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“Build back the confidence”: qualitative exploration of community experiences with polio vaccination in the Covid-19 context in Cameroon and Ethiopia

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Abstract

Background In 2020, as the Global Polio Eradication Initiative worked to address outbreaks of vaccine-derived poliovirus Type 2, particularly in sub-Saharan Africa, the Covid-19 pandemic suspended routine immunization campaigns worldwide. There were concerns about how Covid-19 – and the introduction of Covid-19 vaccines – might influence uptake of the oral polio vaccine (OPV). To inform communications strategies, we conducted a qualitative study to explore insights from community stakeholders into how Covid-19 influenced perceptions of OPV and vaccination campaigns.

Methods We conducted 32 focus group discussions with caregivers of children under 5 and polio frontline workers as well as 22 in-depth interviews with healthcare practitioners and social influencers in Cameroon and Ethiopia. In each country, we purposively sampled stakeholders per discrete eligibility criteria from one urban (Yaoundé and Addis Ababa) and one peri-urban site (Bafia and Adama).

Results We found that the Covid-19 pandemic and related precautionary measures introduced new challenges for OPV campaigns in Cameroon and Ethiopia, including reduced caregiver confidence in routine immunizations and an erosion of trust between caregivers and frontline workers. A salient concern among caregivers was that Covid-19 vaccines might be delivered in place of OPV. When asked how to maximize community support for future OPV campaigns, stakeholders suggested to rebuild caregiver trust for frontline workers; use a variety of information sources to ensure consistent messaging on vaccination reaches caregivers in a timely manner; increase remuneration, resources, and training for frontline workers; and leverage existing community influencers and groups.

Conclusions Despite the challenges to vaccination campaigns experienced during the Covid-19 pandemic, it was anticipated that the Polio Programme would continue to experience community support for OPV with appropriate messaging and community coordination. These efforts would “build back the confidence” among caregivers and other community stakeholders regarding community-based vaccination campaigns. Social and behavior change approaches that leverage clear, consistent messaging from multiple trusted platforms could address caregiver trust and dismantle mis/dis-information that creates confusion surrounding vaccines.

Keywords Poliovirus, Oral polio vaccine, Covid-19, Covid-19 vaccines, Communications strategy, Cameroon, Ethiopia

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Introduction

Global efforts have led to the successful eradication of wild poliovirus serotypes 2 and 3, with serotype 1 still endemic in Afghanistan and Pakistan as of 2024 [1]. The broad distribution and uptake of the live-attenuated oral polio vaccine (OPV) across the globe is lauded as contributing to a 99% decrease in polio cases since the establishment of the Global Polio Eradication Initiative (GPEI) in 1988 [2]. However, there has been a rise in cases of circulating vaccine-derived poliovirus type 2 (cVDPV2) leading to renewed outbreak control efforts [3]. With the global spread of Covid-19 in March 2020, the World Health Organization (WHO) issued guidelines indicating that mass vaccination campaigns should be temporarily suspended, citing safety concerns about the exposure of under-immunized children to Covid-19 while participating in immunization activities [4]. This presented a challenge for many countries, particularly in sub-Saharan Africa, that were facing emergences of cVDPV2 and required active outbreak response. By 2021, GPEI had resumed standard vaccine service delivery, including through OPV campaigns, in most countries. However, there were 44 outbreaks of cVDPV2 in 37 countries between January 2020 and June 2021, with ongoing outbreak response hampered by disruptions in immunization and surveillance activities during that period [5].

Throughout 2021 and 2022, polio vaccination and Covid-19 vaccination campaigns often took place at the same time, in the same places, performed by some of the same actors (i.e., national governments, UNICEF, and WHO), and leveraging the same networks of vaccinators and social mobilizers for both vaccines. Previous research from the Democratic Republic of the Congo, Kenya, and Nigeria found that although stakeholders were largely unaware of cVDPV2, child caregivers were aware of and expressed concern over repeated vaccination campaigns [6]. Caregivers also reported rumors, misinformation, and disinformation that raised suspicion and fear about ongoing OPV campaigns [6].

At the same time, Covid-19 and its associated vaccines had also been subject to persistent mis- and disinformation [7–9], contributing to vaccine hesitancy. There was concern that the rumors/concerns related to Covid-19 vaccines could spill over into perceptions of other vaccines, including OPV. Although there has been little research exploring the effect of the Covid-19 pandemic and subsequent roll-out of novel Covid-19 vaccines on the uptake of OPV, the available evidence suggests reasonable, growing concern over vaccine hesitancy in at least some countries. A Cameroonian report based on fieldwork conducted by UNICEF indicated fear of the Covid-19 virus as one reason for an estimated 30% vaccination refusal rate in a 2020 polio

outbreak response across 7 regions [10]. In Ethiopia, a series of Ministry of Health Covid-19 Taskforce surveys indicated that people were forgoing health services due to the Covid-19 pandemic, which also likely affected routine vaccine uptake [11].

Amid growing concern regarding how the Covid-19 pandemic would influence uptake of OPV, UNICEF and the GPEI acknowledged a need for targeted social and behavior change communications approaches to address new concerns on the part of caregivers, frontline workers, and influencers about polio vaccination in this context. To inform these campaigns, we conducted a study to examine qualitative insights into how the experience of Covid-19 (e.g., social distancing) and perceptions of the newly developed Covid-19 vaccines may have influenced perceptions of OPV and vaccination campaigns more generally. The study was intended to clarify information needs and provide updates to UNICEF and the GPEI to inform communications strategies and messaging around OPV campaigns in the post-Covid context.

Methods

We used an applied qualitative research design [12] based in a pragmatist perspective [13] to gather data via focus group discussions (FGDs) and in-depth interviews (IDIs) from key stakeholders in Cameroon and Ethiopia. Data were collected in Ethiopia in February–March 2022 and in Cameroon between April–May 2022.

