religious organisations actively encouraged adherence to COVID-19 preventive measures.⁴³ These findings highlight the dynamic process of classifying new diseases, as seen in the emergence of Ebola disease,⁴⁴ and the need for sociocultural considerations and community participation in public health planning and communication, as well as active feedback and management of rumours and misinformation during the response.^{45 46}

When caregivers decided to seek care for their children, lack of transportation due to lockdown inhibited access. Our finding agrees with an online survey conducted in Nigeria,⁴⁷ but contrasts with a study conducted in the Netherlands which reported parental non-deterrence in care seeking for a sick child.⁴⁸ Though the nature of illness could have been responsible for this contrasting finding, given the different epidemiological profiles, differences in health systems, COVID-19-related public health measures, as well as better health literacy around COVID-19 also have modulating effects. As reported in the UK, positive experiences from the National Health Service and support from others were positive influencers of care seeking, whereas fear driven by media and community were barriers to parental care seeking.⁴⁹ Worsened household income and food security reported during the acute phase of COVID-19 are in keeping with findings in other African countries, and these have the potential to exacerbate child malnutrition and mortality.^{50 51} Like in other settings,^{52–55} we found evidence suggesting decreased childhood immunisation during the lockdown but the extent is unclear as healthcare providers reported using outreach services to vaccinate defaulters.

Healthcare services being considered as high-risk settings for infection influenced care seeking practices for children. Similar to reports in Nigeria and elsewhere, caregivers were avoiding hospitals for fear of contracting COVID-19.^{49 56–58} The resultant self-management of childhood illness and decreased healthcare service utilisation are in keeping with other studies from Europe and Africa.^{57–60} Studies within and outside Nigeria have also reported increased self-medication practice for the prevention and treatment of COVID-19-related symptoms but did not focus on self-medication for children during the pandemic.^{61–63} A study conducted in Uganda also found higher neonatal mortality and morbidity during the lockdown.⁶⁴ Estimating the impacts of reduced hospital visits, seeking care from alternative sources, delayed hospital visits and increased self-medication for sick children was outside the scope of this study but will be crucial for understanding the indirect effects of COVID-19 public health measures. Nevertheless, our study supports the need for intelligent health communication and flexible approaches to increasing service delivery capacity, such as mobile outreach clinics to maintain healthcare access for children.^{20 65} A study conducted in the UK hypothesised

that decreased incidence of childhood illness during the lockdown period contributed to low paediatric admission for common and severe childhood illness during the lockdown;⁶⁶ however, hospital avoidance, care seeking from alternative sources and delayed presentation should not be dismissed.

The underlying distrust in government influenced COVID-19 perceptions, and provided the platform for the growing misinformation about the pandemic and this in turn shaped vaccine hesitancy.^{67 68} Our findings are in agreement with studies in Nigeria which found that non-adherence to recommended preventive measures for COVID-19 was centred on political distrust, stemming from decades of perceived bad governance.^{68 69} The mixed perception towards COVID-19 in Nigeria was therefore not surprising and similar controversies have been reported across several regions globally.⁷⁰ In times of uncertainty, a coping strategy is to use religion to provide explanations for strange events,⁷¹ and these may conflict with emerging scientific evidence (particularly as conclusions change with new data) and frustrate containment measures.⁷² Our findings support the need for inclusive risk communication for epidemic preparedness and control. Moreover, intervention adaptation to suit local contexts is essential during emergency response to epidemics.⁴⁵ Early reported cases of COVID-19 in the country were among foreigners and high-profile politicians. Linking COVID-19 results to known public officers could have been responsible for the perception that COVID-19 is a disease of the elite. In addition, limited testing capacity could have driven the perception that COVID-19 is not real, as up to 80% of infected individuals had been reported as mild or asymptomatic.⁷³

Interestingly, the demand for COVID-19 vaccine was reportedly higher than anticipated among community members despite negative media reports and conspiracy theories. This finding is consistent with a study conducted by Arce *et al* which found higher willingness to receive COVID-19 vaccine in low and middle-income countries compared with high-income countries in which the survey was done.⁷⁴ Our findings support the call for vaccine equity, the need for sustained global partnership and continuous post-vaccination surveillance to achieve effective global vaccination for COVID-19.⁷⁵ The concern about the unprecedented short period to vaccine production and licensing underscores the need for sustained and increased efforts towards control of other communicable diseases like tuberculosis, HIV/AIDS and pneumonia—not neglecting other diseases because of COVID-19. Considering the background mistrust in government, donation of substandard vaccines and vaccines with short expiry dates or not valid for travel as well as conditional donation of vaccines feeds into public narratives of lack of trust in COVID-19 vaccines and reinforces conspiracy theories about COVID-19.^{76–78} Meanwhile, vaccine hesitancy among healthcare providers requires attention for increased and sustained COVID-19 vaccine coverage in the long term.⁷⁹



