

# Determinants of Health Disparities: The Perennial Struggle against Polio in Nigeria

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## INTRODUCTION

Poliomyelitis or Polio is an acute viral disease caused by poliovirus, from the picornavirus family, which can damage the digestive tract and the nervous system, leading to flaccid paralysis.<sup>1</sup> The global importance of polio is underlined by the fact that a day (October 24) is set aside by the World Health Organization (WHO) known as World Polio day.<sup>2</sup>

Polio has some peculiar characteristics that highlight its global health importance. First, it is mainly a disease of children under five years, although older adults can be infected by the virus. It is very acute and spreads very fast through the fecal-oral route, often leading to debilitating paralysis, which handicaps victims and reduces quality of life and even death in some cases. Even more interesting is that till date, polio has no known cure, but could be preventable, mainly by vaccine and reduction of risk factors for contacting the disease.<sup>3</sup> The discovery and production of polio vaccines— inactivated polio vaccine (IPV) and oral polio

## ABSTRACT

Polio remains a global public health issue, and even though it has been eradicated from most countries of the world, countries like Nigeria, the largest black nation on earth, threatens the dream of total eradication of polio from the surface of the earth. Transmission of wild polio virus has never been eliminated in Nigeria, but even worse is the number of countries, both in Sub-Saharan Africa and all over the world that has become re-infected by polio virus strains from Northern Nigeria in recent past. Although a lot has been documented about the Nigerian polio struggle, one aspect that has received little attention on this issue is ethnic and geographic disparities between the Southern and the Northern parts of Nigeria. Understanding these disparities involved in polio virus transmission in Nigeria, as well as the social determinants of health prevalent in Northern Nigeria will help government and other stakeholders and policy makers to synergize their efforts in the fight against this perennial scourge.

**Keywords:** Healthcare disparities, Poliomyelitis, Nigeria.

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vaccine (OPV) in the 1950s and subsequent massive global anti-polio immunization campaigns through the Global Polio Eradication Initiative (GPEI) changed the picture and infection rates plummeted rapidly, leading to the declaration by the WHO in 1988 that polio would be eradicated worldwide by the year 2000.<sup>4,5</sup> Two decades after the WHO polio eradication declaration, the overall picture continued to improve; incidence rates worldwide dropped significantly from 350,000 in 1988 to 866 cases in 2008, which represent a 99% decline in infection rate, and polio endemic countries from 125 in 1988 to only 4 as at present.<sup>4</sup> One of these four countries is Nigeria, which remains the only polio endemic country in Africa that has never been able to achieve interruption of wild polio virus transmission. Hence, Nigeria is considered worldwide as a reservoir of polio virus and many new cases continue to be reported yearly.<sup>6,7</sup> Presently, Nigeria accounts for almost 60% of earth's wild polio transmission incidences, thus remaining the biggest

threat to the realization of a polio-free earth by the WHO.<sup>8,9</sup> Another complication caused by the Nigerian situation is that there have been documented cases of transmission of the poliovirus from Nigeria to other countries, both in Sub-Saharan Africa, and other parts of the world, causing a re-infection in populations already declared polio free; and so far between 18 and 20 countries have been re-infected by strains genetically linked to original strain from some parts of Nigeria;<sup>10,11</sup> polio strains from Nigeria were responsible for 80% of worldwide polio cases at the time of the polio vaccine boycott.<sup>11</sup>

One challenge in the fight against polio is the dearth of empirical literature, and paucity of data that accurately quantify the dynamics of this infectious disease. Nevertheless, a lot has been gleaned from available though scanty literature from Nigeria, Africa, and rest of the world that helps to describe the problem of polio in Nigeria. From some of these literature, it is now known that there are some clear disparities in incidence of polio in Nigeria, as well as the utilization of immunization and vaccination services in the fight against polio in earth's most populous black nation.

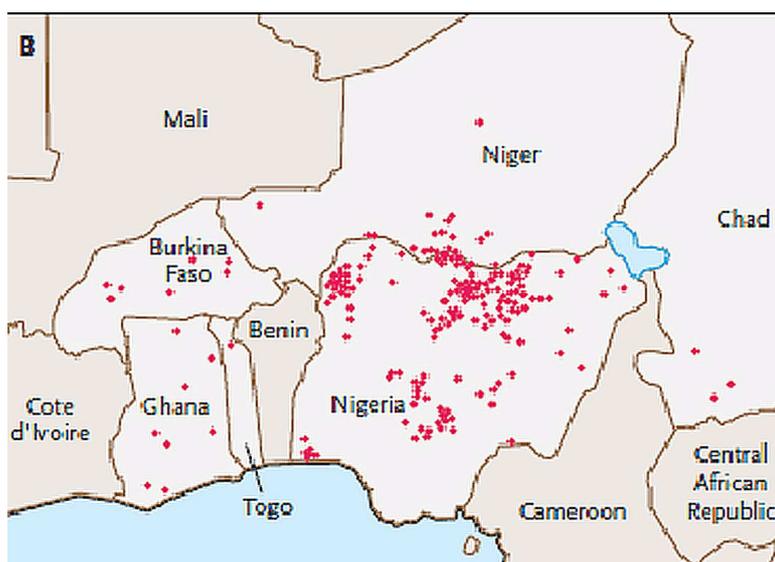
There is a geographical disparity in incidence rates of polio across the Nigerian State, and it is split between the Southern, predominantly Christian population, and the Northern, predominantly Muslim population.<sup>8,12</sup> This North-South disparity (Figures 1, 2) is so evident that when writing about polio in Nigeria, most of the available literature would only discuss in terms