Ethical approvals

Study materials were reviewed by FHI 360's Protections for Human Subjects Committee, which granted an exempt determination per the federal regulatory categories of Human Subjects Research (45 CFR 46). In Cameroon, we obtained approval from the *Comité National d'Ethique de la Recherche pour la Santé Humaine* and site authorization from the Centre Regional Delegation of the Ministry of Public Health. In Ethiopia, the Ethiopian Public Health Institute Institutional Review Board approved the study. All participants provided written informed consent to participate and be audio-recorded.

Study settings

This study was conducted in Addis Ababa and Adama, Ethiopia and in Yaoundé and Bafia, Cameroon. Given the growing number of cVDPV2 outbreaks since the Covid-19 pandemic began, UNICEF sought to purposefully select countries with 1) active cVDPV2 outbreaks, 2) recent OPV campaigns being delivered concurrently with Covid-19 vaccine roll-out, 3) potential challenges with vaccine hesitancy, and 4) geographic variability. UNICEF staff at Headquarters, Regional Offices, and Country Offices provided input on the selection of

study sites, which included one urban and one peri-urban (less densely populated) area per country. Urban and peri-urban sites were selected to represent greater and lesser access to information – and potentially mis- and dis-information – through internet resources. Local health administrations were consulted on health facility selection at each site.

At the time of site selection, there had been 11 reported cases of cVDPV2 in Cameroon since the start of the Covid-19 pandemic, with 5 confirmed cases between January-July 2021 alone [14]. By comparison, there were 1,577 confirmed cases of Covid-19 by the end of July 2021 [15]. The number of routine pediatric consultations decreased by 52% in April and 34% in May 2020 compared to the same periods in 2019, with corresponding declines in prenatal visits and vaccine demand [16]. At the same time, 84.6% of the population expressed concerns over safety, efficacy, and confidence in a potential Covid-19 immunization between May and August 2020 [7]. In July 2021, there was low Covid-19 vaccine confidence among providers, who cited the speed of the vaccine development, and generally low trust in the government's Covid-19 vaccine roll-out [17].

For Ethiopia, in 2020, there were 39 cases of cVDPV2 across 4 affected regions, with 10 cases reported across 3 regions in 2021 [18, 19]. During that time, as the Covid-19 virus spread, health promotion for children under 5 and vaccine campaigns were interrupted. In the North, routine vaccination was down 12.5% from pre-pandemic levels [20]. Moreover, the polio vaccination network in Ethiopia shifted resources to support the detection of Covid-19 cases, including transitioning dedicated polio workers to conduct house-to-house visits for identifying

new Covid-19 cases [21]. The extent to which the Covid-19 pandemic and subsequent roll-out of Covid-19 vaccinations has affected vaccine acceptance for routine childhood illnesses has not been well-documented.

Study populations

Within each country, we engaged four specific groups of stakeholders as respondents for the study: male and female caregivers of children under 5, polio frontline workers (FLW), healthcare practitioners (HPs), and social influencers (SI). Eligibility criteria defining the purposive sampling characteristics for all groups are outlined in Table 1. Briefly, we included caregivers as the decision-makers surrounding childhood vaccination. FLWs and HPs were included to provide perspectives on how their training and the information they receive from trusted sources influence their opinions or guidance related to OPV in the context of the Covid-19 pandemic and vaccines rollout. Influencers, like local leaders and health journalists, were included as integral voices in communications that can shape community perceptions about vaccination campaigns and outbreaks.

Sampling & recruitment

All sampling was purposive based on discrete eligibility criteria given the exploratory and qualitative nature of this research. Sample sizes were based on empirical evidence that 3 to 6 FGDs or 8 to 12 IDIs per sub-population should yield 80% of relevant themes on a focused topic, including the most salient themes [22, 23]. Recruitment efforts were led by the local research teams, who worked closely with local polio vaccination programs, healthcare administrators, and providers to maximize privacy

Table 1 Eligibility criteria of stakeholder groups in Cameroon and Ethiopia

Group	Criteria
All Stakeholders	<ul style="list-style-type: none"> • At least 21 years of age in Cameroon and 18 years in Ethiopia • Speak French in Cameroon and Amharic/Oromo in Ethiopia • Provided written informed consent to participate and be audio-recorded
Caregivers	<ul style="list-style-type: none"> • Male and female caregivers or guardians of children under 5, which corresponds with guidelines on ages at which children should be administered the polio vaccine • Included a range of perspectives, such as caregivers whose children have/have not received the polio vaccine • Male and female caregivers in separate FGs
Polio frontline workers	<ul style="list-style-type: none"> • Men and women working on mobile teams of vaccinators or as social mobilizers or community health workers (Cameroon) • Extensive experience administering OPV, including with harder-to-reach populations who may not regularly access health or vaccination services • At least one year of experience working as a frontline worker in their community
Healthcare practitioners	<ul style="list-style-type: none"> • Doctors, nurses, health officers, or health administrators • At least one year of experience administering the polio vaccine
Social or community influencers	<ul style="list-style-type: none"> • Persons of influence in the community, including village chiefs, traditional leaders, and local religious leaders • Health journalists, including journalists, bloggers, and other informal publishers of health-related information • Has maintained a visible role in the community for at least one year

and efficiency during recruitment. At all sites, study teams first met informally with key gatekeepers, leading to the identification of local leaders to facilitate community entry to staff and caregivers at local health facilities. Study teams also provided generalized information about the research objectives and presented relevant ethical approvals. HPs and SIs were recruited from a list generated through consultation with UNICEF, the Ministry of Health, and other relevant stakeholders. We sampled caregivers from within the catchment areas of health practitioners included in IDIs. FLWs in research sites were sampled and recruited with the help of health administrative units or organizations responsible for facilitating OPV campaigns. The research team had no prior relationship with potential participants and explained during recruitment information about FHI 360 and the purpose of the research, as well as their affiliations. Team members assessed eligibility and obtained written informed consent before scheduling IDIs or FGDs. Initial contact and subsequent recruitment efforts were made via telephone and/or in-person, depending on the type of stakeholder and availability.