This study had limitations. First, we recruited caregivers from PHCs only and did not gather perspectives from other community members. This may mean that the perspectives captured here underestimate negative effects on care seeking. More so, given that participants were not consulted in the design of the interview guide, we acknowledge that finding from this study may not reflect all aspects considered important to the participants. Review of facility data shows a considerable decrease in outpatient attendance for children (online supplemental appendix V). Our findings have provided context-specific understanding of the indirect and direct effects of COVID-related public health measures and may inform future public health responses to disease outbreaks. Though the implementation of lockdown is context specific, findings from our study may be transferrable to other low and middle-income countries with a similar weak health system and where distrust of government has been a problem.

CONCLUSION

The interpretation of the emergence of a new disease classification is dynamic and multifaceted. The COVID-19 pandemic in Lagos had both direct and indirect effects on care seeking for children. It is plausible that these had negative impacts on morbidity and mortality. Subsequent disease outbreak response requires active management of misinformation and intelligent health communication, including context-specific understanding of social media messaging and the role of religious institutions. Strengthening health and social support system interventions, notably around ensuring access to healthcare is not negatively affected, is crucial to building adaptive capacity for future disease outbreaks, pandemics and building public trust.

Author affiliations

- ¹Department of Global Public Health, Karolinska Institutet, Stockholm, Sweden
²Department of Community Medicine, University College Hospital, Ibadan, Nigeria
³Department of Paediatrics, University College Hospital, Ibadan, Nigeria
⁴Centre for International Child Health, Murdoch Children's Research Institute, Royal Children's Hospital, University of Melbourne, Parkville, Victoria, Australia
⁵Department of Community Medicine, University of Ibadan College of Medicine, Ibadan, Nigeria
⁶Institute for Global Health, University College London, London, UK
⁷Department of Paediatrics, University of Ibadan College of Medicine, Ibadan, Nigeria

Twitter Ayobami Adebayo Bakare @AyobamiABakare, Carina King @CarinaTKing, Hamish Graham @grahamhamish and Tim Colbourn @timcolbourn

Acknowledgements We thank the clinical data collectors and facility heads for their support during the data collection and the caregivers and healthcare workers for giving us their time.

Collaborators Full INSPIRING Consortium: Carina King (Karolinska Institutet); Tim Colbourn, Rochelle Ann Burgess, Agnese Iuliano (UCL); Hamish Graham (Melbourne); Eric McCollum (Johns Hopkins); Tahil Ahmed, Samy Ahmar, Christine Cassar, Paula Valentine (Save the Children UK); Adamu Isah, Adams Osebi, Magama Abdullahi, Ibrahim Haruna (Save the Children Nigeria); Temitayo Folorunso Olowookere (GSK Nigeria); Matt MacCalla (GSK UK); Adegoke Gbadegesin Falade, Ayobami Adebayo Bakare, Obioma Uchendu, Julius Salako, Funmilayo Shittu, Damola Bakare, Omotayo Olojede (University of Ibadan).

Contributors AAB, OEO, CK and HMA conceived the study. TC, CK and AGF are grant holders. AAB designed the study. OEO collected the data with oversight from AAB and OU. AAB and OEO led the analysis, with support from HMA, CK and HG. The manuscript was drafted by AAB with support from OEO, CK and HMA. All authors contributed to revisions and approved the final manuscript. CK is the guarantor of this study.

Funding This work was funded through the GlaxoSmithKline (GSK)-Save the Children Partnership (grant reference: 82603743).

Disclaimer Employees of both GSK and Save the Children UK contributed to the design and oversight of the wider INSPIRING study as part of a co-design process but did not take part directly in this substudy. Any views or opinions presented are solely those of the authors/publisher and do not necessarily represent those of Save the Children UK or GSK, unless otherwise specifically stated.

Competing interests SA, TA, CC and PV are employed by Save the Children UK who are part of the partnership funding the research. TFO and MM are employees of GSK, a multinational for-profit pharmaceutical company that produces pharmaceutical products for childhood pneumonia, including a SARS-CoV-2 vaccine, and no direct financial interests in oxygen or pulse oximeter products.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Parental/guardian consent obtained.

