
EDITORIALS AND COMMENTARIES

Nigeria's Polio Elimination Playbook: Lessons To Strengthening Health Systems For Other Eradicable Diseases

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Abstract

According to the World Health Organization (WHO), poliomyelitis (polio) is a highly infectious viral disease that largely affects children under 5 years of age. In August 2020, Nigeria was declared free of the wild poliovirus by the WHO and United Nations International Children's Emergency Fund (UNICEF). This review assesses the available evidence on issues with Nigeria's efforts and challenges towards the fight against poliomyelitis such as the wild poliovirus (WPV) and vaccine-derived poliovirus (VDPV). Published grey literature was assessed to make this mini-review. No restriction on publication dates was applied during the literature search. Available data showed efforts such as strong government accountability framework; introduction of geographic information systems to ensure more efficient utilization of resources and coverage; the digitalization of vaccine delivery; optimal utilization of disease notification officers (DNOs) at every unit of the local government; commitment of resources from the federal government to states that were prone to the reoccurrence of Polio; improved social mobilization, supervision, and monitoring; as well as assistance from international organizations were deplored. Some of the notable challenges faced with the eradication of polio include the refusal of parents to consent to vaccinations for their children, reoccurrences due to poor supplies of potable water, religious bias from the northern region, differential routines, and supplemental immunization coverage. The lessons learned in polio eradication can be channeled into the elimination of other diseases, but efforts must be in place to continue to monitor the reoccurrence of polio and other emerging diseases through surveillance systems.

Key words: Poliomyelitis (polio), Health systems, Nigeria, Epidemics, Infectious

Introduction

Polio is considered to be an extremely infectious viral disease, usually affecting children under the age of 5 years [1]. It can be caused by either the wild poliovirus (WPV) or the Vaccine derived poliovirus (VDPV). Polio is transmitted to people mainly by the faecal-oral route but less frequently by contaminated water or food. It incubates in the intestine and invades the nervous system causing paralysis [2]. The onset of fever, accompanied by stiffness of the neck and pains in the limbs, are important symptoms of polio [1]. Polio is often associated with irreversible paralysis as it usually attacks

the nervous system [1]. Polio is prevented by vaccination because it is still without cure [3]. Since the global effort to eradicate the disease was launched in 1988, world polio cases have reduced significantly, leaving fewer cases of continuous transmission in some endemic countries [1, 3, 5]. Between 2005 and 2009, Nigeria reported over 2,000 polio cases due to the WPV [6]. The WPV, therefore, posed a more serious threat to Nigerian children more than the VDPV [4, 6, 7]. Occurrences associated with increased Type 1 and 3 (WPV 1 and 3) transmission in Nigeria also occurred in 12 countries in 2009, including the Republic of Senegal, Liberia, Mali,

Niger and Chad in 2008 and 2009 [8]. In 2012, there were 122 total WPV cases, with 53 cases in 2013 [9]. The incidence of Type 1 cases, nonetheless, decreased by around 58 per cent in comparison to 2012. This was continued in 2014 with a substantial reduction in the number of cases of up to 88 per cent and circulation in Nigeria was mostly limited to two Northern Nigerian states (Kano and Borno) [10]. After two years of absence of polio cases in Africa, a case of WPV in Borno was confirmed in 2016 [3]. Nigeria, therefore, became the last African country to have recorded a WPV case in Africa. In the year 2020, Nigeria was finally declared free of WPV reflecting efforts by governments, NGOs, and the community in ending WPV transmission in Nigeria [4,5]. But there are still countable numbers of eradicable infectious, non-infectious and neglected diseases of the tropics that needs to be eradicated. This review, therefore, assesses the efforts in the playbook implemented for polio eradication and how lessons learnt could be applied in strengthening health systems for other eradicable diseases in Nigeria.

Efforts to kick out polio in Nigeria in literature

Various strategies were employed in the playbook to kick out polio in Nigeria through a partnership with internal and external stakeholders. These strategies involved the innovation and commitment of thousands of health care workers in Nigeria [4]. The fight towards polio eradication was made possible through routine and supplementary immunization, adequate environmental surveillance and implementation of innovative strategies to vaccinate difficult-to-reach children and ameliorate acute flaccid paralysis (AFP) [4-6]. The fight towards polio eradication was focused majorly in Northern Nigeria states due to the endemic state of polio in the region. These states were Kaduna, Sokoto, Kano and Borno [11]. Quality improvement in supplementary immunization activities is guaranteed by the use of innovative strategies such as Geographic Information Systems (GIS), community engagement, vaccination, strong communication networks, supervision and partnerships [11]. The use of GIS enabled efficient resource utilization and enhanced social mobilization, supervision and monitoring [6, 11-12].

The progress registered in response to the 2016 outbreak was made possible through good surveillance, vaccination (such as directly observed polio vaccination (DOPV), addressing the needs of non-compliant households, use of technology-driven evidence vaccination through electronic health solutions, focus on nomadic groups, and security personnel engagement to reach the conflict northeast region [6,14]. These strategies helped interrupt poliovirus transmission in polio sanctuaries in northern Nigeria, along with areas of interest and security compromised areas. Strengthening partnerships with traditional stakeholders was also instrumental to the progress registered [13].

