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Cholera Outbreak and Public Health Pharmacy in Nigeria: A Call to Action

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ABSTRACT

Public Health Pharmacy is a specialized field that focuses on the pharmacist's utilization of knowledge of diseases' patterns prevalent in neighborhoods at grassroots, amongst a wide range of Public Health activities such as key reporting and referrals up to participating in community health education programs and monitoring communicable disease patterns such as Cholera. Cholera remains a significant public health challenge in Nigeria, with frequent outbreaks causing illness and death, particularly in vulnerable communities with inadequate water, sanitation, and hygiene (WASH) infrastructure. Despite efforts by health authorities in Nigeria, the persistence of cholera outbreaks highlights gaps in disease surveillance, emergency response, and long-term preventive measures. This article explores the factors contributing to cholera outbreaks in Nigeria and underscores the roles of public health pharmacists and the urgent need for coordinated action to prevent and control Cholera, geared towards optimized and improved health for all. Addressing cholera outbreaks in Nigeria requires a multi-sectoral approach that prioritizes improved WASH infrastructure, strengthened disease surveillance, and public health education. Effective government policies, community engagement, and international support are essential to breaking the cycle of recurrent outbreaks. As Nigeria battles this public health crisis, urgent and sustained action is necessary to protect lives and build a healthier future for all.

1. Introduction

Public Health Pharmacy is a specialized field that focuses on the pharmacist's utilization of knowledge of diseases' patterns prevalent in neighborhoods at grassroots, reporting accidental poisonings, referral of patients to hospitals, supporting chronic disease prevention, participating in community health education programs and monitoring communicable disease patterns such as Cholera amongst other key public health activities[1].

The diarrhoeal disease, Cholera, is quite an aggressive infection with its transmission closely linked to poor hand-hygiene, poor environmental sanitation, poor food handling and inadequate access to clean portable water. The disease is caused by contamination of food or water by the bacterium *Vibrio cholera*. Cholera outbreaks are known to be caused particularly by only two serogroups of *Vibrio cholerae* (O1 and O139) out of the many serogroups that exist. The term "disease of poverty" has been used to describe Cholera since social risk factors play an important role in its transmission[2,3]. The disease Cholera, is of serious public health concern globally and it is an indicator of inequity and lack of social development[4,5].

2. Symptoms and manifestation of Cholera

The disease is characterized by severe bouts of "rice-water" diarrhea and vomiting, with or without abdominal

cramping and it affects people of all ages[6]. The onset of cholera often but not always start with stomach cramps, vomiting and diarrhoea, and if left untreated, this rapid fluid loss potentially up to 1 litre per hour, stimulates the G-protein coupled receptor in the lumen of the GIT resulting in severe dehydration and metabolic acidosis, and consequently kidney failure, shock, coma, and death. About 50% of cholera cases are asymptomatic. Asymptomatic cases shed *vibrios* in their stools and serve as a potential source of infection to others. Symptomatic patients may also shed *vibrios* before the onset of illness and will continue to shed the organisms for about 1 to 2 week[7,8,9].

3. Global Outbreaks of Cholera

In the world today, many countries are affected by cholera; Somalia, Sudan, Bangladesh, Haiti, India, Pakistan, Vietnam and other Asia and African countries. Highly devastating epidemics of cholera had been documented in in the last decade in Angola, Ethiopia, Zimbabwe, Ghana, and Nigeria among other African countries as cholera is known to be endemic particularly to African counties[10,11].

4. Cholera Outbreaks in Nigeria

Cholera disease outbreaks are seasonal in most countries[12]. In Nigeria, cholera infections have been reported both in the dry and wet seasons, although the burden of cholera tends to increase during start of rainy and dry seasons[7,13]. In 2014, the Gomani cholera outbreak occurred during the dry season, whose pattern was similar to that observed in Calabar, South-southern part of Nigeria, where cholera outbreaks mostly occurred during the dry season[14]. This could be linked to scarcity of potable water usually faced during the dry season and therefore the likelihood of people to fetch drinking and cooking water from alternative sources with higher tendency for contamination which includes stagnant water bodies[15].

Cholera remains endemic in Nigeria and there are increasingly high morbidity and mortality in the northern part of the country probably due to many people using water from open wells in northern Nigerian[4] and the practice of open defecation is high; uncovered and diarrhea discharge from cholera patients could easily contaminate water supplies[16].

