Nigerian Onchocerciasis: from Control to Elimination

Prof. B. E. B. Nwoke of Imo State University Owerri, Nigeria provides an overview of onchocerciasis control and elimination efforts in Nigeria from the 1950s to date; showing how the country is progressively on track of the elimination drive using mass drug administration with ivermectin.

Introduction

Human onchocerciasis, commonly called River blindness is a chronic parasitic disease caused by filarial worm, Onchocerca volvulus. It is endemic in Nigeria, where it is transmitted by female black flies of the genus Simulium, particularly, Simulium damnosum group. These vector flies breed in fast flowing, well oxygenated rivers/streams with nutrients. The communities severely affected by onchocerciasis are almost located within 15-20 km radius of the breeding sites, which is an effective flight range of blood fed female flies. Onchocerciasis leads to the development of onchocercal skin disease (OSD) (onchodermatitis), lymphadenitis (resulting in hanging groin), ocular lesions (impaired vision and blindness) and systemic manifestations like itching, skin rash and visual impairement.

Of the 20-40 million people globally infected by onchocerciasis in 37 endemic countries in tropical Africa south of Sahara, Central and South America and Yemen, Nigeria is the most endemic, accounting for about 40% of the global prevalence[1]. About 32 million Nigerians living in 36,000 communities in 413 Local Government Areas (LGAs) of 32 States and the Federal Capital Territory (FCT) are estimated to be at risk of the disease[2].

Onchocerciasis in Nigeria has been recognized as a communicable disease that is not only a social problem but also a major threat to productivity and the economy of the country. "It impedes national and individual development, it makes fertile land inhospitable, impairs intellectual and physical growth and exacts a huge cost in treatment and control. It robs affected people of their dignity, independence and hope, especially often among the poorest people", which are at the end of the road and poor rural farmers who produce the bulk of our food and industrial raw materials[3]. It is therefore not a disease that should be taken for granted, hence the drive for control[2].

Control efforts in Nigeria

Initial control efforts started with larviciding of breeding sites in the 1950s at Oji River[5] tributary of River Niger at Lokoja, Kaduna River and river systems in the Abuja Emirate in the 1960s as well as at Hawa River Valley and Kainji Dam site[5].

A National Onchocerciasis Control Programme (NOCP) was established in 1982 to coordinate the control programme. The discovery of ivermectin and its acceptance as a drug of choice for the mass treatment of onchocerciasis, registration of the drug in 1987 and the announcement by Merck & Co., Inc (MSD) that it would donate Mectizan® free for the treatment of onchocerciasis encouraged NOCP to commence mass ivermectin distribution in Nigeria. At this stage, with the support of the Non-Governmental Development Organisation (NGDO) partners, ivermectin was distributed first to those communities whose members were at risk of developing severe and disabling ocular or dermal complications[2].

The first strategy adopted by Nigeria was mobile strategy in ivermectin distribution programme (IDP), which experienced a lot of operational and logistic limitations because it was not community owned. The launching of the African Programme for Onchocerciasis Control (APOC) by WHO in 1995 brought a new impetus to the control programme. "The mandate of APOC was to establish within 12-15 years effective and self-sustaining community-directed treatment with ivermectin (CDTI) through collaborative partnership, within the framework of primary health care activities in the remaining endemic areas in Africa and, if possible, eliminate the vector and hence the disease by using environmentally safe method in selected foci". APOC partnership involved 19 participating African countries (including Nigeria) with WHO was the executing agency.

Nigeria adopted the CDTI strategy; and with the support of APOC and NGDO partners, onchocerciasis control was extended to all the endemic areas in the country. In this strategy, communities were encouraged to take responsibility for organizing their own distribution of Mectizan® and Community Directed Distributors were responsible for the mass ivermectin distribution. This approach assured greater community participation and improved geographical and chemotherapeutic coverage. Epidemiological and entomological impact assessment of APOC activities in Nigeria (Taraba, Cross River, Kaduna and Kogi States) showed reduction in skin and eye lesions as well as significant decrease in the entomological indices, which had fallen below acceptable thresholds[4].

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Elimination of Onchocerciasis Transmission

The first evidence that elimination of transmission of onchocerciasis is feasible with repeated ivermectin treatment was published on July 21, 2009 by Diawara et al[5]. Their study in Mali and Senegal showed that treatment with ivermectin stopped further infections and transmission in endemic areas where the disease had existed continuously. This evidence encouraged Nigeria, and with the support of APOC, it conducted multi-site evaluation studies in endemic foci in Zamfara, Ebonyi, Kaduna, Taraba, Cross River, Edo and Delta States between 2008 and 2010[6]. As observed by Diawara et al [(5)], the results from Nigeria also showed that large-scale treatment with ivermectin stopped further infections in both man and blackfly vectors, especially in areas where there were high percentage of treatment coverage[6].

These results encouraged Nigeria Federal Ministry of Health (FMOH) to embark on the elimination of onchocerciasis. The Minister of Health inaugurated the National Onchocerciasis Elimination Committee (NOEC) on May 23, 2015 to provide technical support and advice in line with the WHO (2016)[7] guideline in the elimination of onchocerciasis. "The goal of the onchocerciasis elimination agenda is to push transmission of Onchocerca volvulus infection to the point where the parasite population is irreversibly moving to its extinction in all onchocerciasis transmission zones by 2030, at which point all Mass Administration of Mectizan (MAM) can be halted".

The Honourable Minister of Health gave the following Terms of Reference (ToR) to the NOEC:

a. Provide technical advice on onchocerciasis elimination to the Federal Ministry of Health;
b. Support the Government of Nigeria to develop a national guideline and road map for onchocerciasis elimination in Nigeria;
c. Assess where and when breakpoint has been reached and recommend to the Hon. Minister of Health the localities where ivermectin treatment can be safely stopped; and
d. Support the government in the preparation of the country's dossier for verification of Nigeria as having interrupted the transmission of onchocerciasis infection nationwide.