Ethics approval We obtained ethical approvals from the following ethics committees: Lagos State Primary Health Care Board (ref: LS/PHCB/MS/1128/VOL.V1/005), University of Ibadan/University College Hospital (ref: UI/EC/19/0551) and the University College London (ref: 3433/005). We obtained informed oral consent from all the participants and conducted the interviews under strict adherence to the study COVID-19 prevention protocol.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Ayobami Adebayo Bakare <http://orcid.org/0000-0003-2456-7899>
 Carina King <http://orcid.org/0000-0002-6885-6716>
 Hamish Graham <http://orcid.org/0000-0003-2461-0463>
 Helle Molsted Alvesson <http://orcid.org/0000-0001-6109-7203>

REFERENCES

- World Health Organization. Statement on the second meeting of the international health regulations (2005) emergency committee regarding the outbreak of novel coronavirus (2019-ncov). Geneva, Switzerland. 2005. Available: [https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov))
- Adams J, MacKenzie MJ, Amegah AK, *et al*. The conundrum of low covid-19 mortality burden in sub-saharan africa: myth or reality? *Glob Health Sci Pract* 2021;9:433–43.
- Sub-saharan africa exits recession in 2021 but recovery still vulnerable. n.d. Available: <https://www.worldbank.org/en/news/press-release/2021/10/06/sub-saharan-africa-exits-recession-in-2021-but-recovery-still-vulnerable>