Data collection

Local data collection teams comprised individual consultants experienced in qualitative data collection selected through a competitive process, with at least one male and one female interviewer per team. Local teams were led by co-authors Ademe Tsegaye (PhD, MPH) and Douglas Mbang Massom (MPH) in Ethiopia and Cameroon, respectively, who served as co-investigators and independent research consultants. U.S.-based research leads co-facilitated a hybrid remote/in-person training over a 5-day period to cover common concerns related to OPV and Covid-19 vaccines, primary research questions, research and informed consent procedures, and data collection and management. Training of data collectors also included refinement of local language FGD and IDI guides and mock interviewing to enhance familiarity with study guides.

Country-based research teams conducted field work over approximately 12 days. Each day of data collection included a mix of caregiver and FLW FGDs and IDIs with HPs and SIs. All data collection took place in-person in a private location, following medically recommended and local Covid-19 precautions (e.g., social distancing, masking). Each FGD was facilitated by a two-person data collection team, with one person as the detailed note-taker, in addition to an audio recorder (given the potential that masks may affect the audio quality of the recording). FGDs were conducted in French in Cameroon and in Amharic/Oromo in Ethiopia. FGDs took about 2 h

and IDIs approximately 1 h. Both were audio-recorded with participants' informed consent. No repeat interviews were conducted. At the end of each day, audio files were sent to the Addis Ababa- or Yaoundé-based team of translators/transcriptionists. Study teams in the U.S., Ethiopia, and Cameroon were trained on data management best practices and were responsible for ensuring that data were secured and remained confidential.

Content of IDI and FGD Guide

For IDIs and FGDs, stakeholder groups were asked questions on the same topic domains: 1) Covid-19 pandemic effects on perceptions of public health efforts generally; 2) Current perceptions around OPV campaigns (importance, process, and how the Covid-19 pandemic affected them); 3) Current perceptions of Covid-19 vaccines and OPV (including rankings of mis-, disinformation); and 4) Suggestions for how to maximize community support for OPV and community-based vaccination in the Covid-19 context, including during roll-out of novel Covid-19 vaccines. The guide also included questions targeted for the respondent group. The stakeholder guide for IDIs and FGDs is available as Additional file 1.

Analysis

FGD and IDI audio-recordings were transcribed in the local language, then translated into English and verified by the local co-investigator. Transcripts were not returned to nor reviewed by participating stakeholders. All English-language transcripts were imported into NVivo12 and tagged to indicate country, site, and type and gender of respondent. A team of two analysts (EN, GM) then followed an applied thematic analysis approach [24] consisting of two levels of coding: structural and emergent. A list of structural codes was developed to mirror the questions asked for each type of data collection event. Structural codes were applied to segment each transcript by question and response, which facilitated extraction for domain-focused analysis. Following careful reading of text within and across structurally coded material, emergent codes were discussed, agreed on, and added to the codebook to represent primary themes. Each transcript was coded again using these emergent codes, as applicable. Codes were then grouped according to research objective and analysts used NVivo and Excel to extract text and create summaries of the primary content and context of responses (e.g., disaggregation by country, type of respondent). Illustrative quotes were identified and are included in the Results section to ground the summaries in the data. Findings were shared with relevant local health officials, but not directly with participant stakeholders.

Trustworthiness

From research design through analysis, we attempted to enhance trustworthiness of the research process through: standardized training of data collectors and transcriptionists/translators; aiming for diversity of stakeholders within the stated purposive sampling criteria; consistent data collection procedures across sites in accordance with the protocol and best practices; quality assurance checks of translated transcripts; the use of NVivo 12 to organize and code data and create an audit trail; and following a two-tiered applied qualitative analysis approach that included both structured (a priori) and emergent thematic codes.

Results

We conducted 16 FGDs per country and 32 FGDs overall with caregivers and polio FLWs (Table 2), totaling 216 FGD participants between Cameroon and Ethiopia. We aimed for even numbers of FGDs between male and female caregivers. Although this was achieved in Ethiopia, in Cameroon we conducted one FGD with men and three with women per site due to challenges with real-time recruitment of men. We also conducted 22 key informant IDIs with HPs and SIs across both countries. Across sites, most respondents were between the ages of 26–35, except in Bafia where respondents were slightly older. Most respondents were Christian and had completed at least some secondary schooling.

Results are organized by key thematic finding, including: 1) observations of and experiences with community-based vaccination campaigns during the Covid-19 pandemic; 2) how Covid-19 precautions affected community-based vaccination campaigns; 3) reasons for vaccine hesitancy; 4) maximizing community support for OPV vaccination in the Covid-19 context, including during roll-out of novel Covid-19 vaccines. Results for Cameroon and Ethiopia are presented together; however, we specify differences by country and stakeholder group, when applicable. We also specify when there are notable differences between urban and peri-urban sites, both across and within countries, when applicable.

Experiences with community vaccination campaigns during the pandemic

Most, but not all, stakeholders were exposed to vaccination campaigns from the beginning of the Covid-19 pandemic. Overall, stakeholders in Ethiopia reported minor changes to vaccination campaigns for OPV or other childhood illnesses during the pandemic; however, stakeholders in Cameroon reported changes due to caregiver suspicions and concerns about the vaccine. For caregivers in Yaoundé and Bafia, some reported a sense of confusion and resistance to vaccination events, largely stemming from concerns that an OPV campaign could instead be a ruse to vaccinate against Covid-19: “They wanted to vaccinate the children, but I didn’t agree because I thought it was [the Covid vaccine]” (Bafia, Caregivers-03).

FLWs in Cameroon also described an uptick in vaccine refusals, with mothers making an effort to hide their children from vaccinators, based on rumors and misinformation. Similarly, HPs in Cameroon noted that mothers were not bringing their children for vaccination like they did before the pandemic. In Yaoundé, one HP observed an estimated 10% drop in routine vaccinations with the onset of the pandemic and an additional drop once Covid-19 vaccines were introduced, from roughly 50–65 children per month pre-Covid-19 pandemic to about 25. In a few extreme cases in Yaoundé, FLWs experienced or heard of other vaccinators experiencing aggression or violence during vaccination campaigns as a result of caregiver refusal, particularly around concerns related to Covid-19 vaccination.