of Northern Nigeria, as the South is generally considered free, although the problem of re-infection of southern population remains often obliterate this clear divide.<sup>9</sup> This disparity exists, not only in the rate of disease incidence, but also the utilization of globally recommended and accepted preventive care: immunization.<sup>12</sup>

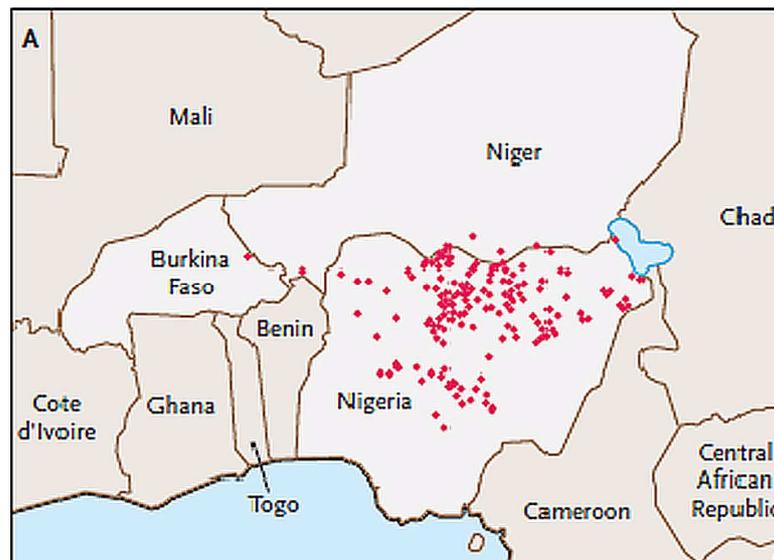
This geographic disparity as a result can be attributed to a combination of factors; largely determinants of health which are so convoluted that they are difficult to discuss exclusive of each other. They include in this case environmental exposures, social circumstances, shortfalls in medical care and health behavior. Again, this paper is painfully limited by the paucity of data describing these health determinants in Nigeria as it affects polio, but some direct and some inferential evidence exist to show how these determinants drive the cause of polio eradication in Nigeria.

### ENVIRONMENTAL EXPOSURES

Polio is a highly infectious viral disease, and although there have been attempts to determine its genetic basis, this has not been clearly established.<sup>13</sup> However, what is established is that polio is an infection that is contracted through person-to-person contact, or through oral-fecal route.<sup>14</sup> Evidence from molecular epidemiology suggests that local conditions like tropical latitudes, hygiene, and sanitation are more implicated in the rate of endemicity of polio rather than specific genetic or viral properties of the



**Figure 1.** Confirmed cases of wild poliovirus in Nigeria and surrounding African countries in 2003<sup>9</sup>



**Figure 2.** Confirmed cases of wild poliovirus in Nigeria and surrounding African countries in 2002<sup>9</sup>

Virus.<sup>15,16</sup> The Northern part of Nigeria is significantly hotter than the South, with temperature sometimes reaching 46 degrees Celsius (114.8 degrees Fahrenheit), and this may be a factor since high temperature reduces polio vaccine potency.<sup>17</sup> Sanitation and hygiene is another major environmental factor. Since the transmission route of polio is oral-fecal, contaminated water sources and poor sewage systems is a major environmental factor in the risk of polio transmission.<sup>18</sup> Although potable water is a general problem in Nigeria, other social factors like poverty and illiteracy in rural areas in Northern Nigeria makes matters worse,<sup>19,20</sup> with poverty levels in various parts of Northern Nigeria ranging from 40 to 81% in some Northern States, poverty and illiteracy being positively correlated.<sup>21</sup> Recent estimates across the country suggests that 67% of Nigerians live below the poverty line of less than 1 \$ a day and only 49% of people living in rural areas have access to safe drinking water; 30% have access to improved sanitation services; of these, at least 53% live in rural areas.<sup>22</sup>

## SOCIAL CIRCUMSTANCES

The cultural values of the people of Northern Nigeria are practically shaped by religion. So the social value system can be safely called a religious value system. As noted by Renne,<sup>23</sup> the Northern part of Nigeria is predominantly Muslim, with the Supreme Council for Sharia in Nigeria better known as the Supreme Council for Islamic Affairs having a major hold on a population for whom religion is a way of life.<sup>24,25</sup>

