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COVID-19 vaccine roll-out at the community level in developing countries: Lessons learnt from Cross River State, Nigeria

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ABSTRACT

Since the first COVID-19 case was reported in Nigeria in February 2020, the Country's effort to curb the surge in cases and protect people from the disease was undeniable, as does Cross River State (CRS). Using document revision, we illustrate the COVID-19 vaccine rollout in Cross River State, Nigeria. The State recorded its first COVID-19 cases on June 29, 2020. COVID-19 vaccination commenced in the State on March 11, 2021. The pandemic response was led by the COVID -19 taskforce constituted by the Government of CRS in March 2020 to ensure effective response to effective response to the pandemic.

Intensified advocacy, communication and social mobilization activities, mainly community engagement, were conducted to minimize vaccine hesitancy. A chain of responsibilities was observed in vaccine management and logistics. The State carried out a successful rollout of the first phase of COVID-19 vaccination, including refugees' vaccination and management of AEFI. This commentary aims to share the experience and lessons learned in rolling out the COVID-19 vaccine in Cross River State, Nigeria. This paper will guide policymakers in developing countries.

1. Introduction

The first case of COVID-19 disease was reported in Nigeria on the 27th of February 2020. Vaccination is one of the Country's strategies to curb the transmission of COVID-19 disease [1]. Although the COVID-19 pandemic affected everybody, the burdens of the disease are not shared equally by all people. The disease's rate of death and severity varies among different groups of people [2]. A study in the USA reveals substantial racial and ethnic disparities in COVID-19 mortality, specifically among Black African Americans [3].

Nigeria has planned four phases to vaccinate its population based on recommended prioritizations. Phase 1 targeted strategic leaders, health care workers and other frontline workers. Other eligible individuals aged 18 years and above were targeted for vaccination in phases 2, 3 and 4. The benchmarks between phases were the availability of vaccines, since most of the vaccines are received through donation. On March 2, 2021, Nigeria received an estimated 4 million COVID-19 vaccine doses through the COVAX facility and subsequently distributed them to States [4,5].

Cross River State is located in the South-South zone of the geopolitical region of Nigeria. The State has 18 Local Government Areas (LGAs) and 196 political wards (the lowest administrative structure). The first COVID-19 case was reported in the State on June 29, 2020. As of April 30, 2022, 829 COVID-19 confirmed cases and 25 deaths had been reported in the State. Through the National Primary Health Care Development Agency (NPHCDA), on March 10, 2021, Cross River State received 53,840 doses of Oxford/AstraZeneca vaccines.

1.1. Coordination and collaboration

Cross River State Primary Health Care Development Agency (CRSPHCDA), under the CRS Ministry of Health (SMOH) Emergency

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Operation Center (EOC), took the leadership of rolling out the COVID-19 vaccines with support from World Health Organization (WHO), UNICEF, NPHCDA, and other partners. The multi-sectoral EOC developed a schedule of activities (pre-implementation and post-implementation) including plans for training of health care workers, community engagement strategies, vaccine management (cold chain and logistics), vaccine delivery strategies and monitoring & evaluation. Health care service providers, mostly from primary, secondary and tertiary health facilities, were engaged at State, LGA and ward levels to facilitate the successful implementation of the vaccine rollout. Each team developed a daily implementation plan (DIP) for 56 days covering first and second dose vaccination for phase 1. The plan was reviewed and validated by the LGA team for its feasibility. An existing structure of the Expanded Program for Immunization (EPI), which includes trained healthcare providers, cold chain supplies, coordination system, social mobilization, data management and monitoring system, was the basis for the COVID-19 vaccine rollout. The CRS Government and partners provided additional resources, mainly funds, to strengthen the existing structure.

1.2. Advocacy, communication and social mobilization

To introduce new products to the populace, especially vaccines, hesitancy is inevitable and expected [6]. CRSPHCDA and CRSMoH, with support from WHO and UNICEF, embarked on a series of Advocacy, Communication and Social Mobilization (ACSM) activities focusing on the targeted groups and institutions where strategic leaders, healthcare workers (HCWs) and other front liners can be found. The aim of the advocacy, communication and social mobilization was to mitigate the risks and impact of vaccine hesitancy, dispel rumors and misinformation about the COVID-19 vaccination, provide accurate, systematic information about the vaccines, build trust among people and communicate the benefits and safety of COVID-19 vaccines.

Several institutions, including the University of Calabar Teaching Hospital, University of Calabar, General Hospital Calabar, College of Midwifery, College of Nursing, College of Health Technology, Nigerian Navy Reference Hospital, Nigerian Navy Command, Nigerian Army, Nigerian Police, Department of Security Service, Nigerian Immigration Service, Margaret Ekpo International Airport Calabar, Nigerian Port Authority, Fire Service, Nigerian Correctional Service, Export Processing Zone, Civil Service Commission, Christian Association of Nigeria, and Obong of Calabar Palace to mention a few were engaged including more than six health professional associations. One of the remarkable innovations and best practices were vaccination teams' readiness and availability to provide the jab on the spot during all advocacy, communication and social mobilization engagement activities.