Since Covid-19 vaccines came out, we have really started to have reservations about polio vaccination and whether parents will accept you entering their house. Even if he knows you, he will take the machete to say, “Go out of my house.” But after having people respond like that you’ll say, “My brother, forgive me, it is not the vaccination against Covid, it is for the polio.” Therefore, it is necessary to know how to speak with the person. It is Covid that has destroyed things ... has changed the immunization

Table 2 Number of FGDs, IDIs, and participants per stakeholder group in Ethiopia and Cameroon, 2022

Stakeholder Group	Ethiopia			Cameroon		
	Urban	Semi-urban	Total Participants	Urban	Semi-urban	Total Participants
Caregivers (FGs)	4	4	64	4	4	51
Frontline workers (FGs)	4	4	47	4	4	54
Healthcare practitioners (IDIs)	3	2	5	2	2	4
Social influencers (IDIs)	3	2	5	4	4	8
All Groups	14	12	121	14	14	117

system in Cameroon because everyone has already put it in his head that as soon as he sees you, it is Covid (Yaoundé, FLW-04).

Some of the concerns reported by Cameroonian caregivers were also reported by Ethiopian caregivers, particularly related to the actual substance of the vaccine, though to a far lesser extent. Generally, Ethiopian caregivers noted that campaigns “continued like the past.” Any concern among Ethiopian caregivers about vaccination events during this period seemed tied more to lack of trust for health extension workers than concerns about the vaccine itself. Meanwhile, FLWs and HPs in Ethiopia did not report any notable difference in vaccination rates due to the pandemic. A frontline worker from Adama commented: “No one resisted vaccinating their children because of the Covid-19 pandemic. We did everything like we did before Covid-19” (Adama, FLW-07). Additionally, a healthcare worker from Addis Ababa described:

There is no change. After the outbreak of Covid-19, there was a campaign for measles as well as for polio. The outbreak of Covid didn't prevent parents from getting their children vaccinated. They were vaccinating their children; there was no impact (Addis Ababa, HP-02).

Reasons for vaccine hesitancy

The concern that Covid-19 vaccines might be delivered in place of OPV was the most salient theme related to vaccine hesitancy identified in both countries, but more prominently in Cameroon. With respect to Covid-19 vaccines, some stakeholders in both countries feared they may become infected with the Covid-19 virus, rather than being inoculated against it. In general, stakeholders reported hesitancy concerns for both vaccines, though the concerns were less prominent for OPV. Nevertheless, the top concerns leading to vaccine hesitancy for OPV across all sites were possible side effects, fear of vaccine overdose (e.g., children being over-vaccinated in repeated community campaigns), religious leaders being against vaccines, concerns about westerners testing vaccines on Africans, and the idea that free vaccines must be in some way compromised.

Westerners donate vaccines for African nations. People think African nations always expect aid, so westerners send vaccines for free to African nations to test the vaccine, because we are poor. People say if the vaccine is effective why don't westerners take it first (Addis Ababa, FLW-04)?

For Covid-19 vaccines, stakeholders also expressed concern about side effects and vaccine overdosing (e.g., confusion over how many “jabs” were required of

different vaccines). However, stakeholders also reported personal or community-wide concern over the Covid-19 vaccines being a form of population control or a ploy by Westerners to test vaccines on Africans. Stakeholders also reported that a proliferation of conflicting information about the vaccines caused doubt among potential end-users. Word of mouth and social media were identified as the most prominent sources of rumors/mis-information.

How Covid-19 precautions affected community vaccination campaigns

With the pandemic came several mandated precautions, including wearing face masks, using hand sanitizing gel, and enforcing physical distancing measures of 1 to 2 m. Although most stakeholders characterized the overall Covid-19 response as adequate in urban and peri-urban sites, some urban caregivers in Yaoundé and Addis Ababa characterized the response as very poor. Overall, stakeholders in Cameroon felt Covid-19 precautions had a greater effect on vaccination events than stakeholders in Ethiopia.

In Cameroon, there was mixed response as to whether Covid-19 precautions affected vaccination campaigns. Some stakeholders said there was no effect and that measures were respected and integrated into standard practice. However, some FLWs described tension between vaccination teams and the community, including being “chased away” due to the fear that those wearing masks might be infectious with Covid-19. At the same time, the inconsistency with which some FLWs exercised Covid-19 precautions, including wearing masks, eroded trust in vaccinators and the vaccines themselves. For example:

In the small health facilities that I attended, those who were giving vaccinations, I did not see anyone washing their hands, wearing face masks, or respecting social distancing, so it makes you doubt the vaccine they are giving to the children (Yaounde, Caregiver-04).

Social distancing was another challenge, both for caregivers and FLWs in Cameroon. Some caregivers expressed concern over not wanting FLWs to touch their children for fear of how Covid-19 is transmitted. At the same time, some FLWs found the physical limitations of not being able to go into people’s homes and have personal face-to-face conversations challenging for reassuring caregivers hesitant to vaccinate. At the facility-level, HPs in Cameroon had mixed reactions, with only one in Yaoundé explicitly stating that vaccinations were affected. Others said they were able to adapt to Covid-19 precautions without issue. The biggest challenge was in needing

to maintain a safe distance and how this affected HPs’ ability to physically touch children, including to calm them for vaccination.

Similar to Cameroon, FLWs and HPs in Ethiopia noted it was more challenging to control or comfort children during campaigns given physical distancing. However, whereas inconsistent application of safety standards eroded trust between FLWs and caregivers in Cameroon, some FLWs described how trust was increased as community members observed them respecting Covid-19 precautions in Ethiopia.

People most of the time look at our behaviors, like when we use hand sanitizer, for instance. They then say, “They are careful.” Then they take action to get the service or vaccination. It is helpful and important in that regard (Addis Ababa, FLW-01).