- 4 COVID-19 weekly epidemiological update. 85th ed. 2022. Available: <https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---29-march-2022>
- 5 Cabore JW, Karamagi HC, Kipruto HK, *et al.* COVID-19 in the 47 countries of the WHO african region: a modelling analysis of past trends and future patterns. *Lancet Glob Health* 2022;10:e1099–114.
- 6 COVID19_Cases. n.d. Available: <https://who.maps.arcgis.com/apps/dashboards/0c9b3a8b68d0437a8cf28581e9c063a9>
- 7 Ibrahim RL, Ajide KBello, Olatunde Julius O. Easing of lockdown measures in nigeria: implications for the healthcare system. *Health Policy and Technology* 2020;9:399–404.
- 8 Amzat J, Aminu K, Kolo VI, *et al.* Coronavirus outbreak in nigeria: burden and socio-medical response during the first 100 days. *Int J Infect Dis* 2020;98:218–24.
- 9 Esmé B, Nick G, Max L, *et al.* The inequality virus: bringing together a world torn apart by coronavirus through a fair, just and sustainable economy. Vol 1. Oxfam GB. 2021.
- 10 Jensen N, Kelly AH, Avendano M. The COVID-19 pandemic underscores the need for an equity-focused global health agenda. *Humanit Soc Sci Commun* 2021;8.
- 11 Akande OW, Elimian KO, Igumbor E, *et al.* Epidemiological comparison of the first and second waves of the COVID-19 pandemic in nigeria, february 2020–april 2021. *BMJ Glob Health* 2021;6:e007076.
- 12 Odusanya OO, Odugbemi BA, Odugbemi TO, *et al.* COVID-19: A review of the effectiveness of non-pharmacological interventions. *Niger Postgrad Med J* 2020;27:1–7.
- 13 Verschuur J, Koks EE, Hall JW. Global economic impacts of COVID-19 lockdown measures stand out in high-frequency shipping data. *PLoS One* 2021;16:e0248818.
- 14 Ozili PK. COVID-19 pandemic and economic crisis: the nigerian experience and structural causes. *SSRN J* 2020;1–19.
- 15 Chakraborty I, Maity P. COVID-19 outbreak: migration, effects on society, global environment and prevention. *Sci Total Environ* 2020;728:S0048-9697(20)32399-8.
- 16 Conlon C, McDonnell T, Barrett M, *et al.* The impact of the COVID-19 pandemic on child health and well-being: are children “slipping through the net”? A qualitative study of frontline emergency care staff. *BMC Health Serv Res* 2021;9:1–29.
- 17 Impact of COVID-19 on people's livelihoods, their health and our food systems. n.d. Available: <https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people%27s-livelihoods-their-health-and-our-food-systems>
- 18 Passavanti M, Argentieri A, Barbieri DM, *et al.* The psychological impact of COVID-19 and restrictive measures in the world. *J Affect Disord* 2021;283:36–51.
- 19 Berhan Y. Will africa be devastated by covid-19 as many predicted? perspective and prospective. *Ethiop J Health Sci* 2020;30:459–67.
- 20 United Nations. Policy brief: the impacts of COVID-19 on children. vol 109. 2020.
- 21 Ashikkali L, Carroll W, Johnson C. The indirect impact of COVID-19 on child health. *Paediatr Child Health (Oxford)* 2020;30:430–7.
- 22 Olaseni AO, Akinsola OS, Agberotimi SF, *et al.* Psychological distress experiences of nigerians during covid-19 pandemic; the gender difference. *Soc Sci Humanit Open* 2020;2:100052.
- 23 Ogoina D. Covid-19 and the rest of us. *Niger Delta Med J* 2020;4:6–8.
- 24 Obi-Ani NA, Anikwenze C, Isiani MC, *et al.* Social media and the covid-19 pandemic: observations from nigeria. *Cogent Arts & Humanities* 2020;7:1799483.
- 25 Johnson OA, Olaniyi SF, John S, *et al.* Infodemic in a pandemic: COVID-19 conspiracy theories in an african country. *Soc Health Behav* 2020:19–24.
- 26 Scaramuzza A, Tagliaferri F, Bonetti L, *et al.* Changing admission patterns in paediatric emergency departments during the COVID-19 pandemic. *Arch Dis Child* 2020;105:704–6.
- 27 United Nations. Transforming our world: the 2030 agenda for sustainable development. 2016.
- 28 WHO and maternal and child epidemiology estimation group (MCEE). global and regional child deaths by cause. 2018.
- 29 J Olumade T, A Adesanya O, J Fred-Akintunwa I. AIMS public health. 2020;7:736–57.
- 30 Braun V, Clarke V. Reflecting on reflexive thematic analysis. *Qualit Res Sport Exerc Health* 2019;11:589–97.
- 31 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349–57.
- 32 About lagos – lagos state government. n.d. Available: <https://lagosstate.gov.ng/about-lagos/>
- 33 Presidential task force on COVID-19. implementation guidance for lockdown policy. vol 5. 2020. Available: <http://www.akrabjuara.com/index.php/akrabjuara/article/view/919>
- 34 Lawal RA, Ibrahim K. #ENDSARS: effecting positive change in governance in nigeria BEYOND. 2021. Available: www.bbforpeace.org
- 35 Graham HR, Olojede OE, Bakare AA, *et al.* Measuring oxygen access: lessons from health facility assessments in lagos, nigeria. *BMJ Glob Health* 2021;6.
- 36 Braun V, Clarke V. Qualitative research in psychology using thematic analysis in psychology using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.
- 37 QSR International Pty Ltd. NVivo (released in march 2020). 2020.
- 38 Graham HR, Olojede OE, Bakare AAA, *et al.* Pulse oximetry and oxygen services for the care of children with pneumonia attending frontline health facilities in lagos, nigeria (INSPIRING-lagos): study protocol for a mixed-methods evaluation. *BMJ Open* 2022;12:e058901.
- 39 Nigeria records chloroquine poisoning after trump endorses it for coronavirus treatment - CNN. n.d. Available: <https://edition.cnn.com/2020/03/23/africa/chloroquine-trump-nigeria-intl/index.html>
- 40 World Economic Forum. What are the myths about the coronavirus in africa? n.d. Available: <https://www.weforum.org/agenda/2020/04/debunking-9-popular-myths-doing-the-rounds-in-africa-about-the-coronavirus/>
- 41 Winters M, Oppenheim B, Sengeh P, *et al.* Debunking highly prevalent health misinformation using audio dramas delivered by whatsapp: evidence from a randomised controlled trial in sierra leone. *BMJ Glob Health* 2021;6:e006954.
- 42 Roberto A, Sellon A, Cherry ST, *et al.* Impact of spirituality on resilience and coping during the COVID-19 crisis: a mixed-method approach investigating the impact on women. *Health Care Women Int* 2020;41:1313–34.
- 43 Ossai EC. It is the antichrist. can't you see?' perceptions of COVID-19 among nigeria's christians and the religion—health debate. *Studies in World Christianity* 2021;27:48–64.
- 44 Hewlett BS, Amola RP. Cultural contexts of Ebola in northern Uganda. *Emerg Infect Dis* 2003;9:1242–8.
- 45 Owoyemi A, Okolie EA, Omitiran K, *et al.* Importance of community-level interventions during the COVID-19 pandemic: lessons from sub-saharan africa. *Am J Trop Med Hyg* 2021;105:879–83.
- 46 Dash S, Parray AA, De Freitas L, *et al.* Combating the COVID-19 infodemic: A three-level approach for low and middle-income countries. *BMJ Glob Health* 2021;6:e004671.
- 47 Briggs D, Kattey K. COVID-19: parents' healthcare-seeking behaviour for their sick children in nigeria - an online survey. 2020.
- 48 Tan CD, Lutger EK, Neill S, *et al.* Parents' experiences with a sick or injured child during the COVID-19 lockdown: an online survey in the netherlands. *BMJ Open* 2021;11:e055811.
- 49 Watson G, Pickard L, Williams B, *et al.* “Do I, don't I?” A qualitative study addressing parental perceptions about seeking healthcare during the COVID-19 pandemic. *Arch Dis Child* 2021;106:1118–24.
- 50 Kansime MK, Tambo JA, Mugambi I, *et al.* COVID-19 implications on household income and food security in kenya and uganda: findings from a rapid assessment. *World Dev* 2021;137:105199.
- 51 Osendarp S, Akuoku JK, Black RE, *et al.* The COVID-19 crisis will exacerbate maternal and child undernutrition and child mortality in low- and middle-income countries. *Nat Food* 2021;2:476–84.
- 52 Connolly E, Boley EJ, Fejfar DL, *et al.* Childhood immunization during the COVID-19 pandemic: experiences in haiti, lesotho. Liberia and Malawi: Bull World Health Organization,
- 53 Zhong Y, Clapham HE, Aishworiya R, *et al.* Childhood vaccinations: hidden impact of COVID-19 on children in singapore. *Vaccine* 2021;39:780–5.
- 54 Chandir S, Siddiqi DA, Setayesh H, *et al.* Impact of COVID-19 lockdown on routine immunisation in karachi, pakistan. *Lancet Glob Health* 2020;8:e1118–20.
- 55 McDonald HI, Tessier E, White JM, *et al.* Early impact of the coronavirus disease (COVID-19) pandemic and physical distancing measures on routine childhood vaccinations in england, january to april 2020. *Euro Surveill* 2020;25:2000848.
- 56 Iwuoha VC, Aniche ET, Obiora CA, *et al.* Citizens lack access to healthcare facilities: how COVID-19 lockdown and social distancing policies boost roadside chemist businesses in south-eastern Nigeria. *Int J Health Plann Manage* 2021;36:2411–23.
- 57 Davis AL, Sunderji A, Marneni SR, *et al.* Caregiver-reported delay in presentation to pediatric emergency departments for fear of contracting COVID-19: a multi-national cross-sectional study. *CJEM* 2021;23:778–86.