The Polio Eradication Programme known as the National Polio Eradication Emergency Plan (NPEEP) was launched in 2012 by the Nigerian government to

intensify efforts directed at interrupting wild poliovirus transmission [6]. This initiative encouraged a progressive decline in wild poliovirus 1 cases from 122 in 2012 to 0 in 2015. The major contributing factors to the registered progress were strong leadership of the Nigerian government at the Federal and State level, community engagement, the institution of an Incident Management System through Emergency Operation Centres (EOC), and localized innovative strategies to address the outbreak. Also, innovations such as Auto-Visual AFP Detection and Reporting (AVADAR) and the use of mobile technology for monitoring program performance enhanced reporting in real-time for decision making and timely action [14-15]. For an improved coverage of routine immunization and vaccination campaigns, social mobilization and community engagement through simplified communication were employed to boost confidence and encourage vaccine use [16].

In 2016, the use of vaccines witnessed a strategic switch from trivalent oral polio vaccine (tOPV) to the utilization of bivalent oral polio vaccines (bOPV) for supplementary immunization activities [16]. This was in line with the strategic focus of the Global Polio End Game Strategy and Plan [4, 6]. This is because of a consequential virulence reactivation of vaccine virus witnessed in 95% of cases involving the use of the inefficacious Vaccine Derived Polio Virus (VDPV) [17]. This strategic vaccine switch proved effective in the reduction of wild virus (type 1 and 2) and a decline in VDPV resurgence [18]. In 2013, 379 million doses of Oral Polio Vaccine were administered in Nigeria during 22 supplementary immunization activities and at least 200 million doses in 11 supplementary immunization activities as of April 2014 [9]. This was vital because Oral Polio Vaccine 3 coverage in 2012 was low at 59% [6]. The government, through its resilient accountability framework, developed and implemented the accountability dashboard tool [4]. These tools were useful in planning and executing sub-national immunization activities, assigning planning and implementation actions to parties responsible, task identification and continuous improvement in immunization activities [11]. Also, the government was supported and assisted by International Organizations in the fight against polio. The Global Polio Eradication Initiative partners that contributed to the financing of polio vaccine purchase in Nigeria were: Bill and Melinda Gates Foundation, World Bank, Rotary International, UNICEF, UN Foundation, US Center for Disease Control (CDC) and Global Alliance for Vaccines and Immunization (GAVI) [4, 6, 19-20].

Challenges faced in WPV eradication in Nigeria

In literature, three identifiable challenges faced WPV eradication in Nigeria. They were low vaccine coverage, failure of the vaccine due to utilization of tOPV, and the problem of spread and distribution of the virus [2, 21]. Poor or low vaccine coverage which is mainly determined by vaccine acceptability and accessibility was a major

setback faced by the polio eradication programme. Vaccine hesitancy was common in Northern Nigeria and was due to certain religions and cultural beliefs. Vaccine accessibility became problematic in North-Eastern Nigeria due to the Boko Haram insurgency [3]. Furthermore, there were myths spread about the vaccine, one of such was that the vaccine causes males to be sterile. Such myths hampered the initial gains during the elimination campaigns [4]. Another challenge in the polio eradication game was vaccine failure. Failures of the vaccines were reported as those who took the vaccine were still prone to the virus. Several factors, such as the storage and transportation systems of the vaccine from health ministry warehouses to rural areas where the vaccines were administered, were attributed to the vaccine failure. The epidemiology of the virus also affected the initial elimination strategies. The circulating variant at a point in time was not neutralize-able to the antibodies being produced by the administered vaccines at that certain time, which lead to a resurgence of the virus [18].

How can lessons learnt from the polio elimination help the health system in Nigeria?

As Nigeria puts in efforts through its journey towards attaining a polio-free status, the campaign to eliminate polio has more lessons to give to strengthen its health sector. Some of these lessons in the literature for Polio elimination are discussed below.

The need to strengthen data acquisition, storage and management systems

When the need to end the spread of poliovirus grew, it became apparent that book based data processing frameworks were not sufficient to make accurate data-driven decisions required to make the program more efficient and effective. Technologies such as the Geographical Information System (GIS) was successfully utilized by independent monitoring and evaluation teams to track progress during the intervention, allowing clinics and catchment areas with low immunization coverage to be identified and addressed [21]. The information was utilized in making informed decisions, such as obliging key leaders to make vaccination programs the target and even ensuring that cases may not resurface in places where polio was already eradicated. Furthermore, eHealth Africa developed Vaccinator Tracking Systems (VTS) using Geographic Information Systems (GIS) which were encoded in Android phones to easily store and record passive tracks of vaccinators as they carry out their house-to-house visits [4]. This same approach can be utilized in other eradication campaign programs. Furthermore, the Nigerian campaign validates the importance of data in the effectiveness and efficacy of an intervention to partners and stakeholders. Hence, robust monitoring and evaluation approaches are an indispensable tool in identifying vulnerable areas and appropriately allotting resources in an eradication campaign as implemented during the national polio elimination program.