Some caregivers and FLWs recalled that the pandemic caused a decrease in access to routine immunization services, which meant children experienced delays in their vaccine schedules. A caregiver explained:

When I came here to get my child vaccinated, there was no service for some period of time. They had suspended the vaccination service for nearly one month. So, my baby girl missed the vaccine that she was expected to take on her ninth month, and they didn’t give me an appointment for another time. She didn’t take the vaccine, so it has affected our vaccination program (Adama, Caregiver-01).

The few stakeholders who did report that precautions affected campaigns noted regulations around curfews due to security issues, the number of people allowed to congregate (typically a maximum of 10), as well as needing to maintain 1 to 2 m of distance, and how this limited vaccination efforts. The few reported challenges with

administering vaccines were often linked to the newly enforced Covid-19-related precautions.

It has many impacts on the vaccine campaign because people may not come to a central site because of the lockdown and social distancing. We couldn’t get many people to a vaccination site; we couldn’t do the vaccination event the past evening because of the curfews (Addis Ababa, HP-01).

One of the more notable shifts as a result of Covid-19 precautions, in both countries but in Addis Ababa to a greater extent, was movement away from facility-based interventions toward door-to-door community campaigns. This shift was exclusively for Covid-19 vaccines and other routine childhood immunizations, as OPV campaigns already utilized a community-based or door-to-door strategy. Stakeholders cited several reasons for preferring the shift to door-to-door vaccination campaigns, though there were also some reported disadvantages (Table 3).

Maximizing community support for OPV campaigns in the covid-19 context

Future vaccination campaigns for OPV, or other routine childhood illnesses, will be challenged to overcome the list of concerns caregivers noted as influencing hesitancy or refusal among themselves and other members of the community. Future vaccination campaigns, in general, may be held with “suspicion,” with a caregiver from Bafia describing feelings toward future vaccination campaigns: *“I think they are looking for all means possible to put in my body something bad, something I consciously do not want” (Bafia, Caregiver-01).*

However, most stakeholders across both countries reported that community members will likely accept OPV or other childhood vaccines. Stakeholders,

Table 3 Advantages and disadvantages of shifting vaccination events from fixed locations to door-to-door campaigns

	Advantages	Disadvantages
Caregivers	<ul style="list-style-type: none"> • Time and money savings linked to not needing to travel to health facilities • Increased access to health services, including for those not vaccinated against Covid-19 who therefore could not enter health facilities • More respectful treatment from providers 	<ul style="list-style-type: none"> • Suspicion of vaccine contents outside of facility setting (i.e., genuine vaccine or knock-off?) • Lack of trust for frontline workers, including their ability to transport and handle vaccines outside facility • Unnecessary since people are comfortable going to facilities • Disturbance to daily life
Frontline workers	<ul style="list-style-type: none"> • Feeling of being more embedded within community • Increased time and space for active discussions with caregivers about concerns/reasons for hesitancy • Raised awareness for polio, importance of vaccination • Engage in messaging related to other health topics (e.g., nutrition, birth spacing, hygiene) 	<ul style="list-style-type: none"> • Less efficient given the need to be in the community all day (compared to fixed appointments) • Still missing certain households depending on time of day visited
Healthcare practitioners	<ul style="list-style-type: none"> • Increased vaccination coverage 	<ul style="list-style-type: none"> • Logistical concerns related to cold chain maintenance • Concerns about whether frontline workers had training or resources to care for vaccines

especially social influencers, felt that because “polio vaccination is common” and familiar, acceptance for OPV is likely to continue or to be “taken seriously.” However, in some cases, time may be required before acceptance numbers return to pre-pandemic levels. Stakeholders did not share the same optimism about Covid-19 vaccines. We asked stakeholders for strategies that could be implemented to ensure caregiver concerns are addressed and improve vaccine acceptance for OPV and childhood immunizations more broadly in the ongoing Covid-19 pandemic. The main recommendations were to: 1) rebuild community confidence through timely and adequate information; 2) use a variety of information sources; 3) rebuild caregiver trust for FLWs; 4) increase remuneration, resources, and training for FLWs; 5) leverage existing community influencers and groups; and 6) make considerations for Covid-19 vaccines and Covid-19 precautions.

Rebuild community confidence through timely and adequate information

A key sentiment to improving future vaccination campaigns was to build back caregiver “confidence” about vaccination. This was particularly salient given that many caregivers across both countries – but particularly in Cameroon – harbored concerns that OPV was actually a Covid-19 vaccine in disguise. A caregiver suggested: *“The State should try to find ways to build back the confidence in people...who are traumatized by [the Covid pandemic]”* (Bafia, Caregiver-01).

Stakeholders across countries and groups felt the best way to build back caregiver confidence was through the timely dissemination of appropriate information. Many stakeholders, particularly caregivers and influencers in Addis Ababa and Adama, reported that greater awareness equated to increased trust among community members. A health journalist also noted the importance of this clear communication given Cameroon’s status as polio-free and how that could be interpreted by stakeholders:

From my point of view, a vaccination campaign now would basically require good communication, because if I come back to polio, remember that Cameroon was declared polio free 2 years ago. It would be necessary to explain very well to the people why Cameroon is considered a polio free country, yet they still want to vaccinate the children. You agree with me that if there is not enough explanation, people will think that there is something else hidden behind this new vaccination (Yaounde, SI-02).

Specific information needs reported by stakeholders across countries and groups included accessible

messaging on the disease itself as well as the advantages of vaccination. Health practitioners in Bafia, for example, emphasized that appropriate sensitization should include an explanation of the differences in how Covid-19 vaccines and OPV are administered. Clarifying that the polio vaccine is administered orally (most often in these communities) whereas the Covid-19 vaccine is administered via injection could assuage caregiver concerns that OPV is a Covid-19 vaccine in disguise. HPs in Yaoundé also felt the government should ensure health professionals, including FLWs, have the most up-to-date information on the advantages and disadvantages of certain vaccinations so that messages could be appropriately passed to caregivers.

