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Determinants of COVID-19 vaccination acceptance based on the novel Omale INDEPT FORCIS Framework and recommendations for subsequent pandemics: a qualitative study among community members in Ebonyi state, Nigeria

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Abstract

Background The unprecedented COVID-19 pandemic has become an endemic disease of global public health importance. Mass COVID-19 vaccination has been an essential global control strategy amidst challenges of limited acceptance. Because of globalization, COVID-19/similar diseases vaccination acceptance and the determinants in any particular setting are important global public health issues. Using a novel and pragmatic framework, this study explored determinants of COVID-19 vaccination acceptance among community members during the pandemic in Ebonyi state, Nigeria, and made policy-relevant recommendations on how to increase vaccination acceptance in subsequent outbreaks/pandemics.

Methods This qualitative study was based on the novel and pragmatic Individual Experiences and Perceptions and Complacency, Confidence, Convenience, and Compulsion (Four 'Cis') Determinants of Vaccination Acceptance Conceptual Framework – Omale INDEPT FORCIS Framework. On April 26 and 27, 2022, 20 semi-structured face-to-face focus group discussions were conducted in local language and pidgin English with 100 purposively selected consenting/assenting community members aged 15 years and above who had resided in the community for at least one year. Data was analysed using deductive (with some inductive) thematic analytic approach.

Results The many, diverse, and significant determinants of COVID-19 vaccination acceptance found were factors that were individual-related (individual experiences and perceptions and knowledge about COVID-19, COVID-19 vaccine/vaccination, and the vaccination process/system, sociodemographic, individual's condition (e.g. pregnancy));

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COVID-19-related (factuality, transmissibility, frequency, severity, fatality); COVID-19 vaccine/vaccination-related (safety/side-effects, effectiveness, speedy production); COVID-19 vaccination process/system-related (real availability/accessibility); family, group, and other individual-related (experiences and perceptions and actions); and broader local, national, international, and global (LONING) context-related (socio-political, economic, historic, health system factors). The broader LONING contextual factors included the unprecedented disinformation/conspiracy theories, non-sustained COVID-19 risk/behaviour change communication, enforcement and non-enforcement or termination of peculiar control policies/measures (lockdowns, social/physical distancing, use of face mask etc.), mandatory COVID-19 vaccination policies, provision of incentives, past experiences regarding the Ebola viral disease outbreak, (un)trustworthiness of the Nigerian health system and her international/global partners, and the (un)trustworthiness of the governments in Nigeria and bad/good governance, inclusive of the failure of the Ebonyi state government to distribute the COVID-19 palliatives to the people during the lockdowns.

Conclusion The evidence illuminates complex and interrelated, specific underlying, and peculiar policy-relevant LONING determinants of COVID-19 vaccination acceptance and emphasizes the need for concerted and comprehensive LONING strategies (involving all the relevant LONING stakeholders/policy makers) in addressing these determinants to increase vaccination acceptance among community members in subsequent outbreaks/pandemics in Ebonyi state/Nigeria and similar settings.

Keywords COVID-19, Vaccination acceptance (uptake hesitancy intention timeliness), Determinants, Omale INDEPT FORCIS Framework, International/global health, Policy recommendations, Pandemics/outbreaks, Qualitative study, Community members, Nigeria

Background

The unprecedented corona virus disease 2019 (COVID-19) pandemic has become an endemic disease of global public health importance [1, 2]. Over 186,000 COVID-19 cases and 2800 related deaths were confirmed globally for the 28-day period of 24 June to 21 July 2024, an upward trend from the preceding 28-day reporting period [3], and 266,675 cases and 3155 deaths had been confirmed in Nigeria with 2064 cases and 32 deaths in Ebonyi state as of 4th May, 2023 [4]. However, these were gross underestimations as testing and reporting had markedly reduced or stopped in most countries, including Nigeria [1, 3]. Moreover, the SARS-CoV-2 test positivity rate increased from 7.4% in the beginning week of the 28-day reporting period to 13.0% in the last week [3] and the possibility of resurgence is a matter of public health concern as new variants of the SARS-CoV-2 continue to emerge [1, 3].

Mass COVID-19 vaccination has been an essential global prevention/control strategy amidst the challenge of limited acceptance (low uptake, high hesitancy and refusal, and low intention with decreased timeliness) and very slow pace of coverage among populations, particularly in Nigeria, including Ebonyi state [5]. As of 26th January, 2022 (before the implementation of this study), only about 4.6% of eligible Nigerians were fully vaccinated with the second dose of COVID-19 vaccination [6] and Ebonyi state had one of the lowest coverage rates in Nigeria [7]. The knowledge of the factors that influenced COVID-19 vaccination acceptance during the pandemic in different settings across the world would be useful for tailored policy actions and strategies in any subsequent resurgence of COVID-19 or outbreaks of similar diseases. Qualitative studies based on different approaches and frameworks were conducted in different settings among the general adult population [8–14] and subpopulations/priority groups [15–29] to provide insights on the factors that influenced COVID-19 vaccine/vaccination uptake/hesitancy/intention. There were particular evidence from many of these studies, perhaps reflective of the different contexts.

The understanding of context-specific determinants of vaccination acceptance is invaluable in informing adaptive interventions for optimal vaccination acceptance [30, 31]. A qualitative exploration of COVID-19 vaccination acceptance among community members in Ebonyi state would enhance the understanding of the underlying context-specific determinants. It would particularly provide insights on why the pace of vaccination coverage was very slow during the pandemic despite the increased availability/access to actual vaccines/vaccination [5]. We also understand that due to globalization, not only that disease outbreaks and their control in a particular setting are potential determinants of disease introduction and/or outbreak control in other settings, factors in the other settings are also potential determinants of the outbreak control in the particular setting. We therefore see COVID-19/similar diseases vaccination acceptance and the determinants in Ebonyi state/Nigeria as important global public health issues.

The aim of this qualitative study was to explore determinants of COVID-19 vaccination acceptance (uptake, hesitancy, intention to receive, and timeliness of the intention to receive) among community members during the pandemic in Ebonyi state, Nigeria, using the novel

and pragmatic Omale INDEPT FORCIS Framework, and make policy-relevant recommendations on how to increase vaccination acceptance in subsequent outbreaks and pandemics.

Methods

Study design

This qualitative study, which was part of a broader and extensive mixed method study [5], explored determinants of COVID-19 vaccination acceptance using the **Ind**ividual **E**xperiences and **P**erce**p**tions and **C**omplacency, **C**onfidence, **C**onvenience, and **C**ompulsion (**Four 'Cis'**) – INDEPT FORCIS – Determinants of Vaccination Acceptance Conceptual Framework. We call this novel framework Omale INDEPT FORCIS Framework or Omale Framework for short (Fig. 1).

This novel framework and its application are also presented in another related paper among health workers (also from the broader study [5]). As such, there are similarities between related sections/sub-sections of both papers.

The Omale INDEPT FORCIS Framework

The Omale INDEPT FORCIS Framework (Fig. 1) was designed based on the understanding that individuals (or parents/primary caregivers of children) have the direct and fundamental responsibilities and decisions regarding their receipt/non-receipt of vaccinations, and take or do not take the actions of receiving the vaccinations, while other close and remote factors influence the individuals' decisions and actions. The concept of this framework reflects the fact, as observed during the COVID-19 pandemic, that there were noticeable differences in COVID-19 vaccination acceptance among individuals of the same/similar backgrounds and environments. This phenomenon also occurs regarding other health interventions and underscores the significance of individual idiosyncrasies in this regard. This framework's design was informed by field experiences and expert judgement, the conceptual framework of the broader study [5], the '3Cs' Vaccine Hesitancy Model and Determinants of Vaccine Hesitancy Matrix [32], and emergent themes/sub-themes during inductive analysis of this study.

Complacency, Confidence, and Convenience are basically as already defined [32]. Compulsion is defined as the measure of the extent to which individuals are compelled (forced) or impelled (influenced) to go or not to go for vaccination which they otherwise would respectively not want to do or want to do. There is compulsion about a vaccination when an individual's decision and action to get vaccinated or not do not result from complacency, confidence, or convenience in the vaccination but rather from, for example, any external compelling factors such as mandatory/prohibitive vaccination policies by the government or family head, external impelling factors such as family influence and the provision of incentives, or internal impelling factors such as peculiar cultural/religious beliefs about/against the disease and/or vaccination.

As illustrated in Fig. 1, vaccination acceptance is a function of complacency, confidence, convenience, and compulsion (FORCIS) which result from the interplay of the respective primary individual-related factors. Compulsion also results from other external factors as stated above. The primary individual-related factors are the individuals' experiences and perceptions or expectations and knowledge about the disease, vaccine/vaccination, vaccination process/system, and their cultural/religious beliefs. The interplay of each set of these factors respectively results in a final changeable state of varying levels of the FORCIS and then the decision and action of getting vaccinated or not. The varying levels of the FORCIS are changeable due to the continuous interplay of the primary individual-related factors and the influence of the secondary individual-related factors (sociodemographic, professional attributes, individual's condition (e.g. pregnancy, health status) and sources of information about the disease/vaccine/vaccination); disease-, vaccine/vaccination-, and vaccination process/system-related factors; family, group, and other individual-related factors; and the broader **L**ocal, **N**ational, **In**ternational, and **G**lobal (LONING) socio-political, economic, historic, health system etc. contexts (Fig. 1).