Instituting community buy-ins and trust is important to the attainment of elimination in the health system

In July 2003, the polio elimination drive was halted in the northern part of Nigeria due to the refusal of the communities in the North to accept the polio immunization program, particularly religious and political leaders, and the disapproval by mothers and families to take the polio vaccine because of several traditions and socio-cultural barriers [22]. Nevertheless, these issues were addressed by collaboration, effective dialogue with communities and engagement of leaders at all levels including traditional and religious leaders as reported in the national polio elimination program [4]. By involving traditional and religious leaders as partners and recognizing them as ambassadors of vaccination, the Ministry of Health effectively initiated confidence with Northern Nigerians including the families and mothers [11, 23]. Elimination campaigns should be initiated upon mutual understanding and trust in authenticity, validity and accountability amongst all key leaders and the society. This trust is essential in attaining other eradicable diseases in Nigeria in the nearest future. Hence, investing in community-centred partnerships and programmes is the key to a successful elimination campaign in any health system.

Boosting resources and putting accountability framework into practice by all partners and stakeholders

Accountability, transparency and clear communication is the bedrock of every successful intervention, as these were fundamental to the polio journey of Nigeria. Monitoring and surveillance were separated from the government and carried out by an Independent Monitoring Board (IMB) [5, 14, 24]. This independent monitoring team helped to eliminate bias and false reporting, increased transparency and in so doing adopted the collected data as proof for holding all stakeholders accountable [25-27]. The IMB also presented forthright insights into challenges; highlighted cultural, financial, social and political barricades which needed to be resolved; and called for further resources to ensure the Strategic Plan would be fully implemented [11, 26]. An Accountability framework was used at the national and state level; hence, national-level policy and regulatory reforms were made to encourage increased engagement and raise funding to boost areas of underperformance [4, 6]. Also, foreign actors were responsible for the procurement of vaccines, financing, and technical assistance, while Nigerian organizations were accountable for ensuring that vaccinations were provided on a timetable set by these foreign agencies [20-21]. At all times, taking responsibility was vital in boosting the effectiveness of the early polio campaign by enhancing the performance, openness, reputation and conversational needs of the intervention efforts. Such endeavours should be replicated in other campaign programs.

Collaboration - an indispensable tool in eradication campaigns

One of the foremost important lessons offered by the Nigeria Polio Eradication Initiative is the strength that comes from partnerships. Local and foreign partners have worked with the Nigerian government at the national and state level through numerous initiatives and schemes to extend exposure to improve group immunity and halt the transmission of polio, particularly in high-risk states such as Adamawa, Kano, Borno and Yobe [28]. This goes to point out that in the health care system, collaboration is essential. So if we can partner in tackling any health care issue, success is attained more rapidly. At the international level, synergies through the Global Polio Eradication Initiative have been very effective in forming collaborations amongst foreign actors to attain the global and national elimination goals [27]. Also, the Emergency Operation Centers (EOC) pressured the global community to make sure that there is constant provision. This was the product of the Nigerian government's primary public-private alliances with organizations such as the Bill and Melinda Gates Foundation, the WHO, UNICEF, the Rotary Club, and the CDC. Such efforts should be channelled into other elimination campaign programs in Nigeria.

Tailored health initiatives to differential political and demographic contexts

Country-specific health initiatives were critical to the achievement of a polio-free status in Nigeria. The inclusion of other health benefits to the elimination programme was one accomplishment of the initiatives throughout the North. Parents have considered diseases such as malaria and typhoid fever more overwhelming than polio to their children [21, 25]. Consequently, integrating bed nets and vitamin A supplements into mass vaccination days reassured parents of their fears and earned their buy-ins. This method has been utilized in mass vaccination "health camps" in Northern- Nigeria [25, 27]. This method could be applied in strengthening eradication programmes and understanding the main concerns of the locals. Incorporating this into the programme will significantly increase the success rate, as witnessed in polio eradication campaigns in the Northern region of Nigeria.

Optimal utilization of disease notification officers

The utilization of disease surveillance and notification officers (DSNOs) as a strategic part of the multi-sectoral efforts to eliminate WPV in Nigeria was another effective strategy utilized in the polio eradication plan. The DSNOs were trained and armed with all the necessary instruments for early disease detection and notification, which is very crucial in an elimination program. The availability of DNOs in local governments areas, which is the smallest unit of governance, facilitated an early and more robust disease detection system [29,30]. This strategy can be utilized for other eliminable diseases if well redirected.

Conclusion

The eradication of WPV in Nigeria was truly a remarkable achievement. To be accomplished, several obstacles were surmounted including the challenge of reaching children in the most remote areas of the country, insurgency and terrorism, boycott of immunization, and misconceptions about vaccination. However, synergized efforts were applied by all stakeholders to overcome the challenges at every point. For any eradication programme to be successful, it must be society-driven, and community-operated. Conclusively, the hurdles and capabilities of any health program can vary in space and time, but it is up to global health players to target diseases innovatively in a country-specific way in the long run.

Credit author statement

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