

ORIGINAL ARTICLE

Experiences from polio supplementary immunization activities in Anambra State, Nigeria

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Abstract

Background: Routine immunization coverage is low in some States in Nigeria and contributes to the transmission of wild poliovirus. Anambra State has been polio-free since 2004. However, the risk of importation of poliovirus from travelers and migrants is a public health concern due to the commercial nature of the State. This paper reported experiences and lessons from supplementary immunization activities (SIAs) conducted in the State that will be useful to other settings experiencing low uptake of routine immunization.

Materials and Methods: The SIAs were conducted simultaneously in the 21 local government areas (LGAs) in Anambra State during January, March, and November 2010. Data were entered and analyzed in Excel spreadsheet and findings were summarized as frequencies and proportions.

Results: A total of 1,187,866 children were vaccinated in January, 1,260,876 in March and 1,225,187 in November 2010. The State's cumulative coverage exceeded the target coverage of >90% in the three SIAs. All LGAs met the >90% target in January and March, but one LGA achieved 79% coverage in November. The proportion of zero-dose children decreased from 6% to 4.7%, and the vaccine wastage rate ranged from 6% to 6.6%. In that same year, the state did not achieve the target coverage of >80% for routine oral polio vaccine (OPV₃) immunization in any of the months and only 29% of the LGAs exceeded the routine OPV₃ target.

Conclusion: The State achieved high polio vaccination coverage through the SIAs, but coverage through routine immunization was low. Adopting proper planning and supervision, financial and political support, community involvement, improved vaccine logistics, and other measures utilized during the SIAs could help to improve routine immunization.

Key words: Community involvement/participation, polio eradication, supplemental immunization activities, vaccination coverage

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Introduction

Polio is a highly infectious viral disease caused by three poliovirus serotypes (1, 2 and 3) and occurs mainly in young children. Together with Afghanistan and Pakistan, Nigeria is one of the countries endemic for wild poliovirus.^[1-3] Poliovirus invades the central nervous system and causes

paralysis in <1% of infected individuals.^[4] The disease has no cure, but can be prevented through the use of polio vaccine. In Nigeria, routine immunization against polio involves the use of two drops of oral polio vaccine (OPV)

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administered in four doses.^[5] The national immunization schedule^[5] is shown in Table 1.

Low routine immunization coverage is a major challenge and contributes to the transmission of poliovirus in some States in Nigeria.^[6] Several factors have led to low uptake of immunization. Mass rejection of vaccine by some communities and religious sects has been reported in the northern part of Nigeria due to misconception that it could cause sterility in children that receive the vaccine.^[7] Communities in other polio endemic settings share similar views. For example, studies conducted in Pakistan found that disapproval of religious leaders, contamination of OPV with birth control substances and other misconceptions were responsible for vaccine rejection.^[8,9] Some of the mothers studied were nonreceptive to the vaccine due to concerns about potential harm and side-effects arising from it.^[8,9] To address this problem, the Federal and State governments, together with its implementing partners namely UNICEF, WHO and other partner organizations, adopted supplementary immunization activities (SIAs) or “immunization plus” as an additional strategy to reach a large number of children at risk of poliovirus infection.

Anambra State has been polio free since 2004, but it shares borders with other States where polio cases were previously reported.^[10] The high level of commercial activities in the State attracts people from within and outside Nigeria. The risk of importation of poliovirus from unimmunized or partially immunized children of travelers and migrants is a public health concern.^[11-13] Hence, the State government is determined to retain its polio-free status by increasing population immunity against the disease. Studies reporting on SIA implementation are necessary. This is because they allow for evaluation of the target objectives to reach children eligible for polio immunization. In this paper, we reported experiences from the three SIAs conducted in the State during January, March, and November 2010. We also highlighted lessons learned from the SIAs that will be useful to other settings experiencing low uptake of routine immunization.

Materials and Methods

Local setting

Anambra is one of the 36 States and the Federal Capital Territory that make up the Federal Republic of Nigeria.

It is located in the South Eastern geopolitical zone and Christianity is the dominant religion. Administratively, the State is divided into 21 local government areas (LGAs) and 177 communities and 330 wards; the wards are smaller subdivisions of the communities/towns within the LGAs. There are 125 private and 462 public health facilities offering routine immunization services.^[10] For planning immunization services in 2010, the projected State population from 2006 census was 4,670,462.^[10] The population of children aged 0-59 months was estimated to be 934,094 for SIAs (i.e. 20% of the total population), while the estimate for children aged 0-11 months was 186,819 for routine immunization (i.e. 4% of the total population).^[10]

Routine immunization coverage has remained low in hard-to-reach areas such as riverine and remote communities in the State (A. Ilika, personal communication). The geographical complexity in these areas created difficulties with transportation, and recruitment and retention of vaccinators and health workers. Furthermore, there were missed opportunities to immunize children due to logistic problems such as inadequate ice blocks to maintain the cold-chain (A. Ilika, personal communication). Some mothers who were turned away due to unviable vaccines never returned with their children even when viable vaccines were available.