Specifically, it will be expected that an old disease that is real/factual, caused by a virus, highly transmissible (via airborne or droplets), frequent, severe, and with high fatality will result in the experiences of fear, cases, severe cases, and deaths and or be perceived to be real, severe, fatal, and possible to have, by individuals who have the knowledge of the foregoing disease attributes and who have no dogmatic cultural/religious beliefs about the disease. The foregoing will lead to absence of complacency about and compulsion against the vaccination and then vaccination acceptance by such individuals and the converse will lead to complacency about and compulsion against the vaccination and then non-acceptance of the vaccination. Similarly, it will be expected that an old vaccine based on an old technology and developed over a long period by a trusted manufacturer, perhaps locally, which is widely used, and is safe and effective with no/mild side-effects will be experienced as a safe and effective widely used vaccine and perceived to be important and safe by individuals who have the knowledge of the stated vaccine attributes, have great trust in the health workers giving/the government providing the vaccination and in the source/manufacturer of the vaccine, and have no dogmatic cultural/religious beliefs about/against the vaccination. The foregoing will result in confidence

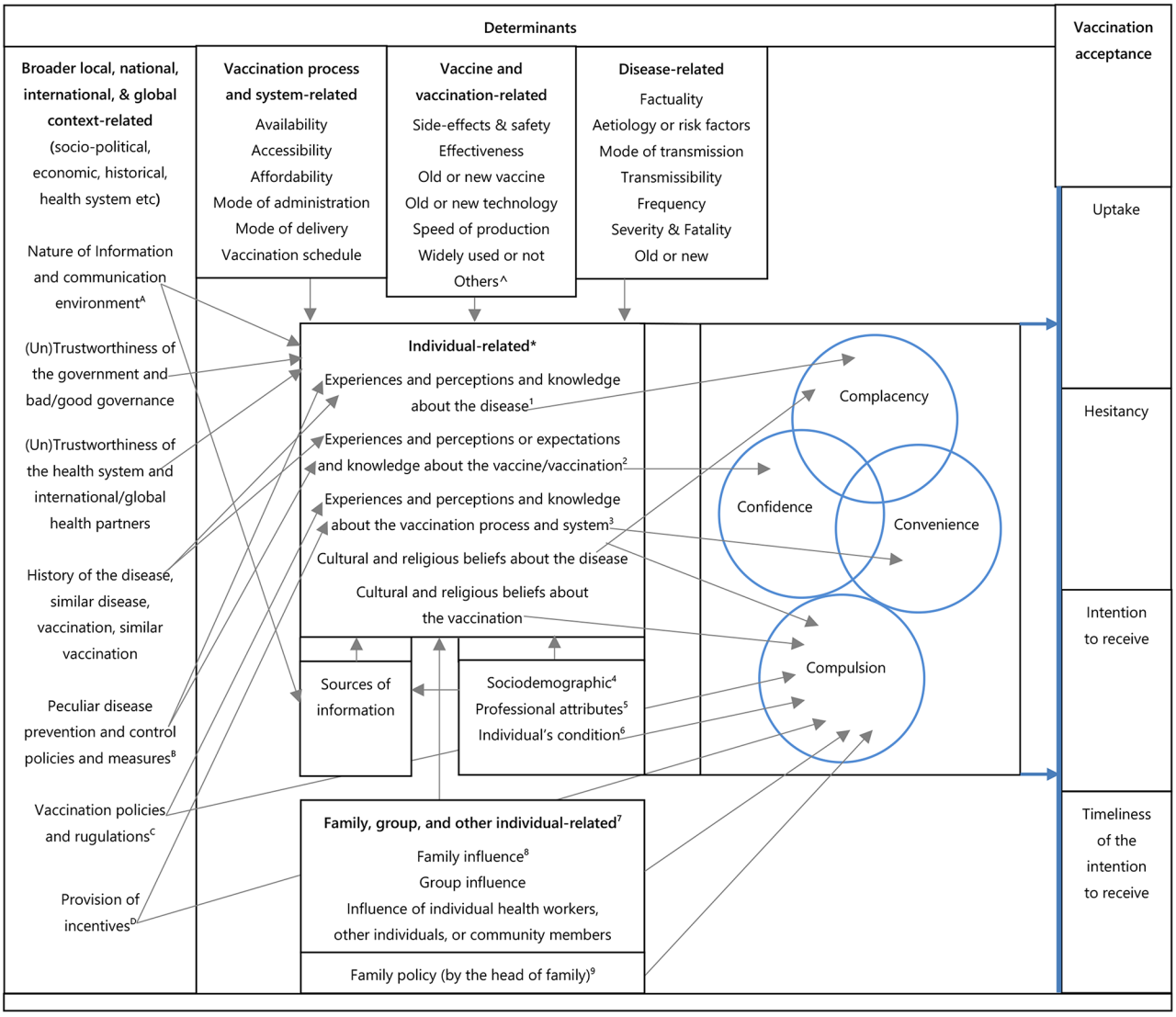

Fig. 1 Individual Experiences and Perceptions and Complacency, Confidence, Convenience, and Compulsion (Four 'Cis') – INDEPT FORCIS – Determinants of Vaccination Acceptance Conceptual Framework (Omale INDEPT FORCIS Framework). *Is about an individual, including a parent or primary caregiver of individual children (minors) and consists of primary factors (experiences, perceptions or expectations, knowledge, and cultural/religious beliefs) and secondary factors (information sources, sociodemographic, professional attributes, individual's condition). ^Including the health workers giving and the govt providing the vaccination and source of the vaccine (country, company). [A]Regarding the disease and vaccine/vaccination, including information and communication being good or bad and its adequacy, consistency, and duration at the Local, National, International, and Global (LONING) levels. [B]The enforcement and non-enforcement or termination of the policies/measures at the LONING levels (e.g. lockdowns, social/physical distancing, use of face mask, etc. and the policy that the vaccinated should still observe other preventive measures against the disease). [C]Include mandatory and prohibitive vaccination policies, regulations like work-free vaccination days etc. by govt, community leaders, employers etc. at the LONING levels. [D]Financial and non-financial incentives e.g. by govt, community leaders, employers etc. [1]Experiences regarding the disease and its attributes (e.g. about fear, cases, severe cases, deaths); perceptions about the disease and its attributes and perceived possibility of having the (severe) disease; and knowledge of the disease and its attributes. [2]Experiences and perceptions or expectations and knowledge about the vaccine and vaccination attributes including level of trust in the health workers giving the vaccination, in the govt providing the vaccination, and in the source of the vaccine. [3]Experiences and perceptions and knowledge about the vaccination process and system attributes (including, for e.g. local availability, stockouts or no stockouts, distance, waiting time, attitude of the health workers, cost (direct and or indirect), vaccination site(s) etc.). [4]Gender, age, education, occupation, income, residence (rural vs. urban) etc. [5]Type and nature of work, place of work, practising experience (in years) etc. [6]Including pregnancy, breastfeeding a child, health status etc. and having contraindications to the vaccination. [7]Experiences and perceptions or expectations and knowledge about the disease, vaccine/vaccination, and vaccination process/system (and their attributes) and the actions about the disease and the vaccination. [8]Also include the request from members and heads of families/households. [9]Include vaccination mandates and prohibitions by heads of families/households

in, and absence of compulsion against, the vaccination and then vaccination acceptance by such individuals and the converse will lead to lack of confidence in, and compulsion against, the vaccination and then non-acceptance of the vaccination. It will also be expected that where the vaccine/vaccination is always readily available and easily accessible without unduly long waiting time and the health workers have caring and friendly attitude, the vaccine/vaccination will be experienced and perceived to be always readily available and easily accessible. The foregoing will lead to convenience in the vaccination and then vaccination acceptance by such individuals and the converse will lead to lack of convenience in the vaccination and then non-acceptance of the vaccination.

However, the extent to which the above scenarios will occur also depends on the influence of the other factors. For example, for the same individuals above, it is likely that the experiences will be lesser (less strong), perceptions less positive, complacency higher, confidence lower, convenience lesser, and then vaccination acceptance by them less likely, accordingly, in the following instances: the individuals are within the low-risk age group (and are aware of such fact); have or know relatives/people and health workers of the same/similar backgrounds and environments who are unvaccinated and or disapproving of the vaccination; had experienced an outbreak of same or similar disease in the past without significant toll on lives and livelihood or with significant harms from the vaccination; in an environment where there is high circulation of misinformation/disinformation and conspiracy theories on the LONING media and grapevine; where there is lack of trust for the government, health system, and international/global partners; where there are no incentives and no mandatory vaccination policies; and where the individuals are very busy/have no chance and there is no favourable regulation like work-free vaccination days. The converse would also be expected.

Participants

The study participants were the community members (in rural and urban/semi-urban geographical communities/clusters) [5] in Ebonyi state. Eligible community members were those aged 15 years and above who had resided in the community for at least one year and gave consent/assent. Based on the researchers' judgement, eligible vaccinated and unvaccinated participants were selected purposively from different categories of sociodemographic backgrounds (gender, age group, marital status, educational level, occupation) in 10 rural and urban/semi-urban clusters in seven local government areas (of the 13 in the state) across the three senatorial zones. The participants were selected as said with the intention of getting full and diverse information and opinions and to enhance transferability of findings.

Ethical approval was obtained from the Ebonyi State Health Research and Ethics Committee (EBSHREC/15/01/2022-02/01/2023) and Research and Ethics Committee of Alex Ekwueme Federal University Teaching Hospital Abakaliki (14/12/2021-17/02/2022). The investigators obtained informed consent/assent from the participants before commencing each focus group discussion (FGD). Participants were assured of confidentiality and that no personal information would be included in the results of the study. Confidentiality was ensured by not referring to participants by name during the FGDs; using unique ID codes such as F1, F2, etc. and M1, M2, etc. (with numbers such as 1, 2, 3, 4, etc.) to represent each FGD (with the participants) in the background information forms and transcripts; and not including potential identifying phrases in the quotes underlying the results. The audiorecords and FGD transcripts are stored in a passworded computer to prevent unauthorized access.

Procedures

Semi-structured face-to-face focus group discussions (FGDs) with participants were conducted by the research team on April 26 and 27, 2022 using an FGD question guide prepared in English and pre-tested in non-participating clusters. The FGD question guide (appendix p 5) was based on the components of vaccination acceptance (and some predetermined themes/subthemes) in the Omale INDEPT FORCIS Framework (Fig. 1). The guide contain step-by-step instructions and both open-ended and more targeted questions and was designed to explore the perceptions of the participants about COVID-19, COVID-19 vaccine/vaccination, COVID-19 vaccination process, and the determinants of COVID-19 vaccination acceptance.