Illiteracy in the Northern part of Nigeria is glaring. For example, among the locals, polio is believed to be caused by an evil spirit who drinks the blood of his victims, thereby causing paralysis or even death.<sup>8</sup> At least 80% of Nigerians, especially those living in the rural areas believe in native medicine and healings, and they often opt for traditional doctors for health-care.<sup>26</sup> Available literature shows that there is a geographic disparity in immunization rates across Nigeria, with rates being as low as 3.7 to 6% from the Northwest to the Northeast, and 33 to 45% from the Southwest to the Southeast.<sup>21</sup> Along with the low rate of immunization in the Northern States, there is also disparity in the level of interest and knowledge of Northern mothers compared to Southern mothers as regards the role of vaccination and its importance to children,<sup>9,12,27</sup> with level of knowledge 68.6 to 70.8% in the South, compared to 27.5 to 50.2% in the North.<sup>21</sup> In 2003, this was further compounded when both religious and political leaders in Northern Nigeria called for a boycott of the polio vaccine.<sup>28</sup> Massive compliance to this call by the people gave rise to new cases of the disease which quickly spread across Nigeria and re-infected more than a dozen countries worldwide.<sup>29</sup> Thus the social circumstance of Northern Nigerians is a major factor in the fight against polio in Nigeria.

## SHORTFALLS IN MEDICAL CARE AND HEALTH BEHAVIOR

As noted earlier, a majority of Nigerians live in the rural areas, and medical care for these

teeming rural dwellers is in the form of primary health care. There at least 20,000 primary health care centers or hospitals in Nigeria provide preventive care and community health services,<sup>30</sup> including polio vaccination. Unfortunately, the primary health care system in Nigeria is in a state of decay, and most of the 20,000 primary health care centers that make up this basic level of health care in Nigeria are in poor infrastructural shape at present,<sup>30</sup> and lack the capacity to deliver vaccination and other basic health services to the communities where they are located. Thus, issues like vaccine storage in the rural area can be a major challenge, and in some cases vaccines have been stored in packs of ice blocks.<sup>23</sup> However, the knowledge, attitude, health behavior and practice of the people, as described earlier, may be most responsible for the incidence rates in Northern Nigeria. For example, literature shows that the rate of utilization of healthcare facilities have always been very low compared to the South (60% to 11% in 2003).<sup>31</sup> The level of community awareness and reporting of cases of acute flaccid paralysis, mainly caused by polio virus, is also very low in this region.<sup>32</sup> There were circulating speculations that vaccines contain substances that would induce sterility in those who use them, and that led to a massive boycott of vaccines in 2003.<sup>33</sup> Others claimed the vaccine contained HIV while others said it contained carcinogenic substances.<sup>31</sup> There is a general lack of trust in Western medicine, and this became even more evident after a Pfizer drug trial caused adverse reactions in subjects in 1999.<sup>24</sup> Another shortfall in medical care as far as polio is concerned is the recent development of virus strains from vaccines, like the circulating vaccine-derived polioviruses and the immune-deficient vaccine-derived polioviruses, and cases of vaccine-associated paralytic poliomyelitis,<sup>14</sup> in Northern Nigeria,<sup>34</sup> which is no doubt a setback in the fight against polio in Nigeria.

It is quite apparent that the fight against polio in Nigeria is a complicated one, given the determinants just discussed. As noted earlier, these determinants are so looped together that it is difficult to isolate the most crucial. For example, the environmental factors are very important, and they revolve around some rather basic human needs like access to safe water and shelter. The importance of sanitation to the survival of man and to global health is well underlined by the Millennium Development Goals of the United Nations, which names access to safe

drinking water and improved sanitary conditions as one of the seven goals that would change global health forever. Obviously, Northern Nigeria will greatly benefit, along with the rest of mankind if this goal is achieved. Same could be said of the social circumstances in Northern Nigeria, which can be summed up in two words: poverty and illiteracy. The need to break this vicious circle in endangered parts of earth like Northern Nigeria becomes even more apparent when a second thought is given to the fact that people would rather consult a native healer than to allow children take free vaccines that could save their lives against what they perceive as a curse from the underworld; locally called *Shan-inna*.<sup>25</sup> Obviously, it is this change in orientation; it is this enlightenment; it is this redirection that is needed more than anything else in Northern Nigeria. This is because even if more hospitals are built, even if Dr. Sabin discovers a new polio vaccine today and without patent issues give them out to Nigeria, how will the rate of hospitalization utilization change from 11% if nothing is done?

## WAY FORWARD

Reflecting on the foregoing, there is need for urgent action to ameliorate the perennial polio in Northern Nigeria. There is need for education, enlightenment, empowerment and communication. There is need for grass-root mobilization and sensitization the people to change their attitude towards western medicine, and a bottom-to-top approach rather than the conventional top-to-bottom approach. There is also need for shoring up the medical facilities available, within the limit of available resources as it is consistent with primary health care practice. Access to healthcare should be improved, as well as living and sanitary conditions. Government should embrace more private partnerships in this fight as they cannot do it on their own. With a concerted effort, the perennial fight against polio in Northern Nigeria and the rest of the world may be won.

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