Pre-implementation activities

Pre-implementation activities were carried out, including meetings of the State technical team to deliberate on supplies, human resources, and measures to increase uptake of immunization. In each LGA, members of the *ad-hoc* task force (comprised of LGA technical team members, other LGA program officers, chairman and secretary of Ward Development Committee) met to discuss cold chain maintenance, social mobilization, logistics, personnel, waste management, and to identify and address other needs. Maintenance of the cold-chain was decentralized to the LGAs. Based on the micro-planning exercises conducted earlier, settlement micro plans were produced and precampaign training sessions took place at State, LGA and ward levels. Members of the social mobilization committee at the State and LGA levels held immunization planning meetings and organized advocacy/sensitization visits to stakeholders in communities such as community/traditional leaders, religious leaders, women’s groups, and managers/proprietors of schools and members of Parents-Teachers-Associations in those schools. The aims of the sensitization visits were to create awareness and educate stakeholders about the health benefits of immunization, to address any concerns regarding immunization, and to solicit support for mobilizing their members to accept immunization. In addition, jingles about the SIAs were aired in the electronic media and through local communication channels such as the use of

Table 1: OPV immunization schedule

OPV	Age
OPV ₀	At birth
OPV ₁	6 weeks
OPV ₂	10 weeks
OPV ₃	14 weeks

Source: National program on immunization; OPV=Oral polio vaccine

town criers or announcers in order to reach the general public and to increase participation in the SIAs. The State has four LGAs with hard-to-reach communities, and some were mostly accessible by boats; this means of transportation sometimes creates phobia among some nonindigenes. Hence, vaccinators and volunteers who were indigenes of those communities were recruited to reach out to children living there. Government and international partner organizations provided financial support for the three SIAs.

The intervention

The SIAs were conducted simultaneously in all the 21 LGAs during January, March and November 2010. Each SIA lasted for 5 days during which two drops of OPV were administered to children 0-59 months irrespective of their previous immunization status. Other child survival interventions were undertaken. These included distribution and promotion of the use of long lasting insecticide nets for under five children, pregnant and lactating women; delivering Tetanus Toxoid to eligible women of reproductive age; de-worming children 12-59 months; screening for malnutrition; promoting the use of low osmolar oral rehydration salts and zinc tablets for treatment of diarrhea; birth registration and HIV prevention information to young persons and women visiting the fixed posts.

Multiple vaccination strategies were utilized; these were fixed posts, special teams and house-to-house visits. In total, there were 660 fixed posts, 214 special teams and 838 house-to-house teams. The fixed post strategy required mothers to take their children to designated centers where they were attended to by one vaccinator and one recorder. Apart from OPV, eligible infants also received other routine immunization antigens at the fixed posts. In the house-to-house strategy, teams visited homes using daily route maps; each house-to-house team was made up of two vaccinators, two recorders, one community mobilizer, and one supervisor. The special teams comprised of one vaccinator, one community mobilizer and one recorder. Special teams were used to reach eligible children on the streets, orphanages, farms, markets, churches, play grounds, motor parks, and other high transit points.

All vaccinated children received pen mark on the nails of their last fingers. For each house visited, marks were made on the wall to signify the vaccination status of the children. This may include: If vaccination has been given to all eligible children in the household, if there was an eligible child who was absent when the vaccination team visited, if there was no eligible child, if vaccination was rejected and so on. Using a standardized checklist, State monitors sampled some households in order to crosscheck previous day's immunization activities. During the inside-household and outside-household monitoring, wall markings and pen markings on children's last fingers were inspected to verify

the accuracy of the previous day's records. Duplication of work conducted by other teams was avoided by checking for markings on children's nails, on houses, and in vaccination cards, as well as verbal confirmation from mothers/guardians. Upon reviewing activities, the monitoring team directed vaccinators (via mop-up vaccination) to reach children living in riverine and other geographically difficult or remote parts of the State.

The Governor of Anambra State, the Governor's wife, some commissioners, some legislators, and other political leaders participated in the opening ceremonies of the SIAs. The State's commissioner for health participated in field supervision of immunization activities. Community members and town union leaders were involved in monitoring the implementation of the SIAs in order to engender a sense of ownership. Town criers announced daily activities in the evening preceding the activity and traditional gongs, bells, and dances were utilized to attract caregivers.