- 58 Lazzarini M, Barbi E, Apicella A, *et al.* Delayed access or provision of care in Italy resulting from fear of COVID-19. *Lancet Child Adolesc Health* 2020;4:e10–1.
- 59 Ciacchini B, Tonioli F, Marciano C, *et al.* Reluctance to seek pediatric care during the COVID-19 pandemic and the risks of delayed diagnosis. *Ital J Pediatr* 2020;46:87.
- 60 Singh DR, Sunuwar DR, Shah SK, *et al.* Impact of COVID-19 on health services utilization in province-2 of Nepal: a qualitative study among community members and stakeholders. *BMC Health Serv Res* 2021;21:174.
- 61 Wegbom AI, Edet CK, Raimi O, *et al.* Self-medication practices and associated factors in the prevention and/or treatment of COVID-19 virus: a population-based survey in Nigeria. *Front Public Health* 2021;9:606801.
- 62 Onchonga D, Omwoyo J, Nyamamba D. Assessing the prevalence of self-medication among healthcare workers before and during the 2019 SARS-cov-2 (COVID-19) pandemic in Kenya. *Saudi Pharm J* 2020;28:1149–54.
- 63 Osaigbovo L, Ogboghodo E, Obaseki D, *et al.* Pattern of drug sales at community pharmacies in edo state as evidence of self-medication during the covid-19 pandemic: implications for policy implementation. *J Chem Inf Model* 2020;20:150–8.
- 64 Hedstrom A, Mubiri P, Nyonyintono J, *et al.* Impact of the early COVID-19 pandemic on outcomes in a rural Ugandan neonatal unit: a retrospective cohort study. *PLoS One* 2021;16:e0260006.
- 65 Maintaining the provision and use of services for maternal, during the COVID-19 pandemic: lessons learned from 19 countries. licence: CC BY-NC-SA 3.0 IGO. 2021.
- 66 Kadambari S, Goldacre R, Morris E, *et al.* Indirect effects of the covid-19 pandemic on childhood infection in England: population based observational study. *BMJ* 2022;376:e067519.
- 67 Agbo UM, Nche GC. Suspecting the figures: what church leaders think about government's commitment to combating COVID-19 in Nigeria. *Journal of Asian and African Studies* 2022;002190962110696.
- 68 Wonodi C, Obi-Jeff C, Adewumi F, *et al.* Conspiracy theories and misinformation about COVID-19 in Nigeria: implications for vaccine demand generation communications. *Vaccine* 2022;40:2114–21.
- 69 Ezeibe CC, Ilo C, Ezeibe EN, *et al.* Political distrust and the spread of COVID-19 in Nigeria. *Glob Public Health* 2020;15:1753–66.
- 70 Hardy LJ. Connection, contagion, and COVID-19. *Med Anthropol* 2020;39:655–9.
- 71 Adiyoso W, Kanegae H. The preliminary study of the role of Islamic teaching in the disaster risk reduction (a qualitative case study of Banda Aceh, Indonesia). *Procedia Environm Sci* 2013;17:918–27.
- 72 Koh Boon Yau E, Pang Tze Ping N, Shoesmith WD, *et al.* The behaviour changes in response to COVID-19 pandemic within Malaysia. *Malays J Med Sci* 2020;27:45–50.
- 73 Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA* 2020;323:1239–42.
- 74 Solis Arce JS, Warren SS, Meriggi NF, *et al.* COVID-19 vaccine acceptance and hesitancy in low- and middle-income countries. *Nat Med* 2021;27:1385–94.
- 75 Forman R, Shah S, Jeurissen P. COVID-19 vaccine challenges: what have we learned so far and what remains to be done? *Health Policy* 2021;125:553–67.
- 76 Statement on Covishield and the European Union (EU) digital COVID certificate “green pass” – Africa CDC. n.d. Available: <https://africacdc.org/download/statement-on-covishield-and-the-european-union-eu-digital-covid-certificate-green-pass/>
- 77 Joint statement on dose donations of COVID-19 vaccines to African countries. n.d. Available: <https://www.who.int/news/item/29-11-2021-joint-statement-on-dose-donations-of-covid-19-vaccines-to-african-countries>
- 78 Hordijk L, Patnaik P. n.d. Covid-19-how Europe's vaccine donations went tragically wrong.
- 79 Ackah M, Ameyaw L, Gazali M, *et al.* COVID-19 vaccine acceptance among health care workers in Africa: A systematic review and meta-analysis. *PLoS One* 2022;17:e0268711.

