



# Epidemiological Assessment of Onchocerciasis in Endemic Communities of UDI and IGBO ETITI Local Government Area, Enugu State, Nigeria

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## Abstract

Impact study of Onchocerciasis was carried out in Udi and Igbo-Etiti Local Government Area of Enugu State, Nigeria using rapid assessment method (RAM) and skin biopsies for Onchocercal microfilaria (MF). Out of the 1362 subjects examined, 1158 (85%) were infected with Onchocerciasis. Individual Onchocercal signs recorded were microfilaria 498 (36.6%), leopard skin 486 (35%), nodules 756 (55.5%), visual impairment 534 (39.2%) and blindness rate of 54 (42%). Infection was independent of sex ( $P < 0.05$ ), but dependent on age and location of the communities in relation to water bodies ( $r = 100$ ,  $P < 0.05$ ). Prevalence of infection among age groups and communities varied. Age group 60 years and above had the highest prevalence (97.5%) while among the communities, Nze ranked highest (93.0%) prevalence.

**Keywords:** Onchocerciasis, *Onchocerca volvulus*, epidemiology, river blindness, *simulium damnosum*.

## Introduction

Onchocerciasis is a disease caused by a filarial worm *Onchocerca volvulus*. The filarial nematode causes a chronic human Onchocerciasis. It infects over 40 million people in the world, some 30 million of them living in the great part of Tropical Africa. Other endemic areas are the Yemen, Guatemala, Mexico, Venezuela and Columbia<sup>1</sup>. This parasite was originally classified into two distinct species *O. volvulus* and *O. caetiens*. The parasitic nematode worm was originally discovered by a German missionary in the Gold Coast (Ghana) and subsequently named *Filarial Vovulus*<sup>2</sup>. The parasite is transmitted to humans who are the only known vertebrate host through the bite of a female blackfly of the genus *Simulium*, and in Nigeria, it is transmitted by *S. damnosum* complex<sup>3,4</sup>. Onchocerciasis is seen as debilitating disease of great magnitude causing more blindness than any other disease. In most endemic areas, more than one third of the adult population is blind. An estimate of 600, 000 people worldwide one blind due to the disease and about 1.5 million people are severely impaired visually<sup>5</sup>. The distributions of Onchocercal skin disease in Nigeria is mostly projected in some hyperendemic states which included Enugu, Anambra, Oyo, Cross Rivers, Bauchi, Kaduna, Plateau, Imo, Bendel and Gongola States<sup>6</sup>. There is a wide spectrum of Onchocercal clinical manifestations which include severe itching, alteration of skin pigmentation with areas of hyper and hypopigmentation such as leopard skin, lizard skin<sup>7</sup>, Onchodermatitis, palpable nodules, hanging groin, lymphadenopathy, scrotal involvement such as hydrocele and genital elephantiasis<sup>8</sup>. Onchocerciasis constitutes a major public health problem and has hindered economic growth in endemic areas. The threat of the disease had led to the abandonment of

more than 250, 000 square kilometer of useful land in West Africa<sup>9</sup>. Onchocerciasis also causes decreased productivity and impoverishes the infected individuals. Many research works on *O. volvulus* infection have been carried out in different parts of Nigeria but non had been documented on Udi and Igbo-Etiti Local Government Area of Enugu State, Nigeria which has an environment that is conducive for the disease to thrive. This study aimed at: (i) determining the prevalence of Onchocerciasis in the four communities of Udi and Igbo-Etiti L.G.As. of Enugu State, Nigeria and (ii) determining the various manifestations of Onchocercal skin diseases.

## Material and Methods

**Study Area:** The study was carried out in three communities of Igbo-Etiti Local Government Area and one community (Nze) in Udi Local Government Area both in Enugu State, Nigeria. The four communities Nze, Uzueme, Useh, and Orda are situated on the same latitude (7° latitude East and (6°, 8°) longitude North of the equator).

They have an average rainfall of 1500-2000ml, a temperature of 25-27°C on the average and relative humidity of 75-95%. The vegetation here is predominantly rainforest with strips and patches of highly wooded savanna on the foothills. The four communities have the same geographical spread and are rimmed off by hills, which placed them in a valley. There is complete dearth of big water bodies in the communities except for springs prominent on the hills. Other water bodies are small streams that are sparsely distributed and some extinct streams. The only large water body "Adada" River is about 1.5km away from Useh community. In fact, all the studied communities are

almost of the same land stretch to the Adada River. However, Orda and Nze are more inland than Useh and Uzueme. Over 95% of the populations are stable farmers at the shore and offshore range of their homes. Udi and Igbo-Etiti shared boundaries with Uzo-Uwani at the Western axis, which is a known endemic onchocerciasis area<sup>10</sup>. Socially, the communities are fast growing and will reaching their peaks if its' resources are properly directed to the demands of a developing area. The communities have poor water supply system. The only main supply is Adada River. Therefore it must be emphasized that great economic activities go on steadily on the Adada River. Occupationally, three quarter of the populations are illiterate farmers and petty traders. The poor living conditions of the people and ignorance of the black fly vector are possible factors responsible for the high transmission of the disease.

**Determining the Prevalence of Onchocerciasis in the Communities:** Sensitization visits were made to the communities before the survey to intimate the subjects the demands of the impending survey and as well as the gains of the survey. All the communities agreed to be visited on a date that will suit their economic engagements. Survey population was an open one, where all that come out for the survey were examined for onchocerciasis.