20 FGDs with 100 participants were conducted in local language and pidgin English and across 10 clusters with two FGDs (one male-FGD and one female-FGD) per cluster. Female-FGDs were separated from male-FGDs for the female participants to freely express their views, considering the patriarchal nature of the study environment. Background information of participants were taken before each FGD which involved 5–8 discussants (participants plus a moderator and note taker), lasted for about 20–45 min, and was audiorecorded with at least two recorders. Relevant and important perceptions expressed immediately after the recorders were switched off were noted. The reporting of this study was guided by the Standards for Reporting Qualitative Research (SRQR) [33].

Data analysis and quality control

The FGD recordings were translated (exact and meaning-based translation) and transcribed verbatim to English by an experienced research assistant who was fluent in both the local language and English (including the pidgin variant) and who first studied the FGD guide to become familiar with it. The research team did the data (transcripts) verification, the principal investigator (UIO) did the analysis and interpretation, and the research team verified the analysis and interpretation in an iterative process of review, discussion, and modification until consensus was reached. The FGD transcripts were compared with the audio recordings by simultaneously reading the transcripts and listening to the corresponding recordings and by systematically re-reading transcripts and replaying corresponding recordings back-and-forth to check for 'accuracy' of every transcript.

Data was analysed using deductive thematic analytic approach based on the predetermined themes and subthemes in the Omale INDEPT FORCIS Framework (Fig. 1). Inductive analysis to identify emergent themes/subthemes was also done. The analytic strategy was informed by methods for qualitative data analysis [34, 35]. In the analysis, familiarization with the data was done by re-reading the transcripts. This was followed by coding during which each transcript was read line by line and any part of the text considered important was highlighted in yellow and labelled (coded) with a descriptive phrase or sentence. Because of the deductive nature of the analysis, the codes indicated the factor(s) identified and how they were related to complacency, confidence, convenience, or compulsion and then vaccination acceptance. The highlighted texts were reviewed, re-reviewed, and discussed by the study team to confirm their importance and the attached codes were reviewed, re-reviewed, and discussed to confirm their appropriateness.

Results

Sociodemographic characteristics

The sociodemographic characteristics of the 100 study participants are in appendix p 2.

Experiences and perceptions/expectations and knowledge about COVID-19 and COVID-19 vaccine/vaccination

The results are in appendix p 3.

Determinants of COVID-19 vaccination acceptance

The determinants were categorized and presented, according to the Omale INDEPT FORCIS Framework (Fig. 1), as individual-related; COVID-19-related; COVID-19 vaccine/vaccination-related; COVID-19 vaccination process/system-related; family, group, and other individual-related; and broader LONING context-related (socio-political, economic, historic, health system etc.) determinants. Illustrative quotes are presented in Tables 1, 2 and 3.

Individual-related determinants of COVID-19 vaccination acceptance

Individual experiences and perceptions and knowledge about COVID-19

These individual factors reduced or increased complacency or led to compulsion about COVID-19 vaccination and, accordingly, resulted in COVID-19 vaccination acceptance or non-acceptance. Illustrative quotes are presented in Table 1 SN 1–11. According to participants, knowing someone who had had (severe) COVID-19 or died from COVID-19 and fear of getting or dying from COVID-19 led to COVID-19 vaccination acceptance. The converse was also the case. The perception/belief that COVID-19 was not real (in Nigeria or Ebonyi state), perhaps because of not knowing anyone who had had COVID-19 or died from it, and the perception that it was not possible to have (severe/fatal) COVID-19 (due to natural immunity), led to non-acceptance of COVID-19 vaccination. The converse was also the case.

Also, there were non-acceptance of COVID-19 vaccination due to ignorance about COVID-19. However, there were also non-acceptance due to the knowledge of COVID-19 risk factors such as knowing that one was at low risk and not susceptible to severe COVID-19. For example, younger people who had the knowledge (and perception) that they were less vulnerable to COVID-19 saw no reason for going to receive the COVID-19 vaccination, which they were not sure about its safety, to prevent a disease they were less susceptible to. Being young was thus an influencing sociodemographic factor. Another factor was the religious belief in the divine protection against COVID-19 which was influenced by the unprecedented nature of the pandemic and the disinformation/conspiracy theories and the places of worship and religious forums. This belief led people to downplay COVID-19 risks and to view the vaccination as not important/needed by the children of God.

Individual experiences and perceptions/expectations and knowledge about COVID-19 vaccine/vaccination

These individual factors led to compulsion or reduced or increased confidence in COVID-19 vaccination and, accordingly, resulted in non-acceptance or acceptance of COVID-19 vaccination. Illustrative quotes are presented in Table 1 SN 12–17. According to participants, non-acceptance of COVID-19 vaccination resulted from the experiences (observations of the facts) of severe side-effects and or the perception/belief that the vaccination was not safe, fear of severe side-effects (including infertility) and death, and lack of confidence in the effectiveness of (and lack of knowledge about) the vaccine/vaccination.

Table 1 Illustrative quotes for individual-related determinants of COVID-19 vaccination acceptance

SN	Quotes
	Individual experiences and perceptions and knowledge about COVID-19
1	'I have not seen anyone killed by it [COVID-19]. … you know it is better when you see the person who has it, then you will know it is serious, then you will know it is what killed the person. That is why I, personally, did not take it [COVID-19 vaccination].' (Female FGD 4)
2	'[A reason for non-receipt of COVID-19 vaccination] Some people said it is a lie, that COVID-19 is not real … and they have not seen anyone that has COVID-19.' (Female FGD 8)
3	'Those people who have not taken it [COVID-19 vaccination] are those who believe that this thing [COVID-19] is not real, … but some who believe it [COVID-19 is real] are taking the vaccination.' (Female FGD 9)
4	'Those people who say they will never go to take the vaccine are those who do not believe the disease [COVID-19] is real. Then those people who say they will take it are those who believe the disease is real.' (Female FGD 9)
5	'Those who have taken the [COVID-19] vaccination took it because they are afraid and they do not want to contract COVID-19.' (Female FGD 10)
6	'… others take it [COVID-19 vaccine] because of the fear that "I do not want to contract it" …' (Male FGD 6)
7	'I received the vaccination because I wanted to save myself from COVID-19. I did that because they said it was the only way to prevent COVID-19.' (Female FGD 7)
8	'I feel we Nigerians don't actually take these things [COVID-19 and COVID-19 vaccination] serious because we believe that we are, our immune system is, different from those in other countries ([are not susceptible to COVID-19 like others] and because of that they [people] are not ready to take the vaccination.' (Female FGD 6)
9	'Yeah, it is because of ignorance, because somebody who is ignorant of it [COVID-19 or COVID-19 vaccination], you might be telling him or her about the [COVID-19] vaccination and he will tell you "I don't have problem" [I don't have any disease or COVID-19 to go for any vaccination].' (Male FGD 6)
10	'… when that thing [COVID-19] came, they told us that older people tends to die because of their low immunity. So, most young people believe that, … "if peradventure I get it, my immunity will actually fight it back … So, why stress myself going to take this thing [vaccination] that I don't even know about?"' (Male FGD 6)
11	'In my own opinion, in my own belief, I do not think God can allow me contract the disease [COVID-19]. So, I will not take the vaccination.' (Male FGD 4)
	Individual experiences and perceptions or expectations and knowledge about COVID-19 vaccine and vaccination
12	'The major reason some people are not taking the [COVID-19] vaccination is fear [of severe side-effects]. For instance, when I took my own vaccination, my cousin saw that I became ill immediately after taking the vaccination and decided not to take it because of the [severe] side-effects on me.' (Female FGD 6)
13	'Fear [of severe side-effects and death] has made some people not to go [for COVID-19 vaccination]. Some will say, "I will wait for other people to receive it", so that if there is any bad effect on them, … or maybe they die, then they [those waiting] will not go to receive the vaccination.' (Male FGD 2)
14	'They [those not intending to get vaccinated] are afraid and will say, maybe, there is another disease they [the foreign providers, government] want to inject [people with] or they want to put something in their body.' (Female FGD 10)
15	'Some people are still under the influence of religious belief, that they will not take it [COVID-19 vaccination), since it is against their religion.' (Female FGD 6)
16	'Some say it [COVID-19 vaccination] is a way of converting people into occultists or it is a way of initiating people into bad things, that it is "666" [the biblical sign of the end-time]. If you take it [the vaccination], you will be initiated. But, to me, I think all these things are because of the rumours.' (Female FGD 6)
17	'I took the first dose but during the time I was supposed to take the second dose, I was pregnant, so, I could not go again [for it]. I heard pregnant women should not take the [COVID-19] vaccination…' (Female FGD 4)
	Individual experiences and perceptions and knowledge about COVID-19 vaccination process and system
18	'Poor attitudes of the health workers also contribute to why some people are reluctant to take the vaccination. For instance, some of the health workers will tell you that the vaccine is finished, or they no longer have the equipment, or some will even say, after some set of people, they will be done for the day. That alone discourages some people from going to take the vaccination.' (Male FGD 2)
19	'Crowd [at vaccination sites] is also one of the reasons [for not receiving COVID-19 vaccine]. For instance, there may be only 3 health workers giving the vaccination where there are "thousands of" [so many] people waiting to be vaccinated. … people [who cannot wait] will leave and coming back again will be a problem.' (Male FGD 2)
20	'… the type of work you are doing might delay you [from receiving the COVID-19 vaccination]. Like [for example], some people are learning work [apprentice] and not all Madams [Bosses] will permit you to go and take such thing [the vaccination] … that you will go today or tomorrow …' (Female FGD 10)
21	'… some people will say, "instead of me to leave the work I am doing to go and stand on the queue, I will not go [to receive the COVID-19 vaccination]"' (Male FGD 10)
22	'Distance [to vaccination site] is one of the reasons why some people have not received the [COVID-19] vaccination and lack of money too [for transportation].' (Male FGD 2)
23	'Some people who are not well informed are yet to find a place where they can receive the [COVID-19] vaccine, that is for those willing to receive it. Many do not know where to receive the vaccination.' (Male FGD 2)