Data analysis

The State Ministry of Health compiled immunization data from all the LGAs, and the data were entered and analyzed in Excel spreadsheet. Findings were summarized as frequencies and proportions. For the three SIAs, vaccination coverage was measured as the total number of children 0-59 months vaccinated divided by the target population, expressed as a percentage. The expected minimum coverage for SIA was 50% of the target population and the target coverage was >90%. The State's monthly routine immunization coverage for children age 0-11 months was based on OPV₃ because it signifies complete immunization: 50% was the expected minimum coverage and >80% was the target coverage.

Ethical approval

Ethical approval was not required.

Results

Supplementary immunization activities

In the first round of the SIAs (January), a total of 1,187,866 children aged 0-59 months were vaccinated. Using the target population as the denominator, the State's cumulative vaccination coverage was 127%. Based on geographical distribution, all the LGAs (including those with hard-to-reach communities) met the SIA target coverage of >90%. Coverage based on the three vaccination strategies are presented in Figure 1. The number of children reached was highest via house-to-house visits [Figure 1]. A total of 1,259,000 doses of OPV were used, and the vaccine wastage rate (i.e. proportion of discarded vaccine) was 6%. The monitoring data showed that the proportion of zero-dose children was 6% and the proportion of missed children (outside house monitoring) was 5.5%.

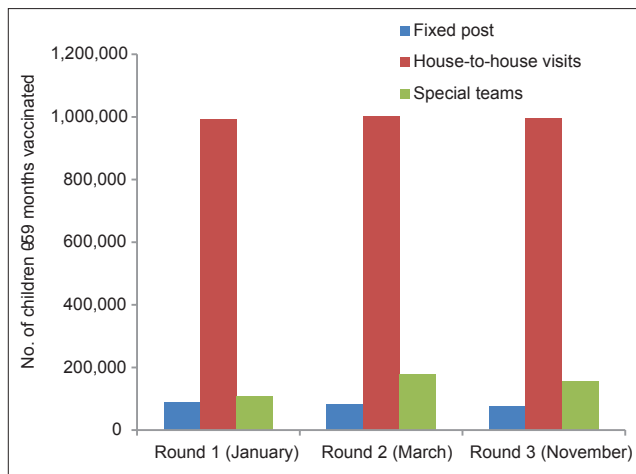


Figure 1: Number of children 0-59 months vaccinated during the supplementary immunization activities in January, March and November 2010 by vaccination strategy

More children were vaccinated in March - 1,260,876 children. The State's cumulative vaccination coverage was 135%. Similar to January SIA, all the LGAs met the target coverage of >90% and most of the eligible children were vaccinated by the house-to-house teams [Figure 1]. A total of 1,336,500 doses of OPV were used for this exercise, and the vaccine wastage rate was 6%. The proportions of zero-dose children (5%) and missed children (5%) were less than those of January SIA.

In the third round (November), 1,225,187 children were vaccinated, with cumulative vaccination coverage of 131%. Again, the majority of the children were reached through house-to-house visits [Figure 1]. Unlike in the other SIAs, one LGA had coverage of 79% and as such, failed to achieve the >90% target. In total, 1,311,360 doses of OPV were used. The vaccine wastage rate of 6.6% was slightly higher than the rates in the two previous SIAs. Based on the monitoring data, the November SIA had the least rate of zero-dose children (4.7%) and the highest proportion of missed children (21%).

Routine immunization

There was a wide gap between vaccination coverage achieved during SIAs and those achieved during routine immunization in 2010. The State experienced an upward trend in cumulative monthly routine OPV₃ coverage from 21% in January to 74% in December, but did not achieve the target coverage of >80% in any of the months. In terms of geographical distribution, three LGAs (14%, $n = 3/21$) performed below the 50% expected minimum coverage for routine OPV₃ immunization. Twelve LGAs (57%, $n = 12/21$) achieved routine OPV₃ coverage between 50% and 79% while the remaining six LGAs (29%, $n = 6/21$) exceeded the target coverage of >80%. Coverage above 100% was noted in two LGAs with large international markets and transportation hubs.

Discussion

The results of the three SIAs showed high coverage of polio immunization; with the exception of one LGA, all others exceeded the target coverage for SIA. The proportion of zero-dose children declined and the OPV wastage rate remained low. Within the same year, only 29% of the LGAs exceeded the target for routine immunization. In all SIAs, the number of immunized children was greater than the target population, with vaccination coverage above 100%. It is possible that children from other geographical areas were also vaccinated due to the commercial nature of Anambra State, and possibly, children of parents fleeing from the unrests in the Northern part of the country. Another possible explanation for vaccination coverage above 100% is the population estimate. Since the target population was estimated from the projected State population from the 2006 census, the actual number of children might have been higher than the original estimate. Nevertheless, one LGA failed to achieve the maximum target in November and the cause of this lower coverage should be identified. Furthermore, the proportion of missed children (outside house monitoring) rose to 21% during November SIA- this finding differed from the decreasing trend reported by Okeibunor *et al.*^[14] The cause of this increase in the proportion of missed children should be investigated and corrective actions should be taken to improve this indicator in future SIAs.