Community sensitization is certainly not a new component of OPV campaigns. However, stakeholders across countries and groups, including health journalists in Yaoundé, SIs in Adama, and most FLWs in both Cameroon and Ethiopia, emphasized that timing in between sensitization events and the campaign itself needed to be lengthened, to provide sufficient information and proactively address rumors ahead of a campaign. However, one FLW from Adama also noted that this time lag was important for the FLWs themselves, who often have competing priorities and need enough time to prepare: *“We are informed one day before the campaign starts. We should be informed in advance to be ready. We might be on other duty...Activities overlap”* (Adama, FLW-06).

Use a variety of information sources

Providing timely information was mentioned about as often as the importance of using a variety of information sources to disseminate clear and consistent messages about vaccination events, including information on when they would occur, but perhaps more importantly, crucial information about polio and advantages to being vaccinated. Some stakeholders, including some caregivers in Yaoundé and Addis Ababa, felt their respective ministries of health were already doing a good job of disseminating information. SIs and at least one caregiver per group in Addis Ababa reported the information received was adequate. However, other stakeholders disagreed. A social influencer argued for a return to using some tried and true methods:

It is good if it is announced in the media. I encountered people who say, “We haven’t heard.” In the past they used to announce on the media the date and where they give the vaccines. They used to promote using cars. But this year there was no such campaign (Addis Ababa, SI-02).

Most stakeholders across groups and countries had a variety of suggestions for how authorities could leverage

different information sources to improve their reach. For caregivers, the most commonly requested mode of communication was through word-of-mouth interaction with FLWs and others in the community (e.g., churches, schools, hospitals). Relatedly, FLWs commonly requested to have information communicated via hard copy written and visual materials, like leaflets or brochures, to support them in more reliably sharing technical content. FLWs in both Cameroon and Ethiopia requested these as counseling support tools, but they also felt adding images of children debilitated by polio to the materials would be a strong visual cue on the importance of vaccination. HPs in Adama concurred with the use of visuals to help caregivers understand the debilitating effects of polio.

Television was mentioned in Cameroon and Ethiopia by caregivers as an important medium for communicating with caregivers. One frontline worker in Yaoundé commented that a coordinator regularly went on a local television station prior to campaigns to share information, which they thought was a useful strategy. However, given that television is not accessible to everyone, a group of caregivers in Adama noted that radio is ubiquitous and still often used: *“People now listen to the radio using their phone. Everyone listens to the radio now”* (Adama, Caregivers-08).

Although television and radio are tried and true forms of communication, a health journalist in Bafia stressed that authorities not forget social media, including Facebook and Whatsapp groups. They felt it was important to have a good sensitization strategy that leveraged both traditional and social media because *“People get more information from social media. The State itself must communicate on social media”* (Bafia, SI-01). However, caregivers in both countries rarely identified social media as a preferred source of information, with the exception of public service announcement text messages from the government.

Rebuild caregiver trust for FLWs

Lack of caregiver confidence in FLWs was a notable reason for hesitancy, particularly for caregivers in Cameroon. There was some discussion in both countries on the need to rebuild this trust eroded during the pandemic in order for caregivers to feel comfortable receiving vaccines from these community actors. This may be particularly important for caregivers who did not have contact with the medical system during the pandemic and require a re-introduction, as was the case for many in Ethiopia whose children’s vaccine schedules were delayed. A group of caregivers in Addis Ababa thought it would be important to ensure that the same FLWs who deliver the vaccines also participate in the mobilization events. Having

consistency between these events would build familiarity with FLWs and the community. Caregivers in Yaoundé felt professionalism was a significant part of building back caregiver confidence in FLWs. Vaccinators needed to not only look the part (e.g., have a badge that clearly links the worker to a known health facility), but FLWs needed to be professionally trained such that they were able to easily answer caregiver questions, as explained: *“The first thing to improve is the quality of the information given on the vaccine by the vaccinators. It must be convincing and satisfactory”* (Yaoundé, Caregivers-03).

Increase remuneration, resources, and training for FLWs

As mentioned by caregivers, FLWs need the tools and resources to be effective. FLWs in both Cameroon and Ethiopia felt this acutely. There were three key issues: lack of appropriate remuneration, lack of resources, and lack of training, all of which contributed to a feeling of being unsupported.

Inadequate remuneration was mentioned by FLWs in both countries. In Bafia, FLWs felt campaigns were under-resourced and some noted that the promised per diems were ultimately not provided. In Adama, some FLWs reported that the funds they received were not adequate to compensate for the work they give up in order to participate in the campaign. Ultimately, FLWs reported remuneration as a central issue, including a perceived imbalance in how funds were distributed across community workers and decision-makers. A Yaoundé-based FLW remarked that *“the actions in the field are not taken care of, and I always say that if the district wants its actions to be effective, the budget must be concentrated on the actors in the field, not the decision-makers”* (Yaounde, FLW-01). Meanwhile, an Adama-based FLW felt similarly: *“...the burden of the task is totally on health extension workers, but the highly paid are those who just sit at their office”* (Adama, FLW-08).

Beyond remuneration, FLWs in Cameroon and Ethiopia discussed how a lack of resources made it challenging to be effective. FLWs requested basic materials to address the elements, such as water supplies and weather appropriate clothing, given the long campaign days. FLWs in Bafia, Yaoundé, and Adama also discussed the need for materials like megaphones/microphones to support sensitization efforts, allowing them to more effectively gather and reach caregivers with information prior to the campaign. In Bafia, FLWs discussed often having to utilize their meager per diems to pay for campaign-related expenses, including transportation and other costs: *“From the little per diem that we receive, we have to take money out and purchase batteries [for the megaphone]. It makes everything complicated at our level”* (Bafia, FLW-01).

FLWs in Adama, Addis Ababa, and Yaoundé as well as SIs in Yaoundé also discussed the need for materials that enhance their visibility and credibility within the communities, such as badges and shirts, hats, or gowns with official branding. These types of materials were considered essential for improving their reputation within the communities and ensuring they are “taken seriously.” Two groups from Bafia suggested that having a representative from the MOH accompany FLWs could increase their visibility. Beyond simply looking the part, having the right professional credentials and branded materials advertising the campaign can rebuild trust between FLWs and caregivers. These materials can also help support FLWs in managing caregiver expectations and concerns, or even aggression.