Table 2 Illustrative quotes for COVID-19-, COVID-19 vaccine/vaccination-, the vaccination process/system-, and family-group-other individual-related determinants of COVID-19 vaccination acceptance

SN	Quotes
	COVID-19-related factors
1	'You know, if it is coming [COVID-19 is spreading] and you are looking at your neighbour and it is killing that person, you will see people running to go and take it [COVID-19 vaccination].' (Male FGD 1)
2	'It is because we have not been seeing those killed by COVID-19, that is why some people say there is no disease like that [and are not getting vaccinated].' (Male FGD 1)
3	'I have not seen anyone killed by it [COVID-19] so there is no point going to take the vaccination. Assuming we have seen the infected persons, maybe your relatives, you will become fearful and you will be asking about where they are taking it [COVID-19 vaccination] and will be eager to go and take the vaccination. Just like when hepatitis B came, we all saw it and how it was killing people, we became afraid and rushed to take the vaccination then. What we will be hearing is that it [COVID-19] is killing people but we have not seen.' (Female FGD 4)
4	'The reason why I took the [COVID-19] vaccination was because of the news we have been hearing about COVID-19, that if it did not kill here today, it kills there today, today it is here, tomorrow it is there.' (Female FGD 8)
5	'My reason, why I decided to go and take the [COVID-19] vaccination was the moment I started hearing how COVID-19 was killing people in other countries. When I heard the vaccine was in Nigeria, that was when I went and took my own. Since COVID-19 is transferable, I decided to go and take the vaccination because the speed at which it was spreading was scaring, … So, instead of me to wait for it, I had to go and take it so that if it spreads to Ebonyi state, I will not be infected. So, that was why I went to take it, although, I have not seen anyone with COVID-19.' (Female FGD 7)
	COVID-19 vaccine and vaccination-related factors
6	'Unfortunately for me, I became ill for about two weeks after taking the [COVID-19] vaccination. Later, I went for the second dose which did not disturb me like the first dose. And I believe the side-effect is one of the reasons people are scared of taking the vaccination.' (Female FGD 6)
7	'Even I had a brother that took it [COVID-19 vaccination], he came home after taking the vaccination and started reacting as if he was epileptic. The wife was forced to call the nurse that gave him that vaccination. … He (the nurse) asked us to give him milk. So, all those experiences [of severe side-effects] can easily scare people away from taking it.' (Female FGD 6)
8	'I think it is because of the side-effects people have after taking the [COVID-19] vaccination. You know some people, like, after taking the vaccination, they develop other sicknesses. Maybe that is why some people do not want to take it.' (Male FGD 1)
9	'There was this vaccinated person I heard about in another country who got infected with COVID-19 … So, in that sense, I feel the COVID-19 vaccination is not as protective [as effective] as they said.' (Female FGD 6)
10	'… no one [that I know in our community] has said he/she had any serious side-effects after taking the COVID-19 vaccination, that is my reason for taking it.' (Female FGD 8)
	COVID-19 vaccination process and system-related factors
11	'They have not brought it [COVID-19 vaccine] to this our place. It is not about telling us to go and take it, they have not brought it here [they should bring the vaccine here].' (Female FGD 9)
12	'For me, I would have taken the [COVID-19] vaccination but when they were giving the vaccination, I relocated from that place to another place and discovered they were not giving the vaccination there.' (Female FGD 8)
13	'… if I am close to the place they are giving the [COVID-19] vaccination, I will take it. But if I am not close to the place, it will take me time [to take it].' (Female FGD 8)
14	'There are people that if it [COVID-19 vaccination outreaches] fall on the days they are going to farm, they will not go and take it.' (Female FGD 9)
15	'Also, some people are been misinformed about the place [and time] where the vaccination is taking place. Misinformation is part of why many have not received the vaccination.' (Male FGD 2)
	Family, group, and other individual-related factors
16	'But I felt sick the first day I took the [COVID-19] vaccination. I took it because my mother took it and my mother asked me to go and take it. Then I felt sick and I could not raise my hand and was unable to do anything with the hand. So, the next day I had to go to the hospital. So, I do not know if it is safe, and I have not seen a COVID-19 patient before. So, according to what they [vaccinated family members who had no serious side-effects] said, I believe the vaccine is safe.' (Female FGD 6)
17	'… when I took my own [COVID-19] vaccination, my cousin saw that I became ill immediately after taking the vaccination and decided not to take it because of the side-effects on me. If not that the father is a medical doctor and made it compulsory in the family, she would not have taken it, she even begged her mother that they should tell [lie to] her father that she had taken it.' (Female FGD 6)
18	'Assuming we have seen the infected persons, maybe your relatives or neighbours, you will become fearful and you will be asking about where they are taking it [COVID-19 vaccination] and will be eager to go and take the vaccination.' (Female FGD 4)

The converse was also the case. Even mixed experiences about side-effects reported by the vaccinated, weakened confidence in the safety of the vaccination and some were waiting (for months to years) to see whether there would later be severe complications (including infertility) or death among the vaccinated or not. The fear was aggravated by the disinformation/conspiracy theories.

In addition, due to lack of confidence/trust in the foreign sources of the vaccines (international/global health partners and manufacturers) and in the government,

Table 3 Illustrative quotes for broader local, national, international, and global context-related (socio-political-economic, historic, health system) determinants of COVID-19 vaccination acceptance

SN	Quotes
	Nature of COVID-19 information and communication environment
1	'[Because of conspiracy theories,] Some people are afraid that it [COVID-19 vaccination] is a means to kill the Africans because they say the African population is too large, especially the Nigerian population. For that reason, many people have sworn not to take the vaccination.' (Male FGD 4)
2	'I have heard about the [COVID-19] vaccination and I will not take the vaccination because I have seen on the [social] media where people in other countries were saying that they were killing them with the vaccination.' (Male FGD 2)
3	'I have also seen on the [social] media where they were giving the [COVID-19] vaccination and that place [the vaccination site on the body] became magnetic. Also, if you are to put an electric bulb on the place, it may light up the bulb. That is to show you how deadly the vaccine is.' (Male FGD 2)
4	'But ever since this COVID-19 vaccine came, rumours have been going round that the vaccine has been killing people. Even in schools, people rushed to pick their children up because they said it was killing the children after they received the vaccination. So, sometimes rumours are part of the things that put fear in some people [and make them not to get vaccinated].' (Female FGD 4)
5	'What spoiled my mind [discouraged me] was the story … that there was nothing like COVID-19, that any person they gave the [COVID-19] vaccination, that there is something [in the vaccine] white men [in other countries] are using to monitor the person's body, with that thing they will be monitoring you.' (Male FGD 3)
6	'There are people who believe that they should wait for those who have received [COVID-19 vaccine] to know if they will die. Then if they waited for months or years and they didn't die, then they will know the vaccine is good [really safe]. They will (then) agree to take it because they have stayed [waited] for years and seen that those who took it, nothing happened to them.' (Female FGD 8)
7	'I was thinking COVID-19 was no longer in the state, that it is now in the past, if not that you people came today. So, I did not know [that COVID-19 was still existing]. When COVID-19 came, once you put on your radio the only thing you will be hearing was COVID-19. Now it has become so cool [no more COVID-19 in the news] and we thought COVID-19 was no longer in Ebonyi state.' (Female FGD 4)
	Peculiar COVID-19 prevention and control policies and measures
8	'COVID-19 is real because I have seen how serious the government was in trying to prevent it and how many movement restrictions were imposed.' (Male FGD 4)
9	'My dad did not believe that COVID-19 was real until they [government] asked everyone to stay at home. … He took the vaccination, but majority of the people are still in doubt.' (Female FGD 6)
10	'There was this vaccinated person I heard about in another country who got infected with COVID-19, after coming in contact with someone who had COVID-19, and was isolated. So, in that sense, I feel the COVID-19 vaccination is not as protective [as effective] as they said.' (Female FGD 6)
	COVID-19 vaccination policies and regulations
11	'Concerning the [COVID-19] vaccination, the first dose I took, it was terrible. I would not have taken it but because of the place I work, we were made to take the vaccination. They asked all of us to go and take the vaccination.' (Female FGD 6)
12	'If not because they made it [COVID-19 vaccination] compulsory in some places, some people would not have taken it. Just like they made the wearing of face mask compulsory, … Because it was the same thing, because where I work, … if you do not take it [COVID-19 vaccination] you are gone [fired]. And if you want to travel out, if you do not take it, you cannot travel out, you cannot travel out of the country.' (Female FGD 6)
13	'For example, we that are going for service [National Youth Service], they actually told us to ensure that we are vaccinated [before going to orientation camp] … So, people take COVID-19 vaccination because of politics (mandatory policies) …' (Male FGD 6)
14	'On the part of the youth Corpers (for the National Youth Service), those going to the orientation camp, because me, I heard that it is now compulsory, that if you do not take the [COVID-19] vaccination, you will not be allowed into the camp. So, me, I did not even have the intention of taking it … I need to go to camp, I need to take this vaccination.' (Female FGD 6)
15	'… they [some of the unvaccinated] will say "let me still wait to see if the COVID-19 will rise again or calm down or the government will make it [COVID-19 vaccination] compulsory", before they will go and receive it.' (Female FGD 6)
16	'… they [government/community leaders] should make COVID-19 vaccination compulsory and prohibit people from going to farm [on specific COVID-19 vaccination days], that anybody that go to farm will pay 2000 or 3000 naira [otherwise, people will always go to farm and not have chance to go for the vaccination].' (Female FGD 9)
	Provision of incentives for COVID-19 vaccination
17	'When you give some people money, you give them 2000 or 3000 naira, that is when they will stop going to the farm [and go and receive the COVID-19 vaccination].' (Female FGD 9)
18	'… they [people] need incentives [to go and receive COVID-19 vaccine]. … if you come [to receive the vaccine] and they give you one thousand or 500 naira, you will see the long queue that it will lead to.' (Male FGD 1)
	The history of the Ebola viral disease outbreak
19	'When we heard it on the radio, but we saw people attending functions [going about their normal daily activities without restrictions], it was hard for us to believe COVID-19 was real. Just like what they did during the time of Ebola, we were told to bath and drink salt water, which many or all of us did but nothing like Ebola came [to Ebonyi state] and some people died because of it [bathing with and drinking of salt water to prevent Ebola]. This kind of experience contribute to some people not going to take the COVID-19 vaccination.' (Female FGD 4)