Appendix I: -Ease of COVID – 19 Lockdown in Nigeria

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Start date	4 th May 2020	2 nd June 2020	19 th October 2020	11 th May 2021	2 nd April 2022
End date	1 st June 2020	18 th October 2020			
Land travel (Interstate)	Banned except for essential services and movement of goods and services only	Open under strict conditions: Allowed for essential services and movement of goods and services only	Open	Open	Open
Land travel (Intrastate)	Limited to 6 am-6 pm with a 50% reduction in bus occupancy	Open	Open	Open	Open
Airspace	Closed for most passenger flights. Open to cargo and specially approved flights only	Open for domestic flights, limited for essential international flights until August 26	Open for domestic and international flights	Open for domestic and international flights	Open for domestic and international flights
Movement	Curfew from 8pm to 6am	Curfew from 10pm – 4am	12am to 4am	Curfew from 12am – 4am	No restrictions
Working hours	9 am to 2 pm	9 am – 2 pm for Government/other corporate offices	All government staff on grade level 12 and below to continue staying at home No limit for private and other corporate bodies	All government staff on grade level 12 and below to continue staying at home until 11 th June 2021 No limit for private and other corporate bodies	No restrictions
Workspace	50% staff occupancy or less	75% staff occupancy or less 50% for clients	100% occupancy	No limits but virtual meetings and work from home encouraged	No restrictions
Entertainment activities	Banned	Banned	Open	Open with some restrictions (bars, night clubs, pubs remained closed)	Open at 50% capacity
Mass gathering	Limited to 20 people or less	Limited to 20 people or less	Limited to 50 people or less	Limited to 50 people or less except with permission	Open

				from the state government	
Religious gathering	Restricted	Restricted	Restricted (subject to the protocol from the state government and the federal capital territory)	Limited to less than 50% capacity Gathering more than 50 people must be held outdoors only	Open
Schools	Closed	Closed, but special consideration for graduation exams	Open	Open	Open
Markets	Partial closure (opened only on designated days weekly between 8.00 am-3.00 pm)	Controlled access by local authorities	Open	Open	Open
Face masks	Mandatory for all persons in public spaces	Mandatory for all persons in public spaces	Mandatory for all persons in public spaces	Mandatory for all persons in public spaces	Mandatory for indoor activities only, but at individual discretion for outdoor activities
Banks and other financial institutions	Limited staff physically to between 30%-50%	Limited staff physically to 75% or less. Operated for normal working hours	Open	Open	Open