Update of onchocerciasis elimination programme in Nigeria (May 2015 – Dec. 2022) (Figure 1)

a. In 2015, no state had eliminated transmission in Nigeria, but as at December 2022 two States (Plateau and Nasarawa) had eliminated transmission to the extent that about 2.0 million people are out of MDA. Currently, post elimination surveillance (PES) is ongoing in these States.
b. No State had interrupted transmission of onchocerciasis in 2015 but at the end of 2022, eight States (Kaduna, Zamfara, Kebbi, Delta, Imo, Abia, Enugu and Anambra) had interrupted transmission of onchocerciasis. About 27.0 million persons in these States are no longer in need of MDA for onchocerciasis. These eight States are conducting post transmission surveillance (PTS).
c. The number of States where onchocerciasis transmission was suspected to be interrupted in 2015 was only five, by 2022, it had increased to 11. Entomological evaluation is ongoing in these States.
d. Available result in 2025 showed that in 12 States and Federal Capital Territory (FCT) elimination of transmission onchocerciasis was on track. At the end of 2022, 9 States were on track and epidemiological evaluation is ongoing to determine the elimination Status.
e. Transmission was ongoing in 8 States in 2015 and by end of 2022, transmission was ongoing only in one State. Twice a year treatment is currently been implemented in the State. Thereafter, epidemiological evaluation has been planned in the State.
f. At the beginning of the elimination programme in 2015, there was limited or no information on the Status of onchocerciasis in 11 States in Nigeria. At the end of 2022, we had only 6 States where there was limited or no information about onchocerciasis. Currently, Onchocerciasis Mapping is ongoin

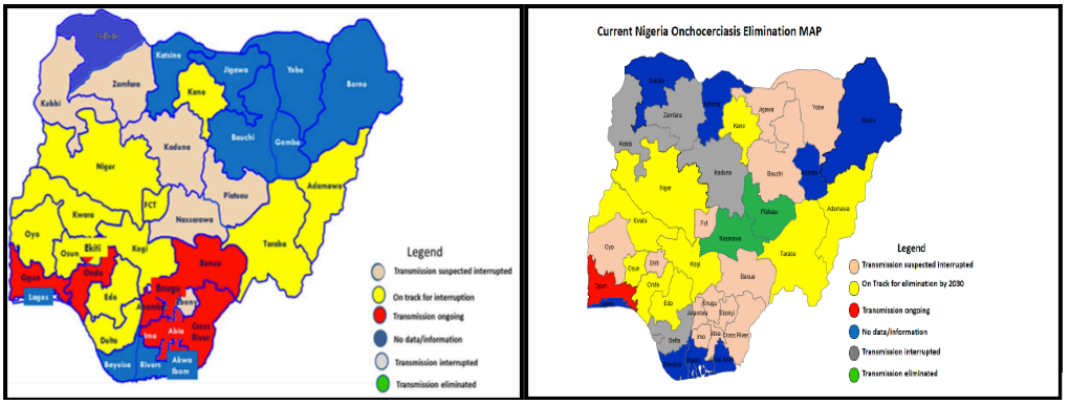

Figure 1: Showing colour status of onchocerciasis in Nigeria in May 2015 (left) and December 2022 (right) (NOEC, 2015; NOEC, 2022)

Table 1: States where breakpoint have been reached and where ivermectin treatment have safely been stopped (where people no longer have need MDA for onchocerciasis) in Nigeria, December 2022

S/N	State	No of LGA	Number of persons who are no longer in need of MDA for onchocerciasis
1.	Plateau	5	2.0 million
2.	Nasarawa	7	
3.	Kaduna	16	2.2 million
4.	Zamfara	5	4.0 million
5.	Kebbi	9	
6.	Delta	15	2.0 million
7.	Imo	50	18.8 million
8.	Abia		
9.	Enugu		
10.	Anambra		
TOTAL		**108 LGAs**	**29.0 million persons who are no longer in need of MDA for onchocerciasis**

Summary

With the evidence that elimination of transmission of onchocerciasis was feasible with repeated ivermectin treatment, Nigeria was encouraged to embark on the elimination of onchocerciasis. National Onchocerciasis Elimination Committee (NOEC) was inaugurated on May 23, 2015 by the Hon. Minister of health to provide technical support and advice in line with the WHO (2016) guideline. The support of the UN Agencies and in partnership with NGDO Collation gave the boost. The effort in the elimination of the transmission of onchocerciasis in Nigerian (May 2015-December 2022) has produced impressive results. During this past seven and half years, transmission of onchocerciasis has been interrupted or eliminated in 10 States and a total of 29.0 million persons from 108 Local Government Areas are no longer in need of MDA for onchocerciasis. These 29.0 million people are no longer at risk of developing onchocercal skin disease (OSD) (onchodermatitis), lymphadenitis (resulting in hanging groin), ocular lesions (impaired vision and blindness) and systemic manifestations. The strategic plan and activities lined up to meet up with 2021-2030 Road Map to eliminate the transmission of onchocerciasis in Nigeria is on track - to be one of the 16 countries to stop MDA in more than 50% of the population. It is the aim of Nigeria to be one of the 12 countries to stop MDA in the entire endemic population.

Appreciation: The support and encouragement of the Minister of Health, Nigeria, WHO Nigeria; UNICEF Nigeria, WHO/ African Programme for Onchocerciasis Control (APOC); MSD, MEC, ESPEN, and NGDO coalition as well as distinguished scientists and administrators are immensely appreciated. The States, LGAs and endemic communities have continued to play very important role in the elimination of onchocerciasis.

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