Table 3 (continued)

SN	Quotes
	(Un)Trustworthiness of the government and bad/good governance
20	'I think another distrust, another distrust started from the period of COVID-19 lockdown when the COVID-19 palliatives were not distributed but hoarded instead. You [the state government] hoarded the food that was supposed to be given to the masses and you are now telling them, "you must go and receive COVID-19 vaccination". So, it is not really coming through [people are not heeding the call]. If they [the government] had distributed the palliatives to the people and are now telling them, "there is a vaccination that you have to receive", we will believe the government is with us.' (Male FGD 6)
21	'There was a time [during the lockdown] they [the government] said they would share COVID-19 palliatives to the masses, but since then they have not done that. Because of that, people are not buying the idea of going to take the [COVID-19] vaccination since they have not fulfilled their promise.' (Male FGD 4)
22	'Look at the election campaign promises, no one has been fulfilled. So, how can you believe such government when they bring something [like COVID-19 vaccination] for you to receive? That is what is happening. Like my brother said, this COVID-19 palliative they [the government] hoarded for themselves instead of distributing to the masses, … Even the money they released, the federal government released for them [the federal and state governments] to distribute to people, up till now I have not gotten my own, so many people have not gotten their own. How can you believe that what they [the governments] are saying [about COVID-19 and COVID-19 vaccination] is the truth?' (Male FGD 6)
23	'Why they are saying that [saying that nothing will make them receive the COVID-19 vaccination] is that, some people say they have not gained anything from the Nigerian government and will never receive the [COVID-19] vaccination. I have not received any incentives from the government who have been using dubious means [including this COVID-19 vaccination campaign] to misappropriate public funds.' (Male FGD 4)
24	'The people that have not received the [COVID-19] vaccination, I told you earlier that they lost confidence, they do not believe in the government, they have lost confidence in the government. That is why they have not taken it [the COVID-19 vaccination]. Those who have taken it, they believe in the government and whatever the government say is the truth.' (Male FGD 6)
	(Un)Trustworthiness of the health system and international/global health partners
25	'Coming back to Africa here, I think the main reason why people are doubting the [COVID-19] vaccine is that the vaccine is being faked [is substandard]. You know they [people] believe everything about Africa [is fake], we fake everything, the way paracetamol and all other drugs [are being faked]. So, for a vaccine like this, they believe it has been faked, … so people are running away from taking it …' (Male FGD 6)
26	'They [those not intending to get vaccinated] are afraid and will say, maybe, there is another disease they [the foreign providers, government] want to inject [people with] or they want to put something in their body.' (Female FGD 10)
27	'Let me add my own [opinion]. What I understand in [about] this thing [the reasons for non-acceptance of COVID-19 vaccination] is fear. Also, they will say it is an expired vaccine.' (Female FGD 7)
28	'I can say even as at now, some people still don't believe that the [COVID-19] vaccine is real, some people don't take it seriously. I remember when I went to take my own vaccination, someone was saying that the available vaccines had expired and were no longer effective. So, I think that could be a reason [for non-acceptance of the vaccination].' (Female FGD 6)

there were lack of confidence in the safety of the vaccines/vaccinations and fears of contracting other diseases (of being injected with other pathogens) and then non-acceptance of the vaccination. Other factors like religious beliefs against the vaccination led to compulsion and non-acceptance as people were impelled not to receive the vaccination. According to participants, some people did not accept to take the vaccination because they believed it was against their religion or that COVID-19 vaccination was the biblical sign of the end-time "666" according to Christianity and that receiving the vaccination meant receiving the mark of "666". These beliefs appeared to be engendered or reinforced by the unprecedented nature of the pandemic and the disinformation/conspiracy theories and the influence of the places of worship/religious forums.

Individual's condition such as pregnancy, breastfeeding a child, and having the intention to get pregnant were other factors identified by participants as pregnant women, breastfeeding mothers, and women who wanted to get pregnant did not receive COVID-19 vaccination because of the fear of any possible adverse effects of the vaccination on the pregnancy or unborn baby, breastfeeding child, and fertility. These fears were particularly serious consequent upon the general fears about the safety and side-effects of the vaccination.

Individual experiences and perceptions and knowledge about COVID-19 vaccination process/system

These individual factors reduced or increased convenience in COVID-19 vaccination and, accordingly, led to non-acceptance or acceptance of COVID-19 vaccination. Illustrative quotes are presented in Table 1 SN 18–23. Participants identified that COVID-19 vaccination acceptance was influenced by individuals' experiences and perceptions about the vaccination process/system regarding availability/accessibility of the vaccination. The experiences of and/or perceptions of vaccination not being locally available, stock-outs of vaccine and vaccination materials, long distance to vaccination site(s), lack of transport fare, long waiting time, being too busy (and not having the chance), poor attitudes of health workers etc. led to non-acceptance of the vaccination and the converse was also the case. Another factor was the lack of

awareness of COVID-19 vaccination availability and vaccination sites and time (due to inadequate information and communication).

COVID-19-related determinants of COVID-19 vaccination acceptance

COVID-19-related factors such as factuality, transmissibility, frequency, severity, fatality etc. influenced individuals' experiences and perceptions and then COVID-19 vaccination acceptance. Illustrative quotes are presented in Table 2 SN 1–5. According to participants, the fact that COVID-19 was not killing people in Ebonyi state/Nigeria like in other parts of the world, as seen or heard on the local and or international media, influenced peoples' experiences and perceptions that the disease was not in Ebonyi state/Nigeria or that it was not severe, leading to non-acceptance of the vaccination. The high transmissibility, frequency, and fatality of COVID-19 in other countries that people were aware of made them to be afraid of COVID-19 and led to acceptance (receipt) of the vaccination as a precautionary measure as soon as they heard the vaccine had become available in Nigeria/Ebonyi state, even though they had not seen any case in Ebonyi state.

COVID-19 vaccine and vaccination-related determinants of COVID-19 vaccination acceptance

COVID-19 vaccine/vaccination-related factors, such as its attributes and peculiar circumstances, influenced individuals' experiences and perceptions and then COVID-19 vaccination acceptance. Illustrative quotes are presented in Table 2 SN 6–10. According to participants, the facts that the vaccine/vaccination did cause serious side-effects on many of the vaccinated persons, did not prevent COVID-19 infection, and was new with unprecedented speedy production (by foreign manufacturers) made people not to accept/receive the vaccination. In their views, these peculiar circumstances and attributes appeared to support the conspiracy theories about the vaccine/vaccination and many preferred to wait for others to get vaccinated first. Conversely, the fact that the vaccine/vaccination did not cause serious side-effects on many other vaccinated persons or death among the vaccinated also led to vaccination acceptance by other people.

COVID-19 vaccination process and system-related determinants of COVID-19 vaccination acceptance

The fact that there were COVID-19 vaccination process/system-related constraints regarding availability and accessibility of the vaccination influenced individuals' experiences and perceptions and then COVID-19 vaccination acceptance. Illustrative quotes are presented in Table 2 SN 11–15. According to participants, there were non-acceptance of the vaccination due to the vaccine not being available locally, stock-outs of vaccine and vaccination materials, long distance to vaccination sites, long waiting time, poor attitudes of health workers etc. and the converse was also the case. Participants said inadequate information and communication and misinformation about the vaccination process led to lack of awareness of COVID-19 vaccination availability and vaccination sites and time and negatively affected COVID-19 vaccination acceptance.

Family, group, and other individual-related determinants of COVID-19 vaccination acceptance

The experiences and perceptions/beliefs and actions of family members, affiliated or social group members, individual health workers, and other individuals or community members regarding COVID-19 and COVID-19 vaccination influenced individuals' experiences and perceptions or led to compulsion (compelled or impelled them) and then influenced COVID-19 vaccination acceptance. Illustrative quotes are presented in Table 2 SN 16–18. According to participants, having family members or relatives/friends etc. who believed COVID-19 was real, had had or died from COVID-19 and or who believed COVID-19 vaccination was safe and effective or had received the vaccination (without serious side-effects) influenced individuals' beliefs and then vaccination acceptance. The converse was also the case.

Being asked by parents to go and receive the vaccination influenced individuals' perceptions or impelled them to receive the vaccination. There were instances where the initial belief that the vaccination was not safe (because of the experience of severe side-effects (pain and inability to move the limb) after the vaccination) later changed to the belief that it was safe because vaccinated family members (who had no serious side-effects) believed in the safety of the vaccination. Also, making the vaccination compulsory by heads of households led to compulsion (compelled family members) and acceptance.

Broader local, national, international, and global (LONING) context-related determinants of COVID-19 vaccination acceptance

Broader LONING context-related factors (illustrated in Fig. 1) influenced individuals' experiences and perceptions/beliefs and knowledge or led to compulsion (compelled or impelled them) and then influenced COVID-19 vaccination acceptance. Illustrative quotes are presented in Table 3.

Nature of COVID-19 information and communication environment

According to participants, misinformation, disinformation, and conspiracy theories about COVID-19 and COVID-19 vaccine/vaccination on the LONING media,

especially on the social media and grapevine, negatively influenced individuals' experiences and perceptions about COVID-19 and COVID-19 vaccination and led to non-acceptance of the vaccination. Illustrative quotes are presented in Table 3 SN 1–7. Specifically, many people believed the rumours and bad stories that COVID-19 was not real (particularly in Ebonyi state/Nigeria) and/or that COVID-19 vaccine/vaccination was lethal, not safe, not effective, was used to monitor/get information about people, was programmed to be used to kill people and reduce the population of Nigeria/Africa, and that the injection/vaccination site on the body would become magnetic. These rumours made many people to be afraid and while some said they would not receive the vaccination, others said they would wait (typically for at least two years) to see whether or not they would later be severe complications (including infertility) or death among those that were receiving the vaccination.