CRSPHCDA and UNICEF's innovation of making reminder calls and SMS for those due for their second dose vaccination were effective communication strategies. A total of 10 callers were engaged, and 8564 calls & 3476 SMS were recorded in 20 days. Around 70% of call recipients appreciated receiving the reminder and promised to get their second dose.

1.3. Vaccine management and logistics

Under the guidance of the State Logistics Working Group, 18 LGAs Cold Chain Officers (CCOs) conducted rapid cold chain capacity assessment in their respective LGAs to ascertain readiness and capacity to manage the COVID19 vaccines. The LGA CCOs led the vaccine distribution activities which cover monitoring the transportation, storage and management of the COVID-19 vaccines as per the National COVID-19 guideline. Chain of responsibilities was observed among the State Logistic Working Group members and Cold Chain Officers on the recording of stock ledgers; requisition, issue & receipt vouchers; physical counting; loading and unloading of vaccines and supervision of vaccination teams. Likewise, LGA officers were advised and guided to implement the same as part of their chain of responsibilities. One of the good opportunities during this COVID-19 vaccination was the receipt of additional Solar Direct Drive refrigerators (SDDR) through the GAVI Cold Chain Equipment Optimization Platform to ensure a standardized cold chain system at the health facilities.

Vaccines were distributed/bundled with other devices/commodities (bundling) and empty vials were retrieved whenever the LGA team came for vaccine replenishment and at the end of the vaccination exercise. All empty vials were returned to the State for proper destruction, boiled and buried by the CRSPHCDA in collaboration with the environmental and waste management agency and partners.

1.4. Vaccine delivery, vaccination and AEFI surveillance

The COVID-19 vaccination was rolled out in Cross River State by higher Government officials, the leadership of the State Ministry of Health (SMOH) and partners on March 11, 2021 during the official flag-off. Ninety-five (95) vaccination teams comprised six members each providing the services across the State applying all COVID-19 infection, prevention and control measures at vaccination sites. With support from UNICEF, 20 additional teams were recruited to ensure all eligible populations got the vaccine. Two strategies, fixed post and temporary fixed post were deployed to reach the eligible targets. Fixed post teams were stationed in health facilities while temporary fixed post teams were assigned to specific sites like Churches, Mosques, markets, bus stations and gas stations. The teams worked between 8:00 to 15:00 every day, guided by their DIPs on areas to cover. Daily review meetings were conducted at the state and LGA levels to monitor implementation progress and recommend corrective actions. So far, a total of 59,674 and 37,891 eligible persons were reached with the first and second doses of COVID-19 vaccine, respectively during Phase 1. Several factors contributed to the differences recorded between the two doses, to mention a few; the major factors were vaccine hesitancy, vaccine stock out at the National by extension at the State level, fatigue among health workers due to extended vaccination periods, and loss to follow-up.

Vaccination teams reported all adverse events following immunization (AEFIs) on a daily basis to the LGA Disease Surveillance and Notification Officer who reports to the state using AEFI data tools and Med Safety App approved for use by National Agency for Food and Drug Administration and Control (NAFDAC) and WHO to report all drug-related adverse events. A total of 1527 non-serious and two serious AEFI cases were reported and investigated by the LGA AEFI committee with state support and reports shared with National Expert Committee (NEC) for classification.

1.5. Vaccination at refugee camps

WHO recommended refugees and migrants among the prioritized population groups for COVID-19 vaccination [7]. Six LGAs in Cross River State share an international border with Cameroon and refugees live in different host communities. Prior to vaccination at the refugee camps, assessment and mobilization at the camps were carried out by the Primary Health Care Coordinator and Local Immunization Officers of the LGAs together with UNICEF. To ensure equitable distribution and access to the COVID-19 vaccine, the SMOH and CRSPHCDA, supported by WHO and the United Nations High Commissioner for Refugees (UNHCR), leveraged on the commemoration of the World Refugee Day 2021 to sensitize and vaccinate the refugees. A high level of hesitancy was previously recorded among the refugees; however, through community dialogue and engagements, improvement in the vaccine uptake was recorded going forward.

1.6. Supervision and monitoring

At least seven qualified and trained supervisors were assigned to monitor and supervise the vaccination activities per LGA. The supervisors were selected from LGA, NPHCDA, CRSPHCDA, CRSMOH, WHO,

UNICEF and other partners. The supervision was conducted using an Open Data Kit (ODK) checklist approved by NPHCDA and used throughout the country. The supervisors visit at least two vaccination teams per assigned LGA on a daily basis, during which corrective measures are taken on the spot to address identified gaps.

State Technical Facilitators (STFs) were also deployed one per LGA throughout the vaccination period to provide technical support. The STFs supervised the overall program activities including monitoring the cold chain system and supporting data capturing and reporting.

Four trained independent monitors (IMs) per LGA were also deployed by WHO to monitor the vaccination activities at the ground level. There were two monitoring processes conducted by the IMs, viz. in-process and end-process. Each monitoring process involves inside household monitoring (household sampled and eligible persons living in the household were interviewed) and outside household monitoring (eligible individuals on the streets and special places were sampled). The In-process was conducted during the implementation days of the vaccination which the IMs sampled ten households for inside household monitoring and 40 persons for outside household monitoring. The checklists consist of questions about age, sex, vaccination status, source of information about the vaccine, and reason for non-compliance (if applicable). Corrective measures were done based on regular analysis of the IMs' data.