Rapid Assessment Method (RAM) in which the observation of nodules, leopard skin, visual impairment and blindness alongside with skin biopsies from the iliac crest of the buttocks were used in assessing onchocerciasis in the communities. Different study units; RAM unit, Visual acuity line and skin-snipping unit were mounted. The supervisor and the researcher visited all the units as work progress to make sure that work was going on as directed. After recording the bio-data and occupation of a subject, he was asked to show the sheen for leopard skin and examined for palpable nodules.

Recording of findings was done by scoring in pulses (+, ++, or multiple). The presence of leopard skin, nodules and subjects personal datas were recorded. Subjects sights were examined by raising different number of fingers at varying distance to the examiner. Individuals who cannot count the raised fingers at all distance and from 5 metres were reported to have impairment. After sight test the subject will go to the Parasitological skin-snipping unit which was in a concealment for skin biopsies. Skin-snipping was done using a 2mm bite sclera punch apparatus. The punch was made sterile after each snipping by dipping into Methylated Spirit and Detol antiseptic. The skin-biopsy was introduced into a physiological saline contained in a micro titration plate and sealed with cello tape for incubation. The site of the biopsy was at the iliac crest of the buttocks. The wound made by the punch bite was covered with a plaster.

**Data Analysis:** All results were recorded and analyzed using chi-square test, correlation and regression analysis and analysis of variance (ANOVA).

## Results and Discussion

The results from the study are hereby presented according to the objectives set for the study.

**Table-1**  
**Epidemiological Distribution of Onchocercal prevalence in the Communities**

Community	Number Examined	Number Infected	Prevalence %
NZE	561	522	93.00
UZUEME	321	222	69.20
ORDA	288	243	84.40
USEH	192	171	82.80
<b>TOTAL</b>	<b>1362</b>	<b>1158</b>	<b>85.00</b>

A total of 4 endemic communities in Igbo-Etiti and Udi Local Government Area, Enugu State, Nigeria were examined by "Rapid Assessment Method" (RAM) and parasitological examination of skin snippings. Of the 1362 communities examined 1158 (85.00%) were positive for onchocerciasis. Three of the communities, Uzueme, Useh and Orda are mesoendemic with 69.2%, 84.4% and 87.5% respectively (60-89%); while Nze community is hyperendemic with a prevalent rate of 93%.

**Table-2**  
**Age Prevalence of Onchocerciasis in 4 communities of Udi and Igbo-Etiti Local Government Areas of Enugu State Nigeria**

Age	Number Examined	Number Infected	Prevalence %
5-9	99	66	66.7
10-19	219	147	67.1
20-29	147	108	73.5
30-39	156	135	86.5
40-49	165	147	89.1
50-59	159	147	92.5
60>	417	408	97.5
<b>TOTAL</b>	<b>1362</b>	<b>1158</b>	<b>85.0</b>

The highest (97.5%) prevalence was observed within age group of 60 years and above, followed by (92.5%) prevalence occurred within age group 50-59 years. Age group of 40-49 yrs, 30-39 yrs, 20-29 yrs and 10-19 yrs had a prevalence of (89.1%), (86.5%), (73.5%) and (67.1%) respectively, while the least (66.7%) prevalence occurred within age group of 5-9 years.

**Table-3**

Communities	Microfilaria (MF %)	Leopard Skin (LS %)	Nodule (NOD %)	Visual Impairme (NT %)	Blindness %
NZE	258 (46.0)	240 (42.8)	330 (58.8)	234 (34.8)	48 (8.6)
UZUEME	60 (18.7)	99 (30.8)	153 (47.7)	75 (23.5)	00 (0.00)
USEH	93 (32.3)	90 (31.8)	144 (46.9)	144 (46.9)	00 (0.00)
ORDA	87 (45.3)	57 (29.1)	129 (67.2)	81 (42.3)	09 (4.7)
<b>TOTAL</b>	<b>498 (36.6)</b>	<b>486 (35.7)</b>	<b>756 (55.5)</b>	<b>534 (39.2)</b>	<b>57 (4.2)</b>

From table 3 above, all four communities were hypoendemic to the various onchocercal diseases except Orda community who recorded a mesoendemic prevalence rate to nodular formations with a rate of 129 (67.2%). Microfilaria recorded overall low prevalence of 498 (36.6%) in the four communities. Nze and Orda recorded the highest prevalence rates of 258 (46.0%) and 87 (45.3%) respectively while Uzueme and Useh recorded a low rate of 60 (18.7% and (32.3%) respectively. Leopard skin manifestations maintained a uniform prevalent rate among the communities, though Nze recorded the highest rate of 240 (42.8%) Uzueme, Useh, and Orda recorded 90 (30.8%) and 57 (29.7%) respectively. Leopard skin has an overall prevalence of 486 (35.7%) more than the microfilariae rate.

Nodular formation ranked very high in the communities viz Useh 51.0%, Nze 58.81%, Uzueme 47.7% and Orda 67.2%. Nodular rate was far higher than the microfilaria, leopard skin, visual impairment and blindness rates. It also recorded the highest frequency of 55.5% when compared to other Onchocercal diseases. Visual impairment almost maintained a uniform prevalent rate in the communities while blindness rate was less frequent.

**Conclusion**

Igbo-Etiti and Udi L.G.As recorded a high prevalent rate 85% to onchocerciasis. The two local councils are known endemic areas and are in the forest-Savanna of East Central Nigeria. Adada River provided the mainstay for the breeding of *Simulium damnosum* which is the rector of onchocerciasis. Ivermectin chemotherapy was found to be accepted by the subjects for treatment though the fear of skin snipping could not allow them to participate in a continous annual treatment and monitoring. There is need for integration of community health education with mass chemotherapy in Igbo-Etiti and Udi L.G.As of Enugu State, Nigeria as means of controlling the spread of onchocerciasis in the communities and its immediate environs.

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