According to participants, the duration of COVID-19 risk and behaviour change communication also influenced individuals' experiences and perceptions about the pandemic and then vaccination acceptance. Due to the early discontinuation or reduction in the COVID-19 risk and behaviour change communication in the local media (radio, television) by the state government after the initial wave(s) of the pandemic, people (that initially believed in the reality of COVID-19) thought COVID-19 was no longer in Ebonyi state/Nigeria. This was so because, unlike during the initial wave(s) when news in the local radio/television was dominated by COVID-19 related news, people were subsequently hardly hearing anything about COVID-19 in the radio/television. Thus, they saw no need to get vaccinated after the initial wave(s) of the pandemic.

Peculiar COVID-19 prevention and control policies and measures

The peculiar COVID-19 prevention/control policies and measures at the LONING levels were determinants of vaccination acceptance. Illustrative quotes are presented in Table 3 SN 8–10. According to participants, the enforcement of COVID-19-related lockdowns, social/physical distancing, the use of face mask, frequent hand washing, frequent alcoholic hand rubs, etc. made some individuals to believe COVID-19 was real and then to receive the vaccination. Conversely, the complete termination or non-enforcement of these measures led to complacency and non-acceptance. The fact that vaccinated persons were also being isolated, after contracting COVID-19 (as heard on foreign/global media), impaired confidence in the effectiveness of the vaccination and led to non-acceptance.

COVID-19 vaccination policies and regulations

Mandatory COVID-19 vaccination policies at the LONING levels led to compulsion (compelled individuals) and then COVID-19 vaccination acceptance. Illustrative quotes are presented in Table 3 SN 11–16. According to participants, mandatory COVID-19 vaccination policies, including those by the Nigerian governments, foreign governments, and private organizations/employers, made the vaccination to be received by many state government workers, individuals in national youth service (Corpers) (before entry into orientation camp), staff of private organizations, and foreign/international travellers to other countries. In addition to waiting to see whether the vaccinated would experience severe side-effects or death, many people were waiting for the vaccination to be made compulsory by the government before they get vaccinated. It was also identified that declaring particular COVID-19 vaccination days as work-free/farm-free days by the government/community leaders would enhance convenience and then vaccination acceptance.

Provision of incentives for COVID-19 vaccination

The provision of incentives for the receipt of COVID-19 vaccination would enhance convenience or result in compulsion (impel individuals) and then lead to COVID-19 vaccination acceptance. Illustrative quotes are presented in Table 3 SN 17 and 18. According to participants, the provision of incentives (stipends, transport fares, food stuff, feeding, loan etc.) for people to go and receive or for those who had received the vaccination (immediately after receiving it or sometime afterwards) would motivate people to forgo their business and farming activities for the day and get vaccinated and/or facilitate their receipt of the vaccination.

The history of the Ebola viral disease outbreak

The experiences individuals in Ebonyi state/Nigeria had during the Ebola viral disease outbreak, regarding the outbreak itself and the control measures, negatively influenced their experiences and perceptions about COVID-19 and COVID-19 vaccination and impaired vaccination acceptance. Illustrative quotes are presented in Table 3 SN 19. According to participants, the experiences during the Ebola outbreak made many individuals not to believe that COVID-19 was real in Ebonyi state/Nigeria and or that the vaccination was safe. Participants made comparison to the fact that people died from drinking and bathing with saline following the information on the social media and grapevine that such acts would prevent Ebola viral disease which eventually did not come to (or spread in) Ebonyi state/Nigeria.

(Un)Trustworthiness of the government and bad/good governance

The untrustworthiness of the federal and state governments and bad governance in Nigeria were said to negatively influenced individuals' experiences and perceptions and led to non-acceptance of COVID-19 vaccination. Illustrative quotes are presented in Table 3 SN 20–24. According to participants, people felt they were not remembered by the Ebonyi state government when it was time for them to receive the COVID-19 palliatives during the COVID-19 lockdowns (as government failed to distribute the palliatives to the people) but were only remembered when it was time to receive COVID-19 vaccination (as the same government was then asking them to receive the vaccination). That experience aggravated peoples' already limited trust in the government and made many not to believe in the COVID-19 and COVID-19 vaccination behaviour change communication by the same government and not to have confidence in the safety of the vaccination provided by such government (who did not care for them when they were in dire need of food during the COVID-19 lockdowns).

Many also believed the lockdowns and vaccination campaigns were rather instituted for ulterior motives by the federal and state governments which were always not trustworthy and corrupt at the expense of the people. Specifically, the vaccination campaign was viewed as a ploy by the governments to misappropriate funds. Conversely, trustworthiness of government and good governance would lead to acceptance of COVID-19 vaccination by those people. Some participants said those that were unvaccinated had no trust in the government while the vaccinated had trust in the government.

(Un)Trustworthiness of the health system and international/global health partners

The untrustworthiness of the Nigerian health system (including health system governance) and the lack of trust for her international/global partners, negatively influenced individuals' experiences and perceptions and led to non-acceptance of COVID-19 vaccination and the converse would also be the case. Illustrative quotes are presented in Table 3 SN 25–28. According to participants, there were lack of confidence in the safety and effectiveness of the COVID-19 vaccines in Nigeria (and Africa) which, like many other commodities in the Nigerian health system, were believed to be fake or of low quality (compared with those in the developed countries) or to have expired. These perceptions were aggravated by the expiration of COVID-19 vaccines in stock at vaccination sites in Ebonyi state/Nigeria, the untrustworthiness of the governments, and the unprecedented disinformation/conspiracy theories.

How to increase COVID-19 vaccination acceptance

According to participants, certain measures could be taken (by governments, community leaders, employers) to increase COVID-19 vaccination acceptance. Illustrative quotes are in Table 4. These measures included: adequate community sensitization and engagement, inclusive of sensitization campaigns in places of worship; adequate sensitization and reorientation of health workers so they can better educate the people; provision of financial and non-financial incentives; making the vaccination available very close to the people, including house-to-house vaccination; distribution of the COVID-19 palliatives to the people as promised; and declaring work-free/farm-free vaccination days (Table 4 SN 1–3).

Other measures suggested included: making COVID-19 vaccination compulsory; the health workers giving the vaccination demonstrating the evidence that they themselves had received the vaccination e.g. by wearing the vaccination card around their necks; leaders and top government officials receiving the vaccination in the presence of the people as against showing the videos/pictures of them receiving the vaccination (as many people did not believe the vaccines being received in such videos were the same as those brought to their communities); and government being trustworthy in every situation and demonstrating good governance (Table 4 SN 4–8).

The following were also suggested: government publicizing the identities of those who have been infected with COVID-19 so that people can verify the truth; government promising to take the responsibility for any severe side-effects or death following vaccination; and prohibiting the spread of false information and conspiracy theories and sanctioning the media channels involved (Table 4 SN 9–11).

Discussion

Based on the novel and pragmatic Omale INDEPT FORCIS Framework, this study found many and diverse determinants of COVID-19 vaccination acceptance among community members during the pandemic in Ebonyi state, Nigeria.

Our findings show that many individual-related factors (individual experiences and perceptions/beliefs and knowledge about COVID-19, COVID-19 vaccine/vaccination, and the vaccination process/system and individual's condition) were determinants of COVID-19 vaccination acceptance. Accordingly, some similar findings were reported by other studies in Nigeria (in Benue [28], Anambra [29]), Malawi [10], Zambia [12], South Africa and Zimbabwe [13], Grenada [11], Bosnia and Herzegovina [9], Guatemala [26], Bangladesh [21], Thailand [23], Vietnam [14], UAE [16], Canada [15], Australia [17], USA [18–20, 27], UK [22, 25], and Ireland [24]. Many COVID-19-, COVID-19 vaccine/vaccination-, and

Table 4 Illustrative quotes for how to increase COVID-19 vaccination acceptance

SN	Quotes
1	'Some of the health workers should also be lectured on what the vaccination is all about. The reason is that some of the health workers cannot even explain or educate the people on the reason why they need the vaccination. So, I suggest that proper orientation should be giving to all the health workers in order to carry out the work diligently.' (Male FGD 2)
2	'What I want to say is that what government can do is to, because you know this thing is government's fault because you know you cannot stop those mothers from going to farm, government should give them something [transport fare] they will use to go to the hospital to take the vaccination.' (Female FGD 9)
3	'… if they [the government] want to do it well [increase COVID-19 vaccination acceptance], they should pay that COVID-19 loan they promised. If they bring the money, we will take the vaccination, if they do not bring it, someone who is hungry does not take vaccinations.' (Male FGD 5)
4	'I want the government to device another means like making it [COVID-19 vaccination] compulsory … For instance, if they use to issue vaccination card as a confirmation card, that the person should come with the card to any [public] gathering, both in the banks, churches, schools, and markets [as was done regarding the wearing of face mask], as most people like us will always want it done by force, then I will immediately start looking for the health centre [to get vaccinated].' (Female FGD 4)
5	'Some people believe that the [COVID-19] vaccine they are given them [in the communities] in not the same as the vaccine that they are showing the pictures or videos of top officials receiving. Why not they bring it down to this level [the level of the people], like [say], if the councilor come in front of everybody and take it at the same vaccination site with the people? Everybody that see it will believe the vaccine is okay. It is not like the fake vaccination that we are seeing in the video. So, most people believe that, at times, those things they see in the video might not actually be what they are coming to give them in the communities.' (Male FGD 6)
6	'Like he rightly said, if somebody who is leading a thousand people get vaccinated in their presence, at least to some extent, it will influence others to get vaccinated. But take for example, somebody that is leading a thousand people step out of his office and take pictures or make a video and post it online, to us, [claiming] that he/she has taken [the COVID-19 vaccination]. How am I sure it is the COVID-19 vaccination and not paracetamol they gave him/her? How am I sure?' (Male FGD 6)
7	'What I feel is that, if the government started from inception to say the truth about what is going on in the country, it would have been easier for us to believe what they say. That way, we would have gone to take the [COVID-19] vaccination by now. So, because the government has not been truthful, people have refused to take whatever they say seriously.' (Male FGD 4)
8	'In my own mind, the problem is from the government. If the Nigerian government can work towards establishing good governance, then I believe people will be eager to receive the vaccination. The people they are governing are not happy with them.' (Male FGD 5)
9	'What I think the government should do … they are the ones to give us information … When the complete information about the person said to be infected or killed by COVID-19 [the name, where the person hails from, etc] is given to me [publicized], it is left for me to go and verify, … even if I do not know the victim, I will trace it, then I will go there and listen to them. When I see some truth about it, nobody will force me, I will start looking for the vaccination site [to get vaccinated]. We are only looking for proof, I need proof, just proof.' (Male FGD 3)
10	'What the government can do for people to go and receive the [COVID-19] vaccination is that … the government should come out and say "people of … go and receive this vaccination and if there is anything like this [severe side-effects], and anybody dies, you people should hold us responsible" … [they should agree that] if somebody finish taking the vaccination, starting from this time to so so time, if the person dies, that the people should hold them responsible.' (Male FGD 3)
11	'Again, there are videos going viral on the internet where people in other countries are protesting that they do not want the [COVID-19] vaccination again, meaning that there may be [COVID-19] vaccines that are fake. So, I suggest the government should stop the spread of the video [such videos] in order not to put fear in some people. … In addition to that, the media channels that disseminated such information should be sanctioned for doing so, because it is a means of discouraging people from taking the [COVID-19] vaccination.' (Male FGD 2)