[A community member] looked around and said you don't have a tent and advertising board that show you come from a health center. I showed him my professional identification card, but he didn't want to accept it, and he insisted that he will bring the police (Addis Ababa, FLW-03).

In addition to financial and other materials, FLWs in all sites discussed the need for more training opportunities to enhance their credibility and effectiveness. FLWs in Yaoundé and Bafia, for example, discussed needing appropriate training so they can answer questions and build confidence among caregivers. FLWs in one group in Yaoundé felt addressing rumors head-on would be an important step to addressing refusals/hesitancy. In Addis Ababa, two groups of FLWs discussed needing the right information to be able to adequately educate caregivers on the advantages or disadvantages of getting the vaccine. A health journalist from Yaoundé made the point that mobilizers require communication-specific training – not just education on the pros and cons of vaccination – to ensure they can appropriately speak with and convince caregivers. They commented:

There are a lot of vaccinators and community actors who do not know how to speak fluently and explain things to people, to convince people, to make them understand what's going on. They need to be trained on how to be diplomatic, how to respectfully convince a skeptical parent without causing frustration or anger (Yaoundé, SI-01).

Leverage existing community influencers and groups

Stakeholders across groups in Cameroon and Ethiopia reported that campaigns could be made more effective if existing community influencers and groups were used to support the mobilization and vaccination efforts. Community leaders were noted by SIs across both countries

as critical for facilitating community entrée. In Bafia and Yaoundé, SIs discussed how traditional and religious leaders can support efforts to rebuild community confidence in vaccination campaigns and assuage any concerns. As one traditional chief from Yaoundé explained: “*Because when someone sees me, he knows that the chief is there, even if he was reticent to bring out the children*” (Yaoundé, SI-02).

In Adama and Addis Ababa, there was strong consensus among all stakeholder groups that it is important to engage the *woreda* or *kebele* (e.g., neighborhood) authorities in sensitization efforts, as these authorities are seen as having the greatest ability to encourage compliance among caregivers. *Kebele* authorities, in particular, were known to have communication events for a variety of community concerns and were, therefore, well-positioned to support mobilization for vaccination events as well. At least one HP suggested utilizing the *kebele* militia to encourage compliance since they have “*the power to mobilize and enforce people to receive the vaccine*” (Adama, HP-03).

Caregivers and FLWs in Ethiopia suggested other key groups to help disseminate information, support vaccination, and otherwise ensure a successful campaign. In particular, *gotes*, or peasant organizations, and women's development groups were named as being influential among the communities and poised to identify unvaccinated children given their familiarity with local families. Together, stakeholders in Cameroon and Ethiopia offered a long list of groups that could be leveraged to support sensitization efforts and included: hospitals, traditional chiefs, mayors, bars, churches, schools, social networks, and media outlets.

Considerations for Covid-19 vaccines and Covid-19 precautions

Stakeholders provided recommendations for how OPV campaigns could best be rolled out in the ongoing Covid-19 pandemic, including during the introduction of novel Covid-19 vaccinations. This included ensuring that OPV and Covid-19 vaccination campaigns remained distinct. For example, at least two groups of FLWs and one HP in Addis Ababa discussed how important it was that OPV and Covid-19 vaccinations not be administered at the same time.

It is better to have a little break. There should be a gap between two vaccines. We know that the polio vaccine is free for children and Covid is for adults and children above 12, but the community doesn't understand that since we are going house-to-house for both. There should be a little break for them so that they will accept us (Addis Ababa, FLW-04).

Another recommendation was that FLWs and practitioners maintain Covid-19 precautions, such as maintaining physical distance, wearing masks and gloves, and using hand sanitizing gel. A caregiver from Addis Ababa also suggested continuing to use some of the incentives that were instituted during the Covid-19 pandemic, including rewards for fully vaccinating children.

Discussion

The Covid-19 pandemic introduced new challenges into the vaccination landscape for polio and other routine childhood immunizations in Cameroon and Ethiopia. More immediate effects of the pandemic included delays in vaccination schedules as caregivers feared bringing children into contact with health personnel and human and financial resources were shifted away from childhood immunization toward Covid-19 emergency response efforts. This experience was shared by other countries across the globe [25], with an estimated 23 million children not receiving routine childhood immunizations in 2020 [26]. However, there were other effects identified in Cameroon and Ethiopia that require thoughtful strategies. These include caregivers feeling “traumatized” by the Covid-19 pandemic. There was a reported erosion of trust between caregivers and FLWs in both countries because masked FLWs were assumed to be bringing the disease but also because FLWs were not consistent in adhering to Covid-19 safety precautions, such as wearing masks or using hand sanitizer prior to handling children.

Moreover, we identified various rumors linked to vaccines that need to be addressed with clear, consistent messaging in order to “win back” caregiver confidence in routine vaccinations, including “familiar” vaccines like OPV. The WHO estimated that 80% of infants around the world received 3 doses of polio vaccine in 2021 [27], and yet vaccine hesitancy can threaten progress made to date. Although there were several salient issues leading to hesitancy, the main stakeholder concern affecting future OPV campaigns in both Cameroon and Ethiopia was the fear that the vaccination to be received by their child was, in fact, a Covid-19 vaccine in disguise or would serve as a mechanism for infecting their child with the Covid-19 virus. This prompted a clear recommendation from several stakeholders to ensure that, in the case of polio outbreak responses, OPV and Covid-19 vaccination campaigns should be delivered separately to avoid confusion or mitigate these concerns, at least until appropriate sensitization campaigns could be carried out. These campaigns could be carried out with targeted messaging that presents information on the difference between the two interventions. For example, there are differences in the target age for OPV and Covid-19 vaccines, the

vaccination area (the mouth for OPV and the front of the shoulder for the Covid vaccine), and the vaccination venues (door-to-door or community-based for OPV versus in health facilities or other public spaces for Covid-19 vaccines). However, hesitancy was generally much higher for Covid-19 vaccines than OPV among stakeholder groups in this study, and many stakeholders felt confident that OPV campaign attendance would ultimately return to pre-pandemic levels if these concerns were addressed.

