

RESEARCH ARTICLE

Re-emergence of diphtheria outbreak in Nigeria: Efforts, Challenges and Recommendations

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Abstract

Diphtheria is a contagious and potentially fatal disease caused by *Corynebacterium diphtheriae*, a bacterium widely recognized for producing a potent exotoxin, and this disease has reemerged in Nigeria. As of December 2023, the diphtheria disease is still spreading in some states within the country. To battle the resurgence of diphtheria, the NCDC (Nigeria Centre for Disease Control and Prevention) started particular response activities, including training in the affected states, routine immunization, and media partnership. The Federal Ministry of Health also joined hands with the NCDC to plan and enact mass vaccination campaigns, among other key interventions. However, these efforts to curb the resurgence of diphtheria in Nigeria have been met with some challenges such as vaccination gaps, poor management and diagnosis of diphtheria cases, and inadequate strategies for timely response. As a form of a way forward for the prevention and management of diphtheria, effective collaboration, strategic increase in diphtheria booster vaccination in traced contacts, and vaccination in high-risk populations, mass education and sustainable practices are essential. There is also a need to ensure adequate access to vulnerable populations, especially the rural areas.

Keywords

Diphtheria, disease outbreaks, Nigeria, epidemic

Introduction

Corynebacterium diphtheriae, recognized for producing a powerful exotoxin, is the bacterium that causes the highly contagious and possibly fatal disease known as diphtheria. As a result of tissue necrosis and the development of pseudo membranes, which restrict airways, it primarily affects the respiratory system (1). Diphtheria is transmitted through respiratory droplets, enabling its swift person-to-person spread, with severe effects including respiratory distress, heart failure, enlarged lymph nodes, and even fatality (2). Diphtheria has returned to the world despite being previously controlled by vaccines, with varied incidence patterns brought on by vaccination, socioeconomic changes, and changing epidemiological dynamics (3). For prevention and control measures of Diphtheria to be successful, there is a need to comprehend its revival.

On the 1st of December 2022, the Nigeria Centre for Disease Control and Prevention (NCDC) was first notified of a suspected outbreak of Diphtheria in Lagos and Kano states, Nigeria. In response to the notice, the NCDC deployed Rapid Response Teams to both states to confirm the outbreak and carry out necessary response activities (4). In January 2023, through an advisory issued by the office of the Director General, the NCDC confirmed cases of diphtheria in Lagos and Kano, as well as occurrences in two other states, namely Osun and Yobe states (5).

As of 3rd December 2023, 20,684 suspected diphtheria cases have been recorded in 33 States across Nigeria of which 12,086 cases have been confirmed. Kano, Yobe, Bauchi, Katsina, Borno, Jigawa States account for 99.7% of the confirmed cases (6). The Northern States are the most affected by the diphtheria outbreak (Figure 1). More than twothird (69.4%) of the confirmed cases discovered in 20 States involved children between 1 and 14 years. Sadly, 554 deaths were reported among confirmed cases yielding a 4.6% case fatality rate. It is also alarming that only 26.5% of the confirmed cases have completed their diphtheria immunizations (6). The last significant outbreak of diphtheria in Nigeria happened in 2011 in Borno State with 98 reported cases (7).



The reemergence of diphtheria in Nigeria, a country with a large population of young people and low immunization rates, is a significant concern due to the lack of diphtheria antitoxin and limited diagnostic capacity (1). This epidemic could endanger Nigeria's population through being exposed to various health

risks (8). This commentary aims to identify the measures in response to the diphtheria resurgence and challenges faced and provide actionable recommendations for its prevention and management.



Figure 1. Distribution of diphtheria confirmed cases and death cases in the six geo-political zones in Nigeria, epi week 19, 2022 – epi week 48, 2023 (6).

Efforts in Response to Battling the Diphtheria Resurgence

Following the notification of NCDC (Nigeria Centre for Disease Control and Prevention) of suspected diphtheria outbreaks in Kano and Lagos States on 1st December 2022, the body swung into action by deploying the Rapid Response Team (RRT) to both states first to confirm the outbreak and support response activities (6). After the outbreaks were confirmed, the NCDC started supporting response activities (7).

According to the NCDC, step-down training has begun in affected states by laboratory scientists and physicians trained at the National Reference Laboratory (NRL) Abuja. Publicity on the current diphtheria outbreak to the public through a partnership with the media agencies has also commenced. This is to increase awareness and enlighten the populace on how to reduce the risk of getting infected through preventive approaches and immunization (7). The NCDC and other partners have also launched the Media Epidemiology, Infodemiology and Social Behaviour Change/Risk and

Communication Media fellowship to improve health reporting in the country (9).