the vaccination process/system-related factors were also identified as determinants of COVID-19 vaccination acceptance by this study. Accordingly, some similar findings were reported by other studies in South Africa and Zimbabwe [13], Grenada [11], Guatemala [26], Bangladesh [21], Thailand [23], Vietnam [14], Canada [15], Australia [17], USA [18, 19, 27], UK [22, 25], and Ireland [24].

Our findings also show that the experiences and perceptions/beliefs and actions of family members/relatives/friends and other individuals (health workers) regarding COVID-19 and COVID-19 vaccination were determinants of COVID-19 vaccination acceptance. Accordingly, some similar findings were reported by other studies in Nigeria (in Anambra [29]), Malawi [10], Zambia [12], Grenada [11], Guatemala [26], Bosnia and Herzegovina [9], Cyprus [8], UAE [16], Australia [17], USA [18–20], UK [22, 25], and Ireland [24].

The whole evidence above have wide-ranging implications. The evidence indicates that individuals' real-life experiences and perceptions/beliefs (and knowledge) about COVID-19 and COVID-19 vaccine/vaccination and the vaccination process/system were of primary significance in determining COVID-19 vaccination acceptance during the pandemic in Ebonyi state, Nigeria. It also emphasizes the significance of contextual factors (family, friends, social groups, other individuals/individual health worker and the peculiar circumstances/attributes of COVID-19, COVID-19 vaccine/vaccination, and the vaccination process/system) in influencing these experiences and perceptions/beliefs and in determining COVID-19 vaccination acceptance. It illuminates specific interrelated policy-relevant determinants of COVID-19 vaccination acceptance that will inform strategies in subsequent outbreaks.

Despite the unprecedented devastating global health and economic effect of the pandemic, the health effect was not severe in Ebonyi state/Nigeria compared to other countries. As found by this study, the common perception/belief that COVID-19 was not real in Ebonyi state/Nigeria was mainly due to lack of experience of real-life cases of COVID-19, and related deaths, by individuals apart from the ones on the media and grapevine. In a quantitative study, more than 90% of the community members in Ebonyi state did not know any person who had gotten COVID-19 and only less than 32% had strong COVID-19 experience and perception [36]. As also found by this study, the above common perception was worsened by the unprecedented misinformation, disinformation, and conspiracy theories about COVID-19 and COVID-19 vaccination and the untrustworthiness of the governments and this perception led to increased complacency about COVID-19 vaccination and then non-acceptance.

As found by this study, participants expressed mixed experiences and perceptions (positive, negative, being unsure) about COVID-19 vaccination in terms of side-effects, safety, and effectiveness. Amidst the negative experiences of (instances of) severe side-effects and their exaggeration on the social and online media channels and grapevine, including the disinformation about deaths following vaccinations, the positive experiences of instances of mild or no side-effects after vaccination and the facts about the safety of the vaccination which was not killing the vaccinated, enhanced confidence in the vaccination and then acceptance. For example, there were instances where the initial negative views of people, including even those who experienced severe side-effects, later changed to positive views because other vaccinated family and community members had no severe side-effects and were expressing their positive views about the vaccination. Participants identified that these experiences made many people to understand that the severe side-effects people had were due to their individual idiosyncrasies.

The above findings demonstrate that the unprecedented misinformation, disinformation, and conspiracy theories had limited negative effect on peoples' perceptions about COVID-19 vaccination, and then vaccination acceptance, as increased number of people got vaccinated without the experiences of instances of severe or fatal adverse events. Moreover, such negative effect would have been further limited if the real instances of the severe side-effects of the vaccination were rare. The findings also offer valuable insights on how the real-life experiences and close perceptions/observations of vaccination attributes (importance, safety/side-effects, effectiveness) positively influenced people's perceptions about COVID-19 vaccination, in the context of increased availability/access to actual vaccines, despite the unprecedented misinformation/disinformation and conspiracy theories and perhaps explain the unexpectedly high prevalence of good COVID-19 vaccination expectation and perception of more than 72% among the community members in Ebonyi state [36].

All the foregoing evidence emphasize the significance of individuals' real-life experiences and perceptions about a vaccination in determining vaccination acceptance and highlight the need for COVID-19 vaccination safety information and communication strategies to actively and extensively promote live stories of positive experiences by the vaccinated, and prevent the exaggeration of negative experiences, on all media channels and grapevine. However, it was observed that while some participants and other community members had received the vaccination, many other participants and other community members had not received the vaccination as COVID-19 vaccination acceptance was reportedly low among community members in Ebonyi state [5]. This means that the encouraging perceptions about COVID-19 vaccination, as stated above, did not result in encouraging vaccination acceptance because of the other equally significant determinants found by this study and which also need to be addressed in the aforementioned regard.

Our study found many broader local, national, international, and global (LONING) context-related factors as determinants of COVID-19 vaccination acceptance. They included the nature of COVID-19 information and communication environment, peculiar COVID-19 prevention/control policies and measures, COVID-19 vaccination policies and regulations, provision of incentives for COVID-19 vaccination, the history of the Ebola viral disease outbreak, (un)trustworthiness of the governments and bad/good governance, and (un)trustworthiness of the health system and international/global health partners. Accordingly, some similar findings were reported by other studies in Nigeria (in Benue [28], Anambra [29]), Malawi [10], Zambia [12], South Africa and Zimbabwe [13], Grenada [11], Guatemala [26], Bosnia and Herzegovina [9], Bangladesh [21], Thailand [23], Vietnam [14], UAE [16], Australia [17], USA [18–20, 27], UK [22, 25], and Ireland [24].

These findings, together with the findings discussed in the preceding sections, emphasize the significance of LONING socio-political, economic, historic, and health system factors in influencing the experiences and perceptions/beliefs, knowledge, and actions of individuals and then in determining COVID-19 vaccination acceptance. They emphasize the peculiar complexities and interrelatedness, and the international/global importance, of the determinants of COVID-19 vaccination acceptance. The anti-vaccination sentiment which became a big public health challenge over the past decade [32, 37] was worsened by the unprecedented nature of the

pandemic, global responses, and misinformation/disinformation and conspiracy theories. As found by this study, many people were suspicious of the responses which were meant to control the pandemic due to the unusual circumstances of the pandemic and the vaccine/vaccination (which appeared to support the conspiracy theories), the lack of trust for the health system and her international partners, lack of trust for the governments, and bad governance. Similarly, the finding that incentives would motivate people and/or facilitate their receipt of the vaccination was against the backdrop of poverty, bad governance, poor vaccination process/system, and complacency about COVID-19 vaccination.

Although the use of COVID-19 vaccination mandates were controversial, with mixed findings regarding its acceptability [38–40], mandatory policies actually led to increase in COVID-19 vaccination uptake/intention in different environments [11, 20, 22–25, 40]. Similarly, our findings show that many people got vaccinated following vaccination mandates and that many were also waiting for the vaccination to be made compulsory by the government before they get vaccinated. Notwithstanding the fact, as observed during this study, that forcing people to get vaccinated may make them suspicious and strengthen their belief in the disinformation/conspiracy theories on the media, the foregoing evidence indicate that, despite being controversial, vaccination mandates could be a useful instrument to enhance COVID-19 vaccination acceptance.

The finding of the untrustworthiness of the governments in Nigerian and bad governance as determinants of COVID-19 vaccination non-acceptance has far-reaching implications. Government has the overall responsibility for ensuring the provision and acceptance of vaccinations for the public good and peoples' trust in government is very crucial in this regard [41]. This responsibility was even more striking during the unprecedented COVID-19 pandemic with the uncertainties and all the misinformation, disinformation, and conspiracy theories about the pandemic and COVID-19 vaccination. Expectedly, the federal and state governments in Nigeria were driving the pandemic control efforts, including COVID-19 risk and behaviour change communication and COVID-19 vaccination provision and vaccination campaigns. The need to build more trust in the governments could not have been greater in the foregoing situation. However, as found by our study, instead of the governments to strive to build her already limited trustworthiness, due to decades of corruption and bad governance, the way the COVID-19 lockdown measures and distribution of palliatives were handled further damaged their untrustworthiness (as many people were having grudges against the state government for failing to distribute the palliatives) at the expense of vaccination acceptance. Similar findings regarding trust or lack of trust in the government and in her management of the pandemic were also reported by other studies in Nigeria (in Benue [28], Anambra [29]), South Africa and Zimbabwe [13], Guatemala [26], USA [19, 20, 27], UK [22, 25], and Ireland [24].