Another concern for “winning back” caregivers was related to the erosion of trust in FLWs reported by caregivers. FLWs themselves noted new challenges engaging with caregivers due to Covid-19 precautions and not being able to effectively gather in groups either for awareness raising efforts or for vaccination. FLWs and HPs noted a variety of challenges that would need to be improved from a provider standpoint in order to effectively run community-based campaigns in the future. These included increased remuneration for vaccinators; provision of materials, such as badges and branded clothing, to increase visibility and credibility in their communities; and increased training to be able to accurately reflect the advantages or disadvantages of vaccination to hesitant community members. Particularly given the large number of potential reasons for caregiver hesitancy, communication training based on a set of clear talking points that address different concerns is now underway.

Improving caregiver confidence in OPV campaigns will hinge on the provision of clear, consistent messaging through different, reputable sources. Written pamphlets, television, radio, and social media were mentioned along with promotion cars and mobilization teams with megaphones to ensure a broader reach. More than any one form of communication, stakeholders felt government authorities should use all possible avenues to reach caregivers with appropriate information. They also reported it was important to enlist existing community influencers, including local authorities, as well as prominent community groups, such as peasant organizations or women’s groups, in the community mobilization and vaccination process. Community leaders and groups are both known and trusted and could, therefore, help assuage community members’ concerns about vaccination. They can also support FLWs in identifying unvaccinated households and children.

Despite the foreseen challenges for future campaigns and vaccine acceptance, government and international health authorities should be encouraged that stakeholders in Cameroon and Ethiopia reported that the public was generally likely to continue to support OPV campaigns going forward given widespread familiarity. However, these key challenges need to be addressed for OPV coverage to improve to pre-pandemic levels and beyond.

Limitations

Our qualitative study does not include a nationally representative sample, and as such, is not intended to generalize findings to all people living in Cameroon and Ethiopia. Further, given the need for rapid turnaround of this information, data collection did not include rural sites, a decision based in part on an earlier, more-comprehensively sampled study in Cameroon that found similar rumors and concerns about Covid-19 vaccination across five regions. That said, we were mindful to include at least one peri-urban and one urban site per country in an attempt to capture perceptions of people living in different areas and with different access to technology, since many rumors were indicated to have originated on social media before being spread by mouth. The initial list of reasons for hesitancy was not generated from our stakeholders but instead from existing literature from Cameroon and other sub-Saharan African contexts, again allowing efficiency and avoiding duplication of previous efforts. This means we may not have captured every possible concern related to vaccine hesitancy. However, we did allow stakeholders to add new concerns, though no additional salient concerns were mentioned. Another potential limitation was the recall period. We asked stakeholders to consider a two-year period as they reflected on changes over the course of the pandemic, which may be subject to recall bias.

Conclusions

There was concern that the Covid-19 pandemic, including hesitancy related to Covid-19 vaccines, might influence the acceptability and uptake of routine childhood immunizations like OPV. We found that the Covid-19 pandemic did challenge caregiver and stakeholder perceptions of community-based OPV and childhood immunization campaigns. Vaccine-related rumors and the fear of contracting Covid-19 amplified vaccine hesitancy in Cameroon, Ethiopia, and several other countries, primarily with respect to Covid-19 vaccines but also for OPV to a lesser extent. Yet, given decades of familiarity with OPV, most stakeholders felt community support for OPV would persist, especially with appropriate sensitization. To ensure community confidence in OPV and routine immunization, in general, it is important to adopt sustainable solutions that rebuild trust between communities, caregivers, and health providers. Social and behavior change approaches that leverage clear, consistent messaging from multiple trusted platforms could help improve caregiver trust and dismantle mis/dis-information that creates confusion surrounding vaccines. It is also important for trusted community stakeholders at the local and national levels

to be included in vaccine communications strategies, as these group are already familiar with caregiver concerns in their communities and can better advocate for their needs. Additional recommendations for maximizing community support for future campaigns included rebuilding caregiver trust for FLWs and increasing remuneration, resources, and training for FLWs.

Abbreviations

cVDPV2	Circulating vaccine-derived poliovirus Type 2
FGDs	Focus group discussions
FLWs	Frontline workers
GPEI	Global Polio Eradication Initiative
HPs	Healthcare practitioners
IDIs	In-depth interviews
OPV	Oral polio vaccine
SIs	Social influencers
WHO	World Health Organization

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

Conceptualization, C.M.P.A., N.A., L.L., R.M., C.M., and S.T.; Methodology, L.L., R.M., G.M., and E.N.; Validation, C.M.P.A., N.A., L.L., D.M.M., G.M., C.M., E.N., S.T., and A.T.; Formal analysis, L.L., G.M., and E.N.; Investigation, D.M.M. and A.T.; Data curation, L.L., G.M., and E.N.; Writing—original draft preparation, L.L.; Writing—review and editing, C.M.P.A., N.A., D.M.M., R.M., G.M., C.M., E.N., S.T., and A.T.; Visualization, L.L., G.M., and E.N.; Supervision, C.M.P.A., N.A., L.L., R.M., C.M., and S.T.; Project administration, L.L., D.M.M., G.M., E.N., and A.T.; Funding acquisition, R.M. All authors have read and agreed to the published version of the manuscript.

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Availability of data and materials

The data that support the findings of this study are available on request on a case by case basis from the corresponding author, L.L. The data are not publicly available due to restrictions on sharing qualitative data that cannot be fully de-identified and could compromise the privacy of research participants.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and approved by FHI 360's Protections for Human Subjects Committee, which granted an exempt determination per the federal regulatory categories of Human Subjects Research (45 CFR 46). In Cameroon, we obtained approval from the *Comité National d'Ethique de la Recherche pour la Santé Humaine* and site authorization from the Centre Regional Delegation of the Ministry of Public Health. In Ethiopia, the Ethiopian Public Health Institute Institutional Review Board approved the study. Informed consent was obtained from all subjects involved in this study.

Consent for publication

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Competing interests

The authors declare no competing interests.

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