4.1 Drivers of Cholera Transmission

The drivers of reoccurring cholera transmission in Nigeria are quite different but they are also functionally interwoven, they range from social, biological, environmental and climatic, health systems related etc. so therefore the importance of a multi-disciplinary approach towards cholera prevention and control cannot be over emphasized. The majority of the drivers of cholera transmission are interdependent of each other such that they are either enforcing the activities or are being enforced by others to bring about cholera transmission. For example, superstitious and/or religious beliefs could influence or be influenced by community knowledge, attitude and practices towards, as well as community trust for health system and delay in seeking health care following symptom onset. Overall, the majority of the drivers of recurrent transmission of cholera in Nigeria seem to be intertwined rather than operating in isolation[17].

Several studies indicate that the persistence of cholera in Nigeria can be ascribed to disturbance in public sanitation services, natural disasters like mudslides. Landslides and floods also contribute to outbreak by disturbing the normal balance of nature, open flow of sewage water around the surrounding, food and water supplies contaminated by parasites and bacteria when essential system like those for water and sewage are damaged, lack of resources, infrastructure and disaster preparedness system among others[10,18,19,20]. Another study on cholera carried out in a district in North central Nigeria, revealed that, the people lacked sufficient knowledge and control awareness of cholera[21]. It's also reported that despite the huge public health impact of cholera, there is a deficiency of information about this preventable disease in the country especially the northern part as most outbreaks is either underreported or not thoroughly investigated[19]. Another study also pointed out that there is lack of evidence of the knowledge and control of cholera in Nigeria[17].

5. Burden of Cholera in Nigeria

Cholera is one of the most infectious diseases that has remained a serious public health burden in Nigeria and it is a growing threat, especially for the vulnerable at the grassroots across urban and rural communities in Nigerian society. The most vulnerable include those without clean water, who lack access to soap and sanitation, the displaced, the food insecure and the impoverished. They are most at risk of being infected, they may become very ill and likely to die[22]. The northern part of Nigeria including some parts of the FCT have been implicated in presenting with cholera in recent times[23,24].

In 2009, it was reported that not less than 260 people had died of cholera in four northern states with over 96 people in Maiduguri, Biu, Gwoza, Dikwa and Jere local council areas of Borno and Kaduna state[25]. In another study carried out in 2014 in the Federal Capital Territory (FCT) Abuja, Gomani, Kwali Local Government Area was promulgated to have a high mortality and morbidity of cholera[21]. It was also

recounted in 2017 that Borno North-eastern part as well as Kwara, North-Central parts of the country had their episodes of cholera outbreaks and many lives were lost[24]. It was also reported that cholera cases are still ravaging eight States including Adamawa, Bauchi, Kano, Katsina, Zamfara, Kogi, Plateau and Kaduna, although, there appears to be a relative decline in the number of new cases[19,24].

Another cholera outbreak was confirmed in January 2021 in Nigeria and by January 2022, a total of 111,062 cases including 3,604 deaths (i.e., Case Fatality Ratio (CFR) 3.2%) as reported by the NCDC. Children of age 5 - 14 years are affected most by the disease. Of the 36 states in Nigeria, 33 states had the disease with four states accounting for 53% of all cumulative cholera cases: Bauchi (19,558 cases), Jigawa (15,141 cases) Kano (12,116 cases), and Zamfara (11,931 cases)[26].

Another report by the NCDC (2024) stated that Nigeria was grappling with a severe cholera outbreak that had claimed 103 lives from 3,623 suspected cases across 34 states and the Federal Capital Territory (FCT), The cases and fatalities had been recorded in 187 Local Government Areas (LGAs), with Lagos, Bayelsa, Abia, Ebonyi, Katsina, and Zamfara states bearing the brunt, contributing 83% to the total disease burden[27]. The wide geographic distribution across 33 states and the FCT underscores the national scope of this health crisis.

6. Strategies for Prevention and Control of Cholera Outbreaks

The sustainable key to prevent cholera outbreaks is through improving personal, private and public hygiene, water sanitation, and sewage systems. Additionally, cholera vaccination can play an important role in infection control and prevention[6,28,29]. The Oral Cholera Vaccine (OCV) is a sustainable and beneficial strategy as a preventative and management tool (in outbreak settings) particularly underserved rural communities.