When people are happy with the performance of the government in caring for their basic needs, they will see the government's recommendation to get vaccinated as another way the government is trying to care for their wellbeing and they will abide by such recommendation. However, the converse was mainly the case according to our study findings. Moreover, the situation was perhaps aggravated by the untrustworthiness of the Nigerian health system (and the lack of trust for her international/global partners) with many fake and expired commodities in the market. This also led to lack of confidence in the safety and quality/effectiveness of the vaccines in Nigeria which was further impaired by the fact that there were expired COVID-19 vaccines at the vaccination sites in Ebonyi state/Nigeria. The foregoing experiences will likely be remembered by the people during any subsequent outbreaks/pandemics, with implications on their confidence in the governments and health system and on vaccination acceptance. The foregoing evidence thus emphasize the necessity of incorporating good governance and the development of the trustworthiness of the government, and of the health system and her international/global partners, in outbreak/pandemic preparedness and control strategies.

The foregoing discourse illuminates the need for concerted and comprehensive (long-medium-short-term) local, national, international, and global (LONING) actions in addressing the complex and wide-ranging interrelated LONING determinants identified by our study in the strategies to increase vaccination acceptance in subsequent outbreaks/pandemics.

The limitation of this study was the possibility of the overstatement or understatement of facts by participants due to personal inclinations as data measurement through FGDs was based on the perspectives of participants. Participants could also consciously overstate or understate their positive or negative perceptions due to personal interests and COVID-19/COVID-19 vaccination being a sensitive and controversial topic. However, measures were taken to prevent such bias, overall, by selecting both vaccinated and unvaccinated participants from different sociodemographic backgrounds to give diverse opinions, asking more general and indirect questions as much as possible, ensuring the conduct of the FGDs were non-judgemental and friendly, and assuring participants of and ensuring high degree of confidentiality.

The strengths of this study were several. First of all, this study involved face-to-face FGDs with vaccinated and unvaccinated community members from diverse sociodemographic backgrounds in 10 rural and urban or semi-urban geographical clusters (out of the 28 randomly

selected clusters for the mixed method study [5]) in seven local government areas (of the 13 in the state) across the three senatorial zones. These made the findings more diverse, insightful, transferable, and valuable. Secondly, it explored determinants of the full spectrum of COVID-19 vaccination acceptance by measuring perceptions on determinants of uptake, hesitancy, intention to receive, and timeliness of the intention to receive real vaccination and the assessment was based on the novel and pragmatic Omale INDEPT FORCIS Framework that reflects the real-life situation in the study setting during the pandemic, making the findings invaluable and more policy-relevant and the recommendations feasible for practical applications. Moreover, the implementation of this study was more transparent as it was based on a mixed-method study protocol [5] which was registered prospectively and prospectively submitted to a peer-review journal.

Conclusion

There were many, diverse, and significant determinants of COVID-19 vaccination acceptance among community members during the pandemic in Ebonyi state, Nigeria, based on the novel and pragmatic Omale INDEPT FORCIS Framework. These determinants were individual-related; COVID-19-, COVID-19 vaccine/vaccination-, and the vaccination process/system-related; family, group, and other individual-related; and broader local, national, international, and global (LONING) context-related (socio-political, economic, historic, health system) factors that should inform relevant and adaptive health policy actions. The evidence from this study illuminates specific underlying and peculiar policy-relevant LONING determinants of COVID-19 vaccination acceptance, and their complexities and interrelatedness, and emphasizes the need for concerted and comprehensive LONING strategies (that involves all the relevant local, national, and international/global stakeholders and policy makers) in addressing these determinants to increase vaccination acceptance among community members in subsequent outbreaks and pandemics in Ebonyi state, Nigeria, and similar settings. We have made recommendations in this regard.

Recommendations on how to increase vaccination acceptance among community members in subsequent outbreaks and pandemics

The heads of the Nigerian government, the Ebonyi state government, and local governments in Ebonyi state (as applicable) should

1. Be committed to the building of trust with the people in every situation and to ensuring good governance. Fulfilling every promise made to the people and strong and honest commitment to anti-corruption, particularly the misappropriation or embezzlement of public funds, will be vital in this regard.
2. Be committed to and ensure the trustworthiness of the Nigerian health system. In this regard, it will be useful to always address the issue of fake and expired health commodities.
3. Ensure extensive and sustained risk and behaviour change communication, including community sensitization and engagement, about the disease, vaccine/vaccination, and vaccination process. The mobilisation of adequate number of health workers, opinion leaders, and financial resources for physical sensitization and engagement activities, as appropriate, will be vital in this regard.
4. Ensure sufficient and fair distribution of any palliatives that is available for the outbreak/pandemic.
5. As much as possible, ensure the vaccine(s) have acceptable minimal side-effects, very rare or no severe side-effects, and are truly effective before their introduction and mass use.
6. Ensure the provision of only vaccines with longer expiry dates, to help in preventing the expiration of vaccines before vaccination.
7. Ensure the vaccination is available very close to all community members, including those in remote rural areas. House-to-house vaccination will be vital in this regard.
8. Ensure adequate mobilisation of resources for continuous and efficient vaccination to prevent missed opportunities and long waiting time. Having many vaccination sites as much as is feasible, ensuring vaccines and vaccination materials are always available, and that the number of personnel in each vaccination team is adequate will be vital in this regard.
9. Ensure the provision of incentives (financial and/or non-financial), including stipends or transport fares as appropriate, to motivate people to go for the vaccination.
10. Declare work-free vaccination days as appropriate and sanction defaulters accordingly.
11. Prohibit the intentional spread of false information (disinformation) and conspiracy theories by anti-vaccine campaigners and media channels as appropriate and sanction those involved accordingly.
12. Make use of mandatory vaccination policies as necessary and as appropriate.
13. Strongly consider publicising more information about cases in dire situations of an outbreak/pandemic of a disease that is acute in nature (like COVID-19). This should be done in consideration of confidentiality and the public good as appropriate.

14. Strongly consider taking full responsibility and making provisions for compensations for any severe side-effects or death following vaccination, as appropriate and practicable, in dire outbreak/pandemic situations.

Top government health officials should

1. Be committed to good health system governance and the building of people's trust in the Nigerian health system. In this regard, it will be useful to always address the issue of fake and expired health commodities.
2. Ensure adequate and balanced disease-risk and vaccination-risk-benefit information and communication during community sensitization and engagement. More information about the potential side-effects of and absolute or relative protection from the vaccination (as applicable) will be crucial in this regard.
3. Ensure adequate sensitization and reorientation of all cadres of health workers (at tertiary, secondary, and primary levels and in public and private health sectors) about the disease, vaccine/vaccination, and vaccination process. This will enhance the quality and consistency of information delivery and education of the community by health workers at all levels.
4. Ensure the sensitization and education of religious leaders, including sensitization campaigns in places of worship.
5. Ensure vaccinated persons, and their positive experiences following vaccination, are actively and visibly part of the extensive and sustained risk and behaviour change communication campaigns on all media channels and the grapevine. It will be vital if the vaccinated persons also demonstrate (verifiable) evidence of their receipt of the vaccination as appropriate.
6. Receive the same vaccines brought to their communities in presence of their people at the local vaccination sites.
7. Ensure health workers giving the vaccination are themselves vaccinated and that they demonstrate such evidence (which should be verifiable) as appropriate.
8. Ensure sufficient measures are put in place for prompt detection and management of severe side-effects following vaccination. This will reassure potential recipients of the vaccination.

Community leaders should

1. Receive the same vaccines brought to their communities in presence of their people at the local vaccination sites.
2. Declare work-free or farm-free vaccination days as appropriate and sanction defaulters accordingly.

Political and opinion leaders should

Receive the same vaccines brought to their communities in presence of their people at the local vaccination sites.

Heads of private organizations or private employers should

1. Receive the vaccination in presence of their employees at designated vaccination sites.
2. Declare work-free vaccination days for their employees as appropriate. Off days can be given to employees in this regard.
3. Make use of mandatory vaccination policies as appropriate.

International/global health partners should (in their collaboration and support for the Nigerian government)

1. As appropriate, be committed to the building of trust with the people in every situation and to the trustworthiness of the Nigerian health system. Honest commitment to always addressing transnational factors in the supply of fake/substandard health commodities to the country will be vital in this regard.
2. As much as possible, ensure the vaccine(s) have acceptable minimal side-effects, very rare or no severe side-effects, and are truly effective before their introduction and mass use.
3. Ensure the provision of only vaccines with longer expiry dates, to help in preventing the expiration of vaccines before vaccination.
4. As appropriate, be committed to any national drive to combat the intentional spread of false information (disinformation) and conspiracy theories by transnational anti-vaccine campaigners and media channels.
5. Make use of mandatory vaccination policies as necessary and as appropriate.

Supplementary Information

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Supplementary Material 1

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Author contributions
UIO is the lead author and was the principal investigator, conceptualised and designed the study, conceptualised and designed and prepared the Omale INDEPT FORCIS Framework, designed the data collection tools, directed the implementation of the study, oversaw data collection and transcripts verification, did the data analysis and interpretation, and wrote the manuscript. ASA, OUO, COI, OI, OON, VUU, UIAN, OOU, IMO and RLE contributed to the design of the study and data collection tools, collected data, contributed to the verification of transcripts, and did the verification of data analysis and interpretation. CIA and GEN contributed to the design of the study and data collection tools. All authors revised the manuscript, read and edited and approved the final manuscript, and agree with its submission for publication.

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Data availability
The empirical data underlying the analytic findings are appropriately presented in the manuscript as quotes. Because of the very sensitive and descriptive nature of the underlying data, further empirical data (including anonymized data) will not be made available to protect participants' confidentiality.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the Ebonyi State Health Research and Ethics Committee (EBSHREC/15/01/2022-02/01/2023) and Research and Ethics Committee of Alex Ekwueme Federal University Teaching Hospital Abakaliki (14/12/2021-17/02/2022). The investigators obtained verbal informed consent/assent from the participants before commencing each focus group discussion. The conduct of all procedures was in accordance with the Declaration of Helsinki.

Consent for publication
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Competing interests
The authors declare no competing interests.

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