Source: NCDC Coronavirus COVID-19 Microsite. Accessed June 29, 2022. <https://covid19.ncdc.gov.ng/guideline/>

- *There was a total lockdown of economic activities in the FCT, Lagos and Ogun states for 35 days from 30th March 2020. This was coupled with a total ban on non-essential interstate travels*
- *From the third phase, the end dates were assumed as the onset of the next phase*
- *Data collection was done during the phase 3*
- *The second wave of infection and vaccine rollout started during the phase 3*

Appendix II: In-depth interview guide for healthcare provider's interviews

1. Tell me about the facility you work in?
 - a. What type of services do you offer children?
 - b. Tell me specifically about this week in your clinic
2. Think about last 8 months, has things been typical? Why? Why not?
 - a. When did you first hear about covid?
 - b. When did you make adaptation or adjustment in your facility as a result of covid?
 - c. What changes did your facility make?

NOW WE WANT TO FOCUS ON QUESTIONS REGARDING CHILDREN

3. Tell me how the lockdown in year 2020 affected service provision at your facility
 - a. How did it affect services you provide for children?
 - a. How did it affect care seeking for sick under-five?
 - o Probe severity of illness at presentation/late presentation
 - o Was the PHC the first point of call?
4. Thinking about this time last year, before covid/EndSARS, is there any differences? What is different (numbers, type of presentation, services provided, resources), what is the same?
5. Now that lockdown is over, have things normalized the way it used to be before COVID-19? What has normalized? What is yet to normalize. What about number of under-five that you see, any difference compared to last year in terms of number, type of presentation
6. Late in last year, there was Endsars protest. How did it affect service delivery in your facility?
7. Currently, there is second wave of Covid-19 in Nigeria. How has it affected service delivery in your facility?
8. What can you say about the care seeking behavior of caregivers of sick children you have attended to in recent times?
9. Between Covid-19 lockdown, End-Sars protest and current economic hardship, which one has affected care seeking for sick children most? Why? Short term consequences? Any long term consequences?
10. Finally, the federal government is making plans to procure Covid-19 vaccines for Nigerians. How willing are you to receive the vaccine? Why/why not? What about for your child/children? Why/why not? Will you tell others to take it? Why?
11. Do you have any other things to say?

Appendix III: In – Depth interview guide for caregiver of under-five with recent illness episode

1. Tell me about your family.

Probe to get information on:

- a. Who lives with the participant
- b. Participant's job
- c. Where participant's extended family live
- d. Involvement in child's care

2. How will you summarize year 2020?

Probe:

- a. How did it affect you and your family?
- b. Could you say these changes were due to impact of covid-19 pandemic?
 1. If yes, why? In what other ways have covid-19 affected you and your household
 2. If no, why not?
- c. Have you noticed changes in the price of commodities?
 - i. How does this affect you and your household?
 1. House rent
 2. Transport cost
 3. Food items

Now we want to talk about child health services, particularly care seeking for sick under-five

3. Your child was recently sick; I would like to know more about the illness.

- a. How did it start? Who first noticed the symptoms?
- b. What did you do first? When did you do that?
- c. What next did you do?
 - i. How did you decide?
 - ii. Why did you do that? Could you have done something else?
 - iii. What treatment were given? Was your child asked to do some tests? Could you afford all the test?
 - iv. Were you referred?
 1. If yes, did you honour the referral? Why?
 2. How did you feel with the referral?
 3. If no, why? What did you do next? Why did you do that?
 4. Was your child asked to do some tests? Could you afford all the test?
 5. What about medications? Did you buy all the medication?
 - v. Like how much did it cost you to treat your child? Would the cost have been cheaper if not for current situations? How did you cover the cost of treatments for your child?
 1. Personal money/savings?
 2. Support from father?
 3. Support family and friends?
 4. Did you have to borrow or sell any items?

4. Overall, has covid-19 affected your decisions and steps when your child was sick?

- i. If yes, how?
- ii. If no, what affected your decisions and steps?
 - i. Endsars protest?

- ii. Insecurity?
 - iii. Current economic hardship?
 - iv. Could you have taken different actions/steps (*relate this to previous answers*) What about fears of catching covid at the hospital?
5. Finally, the federal government has indicated that by Jan 2021 the country will have covid-19 vaccine. How willing are you to receive the vaccine? Why/why not? What about for your child/children? Why/why not?
6. Do you have other things to say or bring to my attention? Thank you for your time!