Recent reports have shown that the global estimates for cholera infections annually gets as high as 4 million patients, with up to 143,000 annual mortalities[30]. Controlling cholera outbreaks requires very efficient surveillance, report and response systems by all healthcare workers at the grassroots, of which are often not optimal in developing countries. The urgent need for an effective inter professional and collaborative surveillance system that has the capacity to adequately detect and contain cholera outbreaks timely was accentuated as sustainable panacea for cholera epidemics[31,32]. The long-term solution for cholera control lies in directed Federal as well states and local governments genuine economic development interventions on citizens through provision of universal access to safe drinking water and adequate sanitation[25,33], A crucial cholera epidemic preventive mechanism remains providing a functional waste management system that separates waste from the water supply.

7. Management of Cholera

The management of cholera primarily consists of rehydration therapy—administering fluids and electrolytes (such as Oral Rehydration Salts/Solution or intravenous fluids for severe cases)—to counter the vomiting and diarrhea. Antibiotic administration is also employed for the infection in moderate to severe cases. The management of cholera consists of administration of antibiotics for the infection, and rehydrating measures for the vomiting and diarrhea through electrolytes and fluids administration[34]. *Vibrio cholera* strains from endemic and outbreaks situation within the last decade revealed interesting patterns of antibiotic resistance to commonly used antimicrobial agents. Mobile genetic elements able to transfer multiple drug resistance among *Vibrio cholera* strains have also been described in numerous studies and are considered a major public health problem[35]. Eighty-six strains of *Vibrio cholera* O1 (79 Ogawa serotype and 7 Inaba serotype) from 1992 outbreak in Nigeria were less sensitive to Ampicillin, Penicillin, Cloxacillin, Cotrimoxazole, Streptomycin and Tetracycline[36]. The study also described *V. cholera* strains with 4.5 kilobase to 150 kilobase plasmids specifying resistance to Ampicillin, Tetracycline and Trimethoprim. Ten of the forty-one isolates were able to transfer resistant plasmids to *Escherichia coli* K-12 by conjugation suggesting that conditions conducive for transmission of resistant strains exist in Nigeria[36].

Another contributing factor for the spread of cholera is the poor knowledge and awareness of the public at grassroots and poor health literacy amongst literate urban dwellers, about its modes of transmission and early measures of diagnosis and treatment of cholera symptoms. Hence, it is important to understand the knowledge and awareness of the general public toward the disease to reduce its transmission[37].

8. Role of Public Health Pharmacists in addressing Cholera Outbreaks

Public health pharmacists play a critical role in addressing cholera outbreaks in Nigeria through different ways by contributing towards disease prevention, response, and health system strengthening. These strategic roles are exemplified in the following vital interventions:

8.1 Surveillance and Early Detection

Public health pharmacists at the community and hospital pharmacy practice settings in Nigeria assist in monitoring outbreaks, documenting and ensuring timely reporting of cases, and facilitating contact tracing and epidemiological data collection. Contact tracing is a critical component of early detection and containment of diseases outbreaks.

8.2 Provision of Oral Rehydration Therapy (ORT) and Medicines

Public Health Pharmacists ensure the availability and proper distribution of essential medications such as oral rehydration salts (ORS), intravenous fluids, and antibiotics for severe cases management.

8.3 Public Health Education and Advocacy

Pharmacists engage in community health education on proper personal and environmental hygiene, sanitation, and safe drinking water practices to prevent cholera transmission.

8.4 Vaccine Distribution and Immunization Campaigns

Public Health Pharmacists play a role in the storage, distribution, and administration of cholera vaccines in outbreak-prone areas.

8.5 Water, Sanitation and Hygiene (WASH) Promotion

Public health pharmacists collaborate with the NCDC and other NGOs to promote WASH interventions, ensuring access to clean water and sanitation to reduce the risk of outbreaks.

8.6 Policy Development and Research

Through their professional and technical associations such as the Pharmaceutical Society of Nigeria (PSN), Association of Hospital Pharmacists of Nigeria (AHAPN), Association of Community Pharmacists of Nigeria (ACPN) and the West African Postgraduate College of Pharmacists, Public Health pharmacists contribute to development and review of public health policies, advocate for stronger healthcare systems, and engage in operational and implementation research to improve outbreak preventions, responses and preparedness.

By integrating their clinical knowledge and core expertise of pharmaceutical care with public health strategies, pharmacists serve as key players in combatting against cholera outbreaks in Nigeria at both the grassroots and hospital settings.

9. Conclusion

Addressing cholera outbreaks in Nigeria requires a multi-sectoral approach that prioritizes improved WASH infrastructure, strengthened disease surveillance, and public health education. Effective government policies, community engagement, and international support are essential to breaking the cycle of recurrent outbreaks. As Nigeria battles this public health crisis, urgent and sustained action is necessary to protect lives and build a healthier future for all.

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