Lessons learned and implications for routine immunization

Advocacy/sensitization visits conducted during the SIAs helped to address concerns about immunization. Strong interests demonstrated by political leaders through participation in the opening ceremonies further encouraged receptivity to immunization. The use of multiple vaccination strategies helped to increase uptake of immunization. However, the fixed post strategy was the least effective of the three methods. Given that routine immunization is offered at fixed posts, this finding might be a hint of future difficulties of improving coverage once the Global Polio Eradication Initiative goal has been attained. The use of house-to-house strategy ensured wider coverage during the SIAs, but is resource-intensive for routine use. Therefore, community involvement adopted during the SIAs could help to increase the level of utilization of routine immunization services available at fixed posts (i.e. health centers and other health facilities). Consultation with community members through meetings, interviews, and group discussions, will help to improve understanding of factors that prevent mothers from visiting the fixed posts.^[15]

Funding from national and partner organizations contributed to the success of the SIAs. In order to improve routine immunization and other child health services, there is

a need to strengthen the primary health care system by giving similar level of financial support and political commitment demonstrated during the SIAs. Other child survival interventions were implemented together with the SIAs. This was an important accomplishment because program officers elsewhere have expressed support for SIAs with broader scope^[16] and a South African study^[17] has demonstrated the cost-effectiveness of combining multiple interventions onto the same delivery platform. Implementing SIAs as a comprehensive package further reinforces the need to strengthen the primary health care system because routine immunization and other essential primary health care services are offered at the same place.

Proper planning and other pre-intervention activities helped to solve some of the vaccine logistics problems. Decentralization of the cold-chain maintenance to the LGAs led to timely distribution of vaccines and reduction in vaccine wastage. Such level of efforts should not be reserved only for SIAs - they are one-time events and should not be a replacement for routine immunization.^[7,18-20] Similar level of planning will help to address “known causes” of low utilization of services and incomplete immunization such as frequent and prolonged vaccine stock-outs, inadequate staffing at health facility,^[21] long distance from health facility, and long waiting time.^[22]

It is equally important to identify “unknown causes” of low uptake of routine immunization. In a previous study conducted in Anambra State, researchers found a massive increase in utilization of other maternal and child healthcare services except immunization services at primary health care centers in their study communities.^[23] There was no clear reason for this but the authors opined that too frequent SIAs might have diverted some mothers’ attention from routine immunization.^[23] Community-engaged research approach using focus group discussions and other qualitative research methodologies may yield valuable information. Local managers and health workers could also provide new insights into the problem.^[24] For example, studies conducted in other settings have highlighted parental decision-making autonomy, maternal education, parents’ interactions with health professionals, suspicions about persistent emphasis on polio vaccination, and perceived harm from repeat doses of OPV as some of the factors influencing uptake of immunization.^[9,25-27] Recent reports from Cameroon, Ethiopia and South Africa suggested that SIAs have negative impact on routine child health services, especially, by interfering with the availability of health workers to carry out routine services during the implementation of SIAs.^[28,29]

Challenges

Some challenges were encountered during the SIAs. Less emphasis was placed on giving incentives to vaccinators and volunteers participating in the SIAs. This was necessary to

ensure sustainability of vaccination campaigns and reduce dependence on donor funds. However, many volunteers expected incentives/salaries and were discouraged, especially those recruited to reach children in hard-to-reach areas. The State and LGAs should give more consideration to motivation of future volunteers. There were challenges in reaching some children whose parents were traders/business people living in the urban areas. This was because they return home late in the evenings and in their absence, nannies/house helps would not admit vaccinators into the house. Repeat visits by vaccinators to immunize such children were at an additional cost.

Conclusion

The results of the SIAs showed that it is possible to achieve high coverage for polio immunization. The State experienced an upward trend in routine OPV₃ coverage in 2010 but it was still below the target of >80%. Adopting proper planning and supervision, financial and political support, community involvement, improved vaccine logistics, and other measures utilized during the SIAs could help to improve routine immunization. Strengthening routine immunization is a crucial step for eliminating polio.^[30] Although SIAs in our own setting raised awareness and uptake of immunization, it will be important to evaluate if SIAs are causing any harms to our health systems. Such data, particularly at national level, will enable policy makers to decide the best way to utilize our scarce human and financial resources.

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