On monitoring, the LGA and State teams conducted daily evening review meetings (ERM) to assess the daily activities, feedback from the supervisors, review the daily data and share it with the State and National. Where serious gaps were identified, corrective interventions were carried out and technical support was provided by the State team when necessary. One of the best practices and innovations by Cross River State was the virtual weekly expanded review meeting of State with the 18 LGA teams on zoom providing opportunities for learning among teams.

1.7. Data management

The vaccination data were captured using a paper-based register and an electronic-based data collection system-the Electronic Management of Immunization Data (EMID) platform. The need for both data capturing mechanisms was to make available vaccination history of vaccines readily accessible from any location. Though, technological hitches were experienced in accessing the electronic data capturing system at the beginning of the vaccination mainly due to network challenges in certain areas and inadequate data bundles provided to recorders.

The STFs and the LGA M&E officers send the validated vaccination data daily by 16:00 to the state operations room which is transmitted daily by 17:00 to the National.

1.8. Strengths

- To address vaccine hesitancy in Cross River State, SMOH and SPHCDA with support from WHO and other partners embarked on effective institutionalized ACSM engagements and provided information on COVID 19 vaccine safety and efficacy. A vaccination team accompanied the social mobilization team and provided the vaccine on the spot to those who were hesitant to be vaccinated.
- Senior Government officials, leadership in health, strategic leaders or personnel from WHO, UNICEF or other partners vaccinated in front of the communities to prove the vaccine's safety and efficacy.
- Bundled supply of COVID-19 vaccine with safe-injection equipment to LGAs, health facilities and vaccination sites.
- Keying into "No one is safe until everyone is safe," Cameroonian immigrants and refugees were targeted to ensure equitable vaccination.
- Social media presence with high visibility of Cross River State COVID 19 vaccination activities, especially Twitter.
- Daily State/LGAs and weekly expanded review meetings to evaluate the day's work, document best practices & challenges and take timely corrective actions.
- Engaging and vaccinating community and traditional leaders for better acceptance of the vaccine in the communities.
- Bulk SMS and phone call reminder to eligible persons due for 2nd dose.
- Daily tracking of COVID-19 vaccines from the State down to the vaccination teams.
- Targeted advocacy to institutions where the eligible populations were located.

1.9. Challenges

- Inadequate Information, Education and Communication (IEC) materials to indicate the location of vaccination sites.
- Health workers were fatigued due to the extended vaccination period.
- Delayed payment of the LGA and vaccination personnel from the National.
- Challenges with electronic registration, such as heavy traffic on the server, inaccessibility of internet in some LGAs, and lack of battery back-up (power bank) of smartphones for recorders contribute to data variance between online registration and paper-based reports (call-in data).
- Continued high level of vaccine hesitancy among the populace.
- Some persons who took the first dose migrated to other locations and were unable reached for 2nd dose.

1.10. Recommendations

- Government to continue mobilization of additional funding and human resources.
- Intensify continuous ACSM engagement activities to dispel misinformation and disinformation.
- Intensify quality supportive supervision and take corrective actions on gaps identified.
- Provide smartphone power backup for recorders.
- Timely provision of internet bundle for recorders to share data to the server in good time.
- Provision of adequate personal protective equipment for teams to observe COVID-19 protocol.
- Improve defaulter tracking mechanism for the second dose.
- Ensure the provision of Essential Health Services is integrated into the vaccination program.
- Direct vaccine delivery to health facilities is recommended to enhance monitoring of teams and ensure prompt retrieval of opened vials and documentation of transactions.

2. Conclusions

Cross River State has successfully implemented the first phase of COVID-19 vaccination owing largely to the strong coordination and collaboration between the state and partners. Amidst massive misinformation and disinformation, an effective ACSM team with support from WHO and other partners recorded massive success in providing the correct information which enabled eligible persons to make informed decisions regarding vaccination. Cross River State Logistic Working Group worked hard to ensure appropriate vaccine forecasting and distribution to each LGAs. The supervision & monitoring team went down to each community and institution to monitor proper vaccine rollout and provided on-the-spot corrective actions.

Though the COVID-19 vaccination team experienced challenges documenting electronic data, the State monitoring and evaluation team was the backbone of the vaccination. We believe documenting such experiences, especially at the community level, would provide a lesson

to policymakers and stakeholders in resource-limited settings. Cross River State is prepared for the second phase of COVID-19 vaccination based on the lesson learned.

Ethical statement

Ethics approval not required because the authors wrote a program implementation. The authors did not use individuals' data.

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Contributors

CE, BG, UPA, BE and JE made substantial contributions to the conception of this paper. BG and CE drafted the manuscript. All authors made substantial contributions to the design of the paper, critically revised it and gave their final approval of the version to be published. All authors attest they meet the ICMJE criteria for authorship.

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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