It is important to note however that not only the NCDC has made efforts in responding to the diphtheria outbreak. The Federal Ministry of Health (FMOH) also works in partnership with the National Primary Care Development Health Agency (NPHCDA), NCDC, affected states and other partners to respond to the outbreak (10). They planned a 5-day catch-up campaign with the hope of curbing the outbreak through mass vaccination which was planned to start 7th of August 2023 targeting children less than 14 years of age in the affected 25 Local government Areas (LGAs). They also planned 3 rounds of the reactive campaign in 171 chosen LGAs in 14 states. The first batch was scheduled for 21st August, the second for 18th September, and the final one for 16th October, all in 2023 (10). Nongovernmental organizations like the United Nations International Children's Emergency Fund (UNICEF) and the Nigerian Red Cross Society have also closely collaborated with the NCDC to plan and implement responses to the diphtheria resurgence. Aside from planning and implementing, some of their key



interventions include: funding risk communication and engagement activities; supervising response activities, and working closely with the NCDC in their responses (11-13).

Possible ways to curb the spread and even a future resurgence were suggested such as launching campaigns by the government to make the public see the importance of vaccination and improving health care facilities in the countries (14). It was also suggested that Routine Immunization be strengthened, and the immunity levels of children be checked as well as adolescents and adults to know if booster shots will be needed (15).

Challenges Encountered in the Elimination of Diphtheria in Nigeria

In the past diphtheria outbreaks in Nigeria, it has been identified that; gaps in vaccination, inadequate healthcare infrastructure and strategies for timely response, poor management and diagnosis of diphtheria cases were the most pronounced challenges encountered in the elimination of this infectious disease (16). Diphtheria outbreaks have reflected a large gap in vaccine coverage in the previous years, due to the noticeable collapse of the health system (17). Nigeria encounters many problems in addressing the high gap in vaccination because of low vaccine uptake and some other social factors (18). Diphtheria-Pertussis-Tetanus (DPT) vaccine coverage may be dependent on geographical location as it has been reported that southern Nigeria has a greater vaccination rate than northern Nigeria (19). The economic fluctuations within the country might also affect various public health interventions, or slow down progress through increased healthcare costs and inadequate funding (20). Among several other challenges is the inequitable distribution of funding and resources and limited funding for disease surveillance and response (21). It is also important to state that the management of multiple diseases simultaneously can also pose a challenge in addressing re-emerging diseases through the pressure it poses on the weak health system in Nigeria (22).

Recommendations

Ι. Sustainable Prevention and Management

Diphtheria is a preventable disease that is covered the World Health Organisation's routine in immunization schedule (23, 24). The current outbreak may be due to a historic vaccination gap (25). There have been fluctuations in the DPT3 vaccination coverage in the past. The people who were to be vaccinated did not get the vaccine, hence a plausible explanation for its re-emergence (18). Secondary prevention must be thoroughly carried out to identify asymptomatic carriers by testing nasopharyngeal specimens of suspected individuals (26).

The various community populace should continue to be enlightened on the need for vaccination to promote vaccine uptake. Disease prevention measures

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should also be intensified. With high vaccination coverage, herd immunity can be achieved within the population. In 2022, Nigeria was reported to be part of the 10 countries that had just less than 60% of the infants not fully vaccinated (unvaccinated & partially vaccinated) for diphtheria globally (23). This is a challenge that requires timely intervention and attention. Also, sustainable practices such as hand washing should be encouraged. Increased practice of handwashing within the population would reduce disease transmission since diphtheria spreads by direct contact and through respiratory droplets (27). Political will is also necessary in promoting research initiatives that would study the dynamics of the disease in the Nigerian population. There is a need to ensure access to immunization in the rural areas. II.

Increased vaccination coverage

There is also a need to address sub-optimal vaccine coverage to stem future outbreaks of the disease. Some factors responsible for this are accessibility of health facilities that offer immunisation services, availability of vaccines, and maternal knowledge on immunisation (28). It is important to communicate vaccination information effectively to parents to surmount problems relating to childhood vaccination (29). Adequate communication of vaccination information will aid understanding and convince parents to take their children for vaccinations. Educating community heads and religious leaders while intensifying mass media awareness would go a long way in community vaccination efforts.

Effective collaboration III.

Bevond the intervention of International Organisations, The Nigeria Centre for Disease Control and Prevention (NCDC) and the National Primary Health Care Development Agency (NPHCDA), the state and local governments must also continue to collaborate in curbing the current outbreak. Fostering an efficient healthcare system would encourage early presentation at primary health centres. The state government should also supplement the efforts of the federal government and national agencies by ensuring that primary healthcare workers within its jurisdiction are well-trained on the standard operating procedures for early detection and isolation of diphtheria cases.

Conclusion

Diphtheria remains prevalent in Nigeria since its outbreak in 2022. Despite the state of the healthcare system in the country, the disease can be eradicated with strong political will and effective collaboration among various sectors. Adherence to NCDC guidelines, their continued efforts, and multisectoral collaboration are needed in the fight against this disease. Sustainable prevention and management, increased vaccination coverage, and uptake amongst vulnerable communities will play a significant role in getting rid of this vaccine-preventable disease in the country.



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