Appendix IV: IDI guide for No illness episode

1. Tell me about your family.

Probe to get information on:

- e. Who lives with the participant.
- f. Participant's job
- g. Where participant's extended family live
- h. Involvement in child's care

2. How will you summarize year 2020?

Probe:

- a. How has it affected you and your family?
- b. Were these covid-19 related?
 - i. If yes, why and how? In what **other** ways have covid-19 affected you and your household
 - ii. If no, what do you think is responsible?
- c. Have you noticed changes in the price of commodities?
 - i. How does this affect you and your household?
 1. House rent
 2. Transport cost
 3. Food items
 4. Fuel price

3. Now we want to talk about care seeking for under-five. What actions do mothers/caregivers take when their child develops illness?

- i. Why do they do that?
 1. Could it be because of trust/distrust in health care workers?
 2. Could cost have influenced their decision? How?
 3. What else could have influenced their action?
- ii. Think about the last time your child (or that of someone close to you) fell sick
 1. What was wrong? What did you do? How did you decide on what to do? Who did you talk to? What alternatives were considered? What were your concerns?
 2. Was your child referred?
 3. Did you honour the referral?
 4. If yes, why? If no, why?
 5. If it happens this period, could you or they have taken different action? Why?
- iii. During the covid-pandemic in Nigeria, do you think covid-19 affected decisions taken by caregivers when their child was sick? if yes, why and how? If no, why?
- iv. What about now? Do covid-19 affect actions taken by mothers when their child falls sick?
- v. Between covid-19 and current economic hardship, which one has greater influence on actions taken by caregivers when their child is sick?
 1. Why and how?

4. Finally, the federal government has indicated that by Jan 2021 the country will have covid-19 vaccine. How willing are you to receive the vaccine? Why/why not? What about for your child/children? Why/why not?

5. Do you have any other thing to tell me?

Thank you for your time!

Appendix V Outpatient attendance for under-five children in the 7 flagship facilities in Ikorodu LGA (January-June 2020)*

Year	Flagship PHCs													
2020	Ikorodu		Igbogbo		Odonla		Agbede		Ipakodo		Imota		Oke-Eletu [‡]	
	Diagnosis	Number	Diagnosis	Number	Diagnosis	Number	Diagnosis	Number	Diagnosis	Number	Diagnosis	Number	Diagnosis	Number
January—March	Pneumonia	9	Pneumonia	3	Pneumonia	1	Pneumonia	0	Pneumonia	3	Pneumonia	19	Pneumonia	-
	LRTI	7	LRTI	12	LRTI	1	LRTI	0	LRTI	1	LRTI	2	LRTI	-
	URTI	133	URTI	290	URTI	89	URTI	0	URTI	102	URTI	47	URTI	-
	ARTI	0	ARTI	0	ARTI	0	ARTI	0	ARTI	5	ARTI	0	ARTI	-
	Malaria	511	Malaria	275	Malaria	149	Malaria	129	Malaria	234	Malaria	125	Malaria	-
	Sepsis	43	Sepsis	97	Sepsis	243	Sepsis	21	Sepsis	42	Sepsis	33	Sepsis	-
	Others	274	Others	374	Others	406	Others	115	Others	211	Others	252	Others	-
	Total	977	Total	1051	Total	892	Total	265	Total	589	Total	478	Total	-
	April—June	Pneumonia	1	Pneumonia	0	Pneumonia	2	Pneumonia	0	Pneumonia	0	Pneumonia	1	Pneumonia
LRTI		3	LRTI	1	LRTI	0	LRTI	0	LRTI	0	LRTI	0	LRTI	0
URTI		10	URTI	55	URTI	5	URTI	1	URTI	25	URTI	2	URTI	34
ARTI		0	ARTI	0	ARTI	0	ARTI	0	ARTI	0	ARTI	0	ARTI	0
Malaria		215	Malaria	183	Malaria	64	Malaria	23	Malaria	39	Malaria	52	Malaria	42
Sepsis		22	Sepsis	26	Sepsis	55	Sepsis	2	Sepsis	9	Sepsis	8	Sepsis	63
Others		113	Others	39	Others	159	Others	5	Others	99	Others	125	Others	164
Total		364	Total	304	Total	285	Total	31	Total	172	Total	188	Total	303

*Lagos placed on lockdown on the 30 March 2020

[‡] Facility register not found