

**Clinical Manifestations of Onchocerciasis in Imeri: an Endemic Community in Nigeria****\*<sup>1</sup>OJ Afolabi, <sup>2</sup>CE Okaka, <sup>1</sup>MO Oniya**

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**Abstract**

Clinical manifestations of onchocerciasis were investigated among 194 respondents of both sexes of not less than 10years of age in Imeri community of Ose Local Government Area of Ondo State, Nigeria. Structured questionnaire was used to obtain useful epidemiological information from the respondents, physical examination through palpation from head to ankle was used to assess clinical symptoms from the respondents and skin snip test was used to determine the prevalence of the disease among the subjects. The results of the research revealed that 116 of the 194 respondents included in the study manifested varying degrees of the clinical symptoms of onchocerciasis ranging from cataract to self-inflicted injury. Meanwhile, only 62 respondents of the 116 that manifested the clinical symptoms were positive to the skin snip test and the total prevalence of the disease in the community is 32%. The prevalence of the disease varied significantly among the clinical symptoms ( $p < 0.05$ ) with the highest prevalence (100%) recorded among the respondents with partial blindness and the lowest (33.3%) observed among respondents with pruritus and self-inflicted injury. The percentage of the clinical symptoms was also found to be significantly different among the age groups ( $p < 0.05$ ) with highest percentage (22%) recorded in the age group (51-60years) and the lower percentage recorded in age group (71-80years). Similarly, the clinical symptoms were higher in the male gender (55.2%) than the female gender (44.8%). The results of the research suggest that community directed treatment with

ivermectin should be further sustained in the community to reduce the clinical symptoms of the disease and its prevalence in the community.

**Keywords:** Onchocerciasis, clinical symptoms, prevalence, Imeri

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## 1.0 Introduction

The clinical manifestations of onchocerciasis vary from one geographical region to another, although, there are general manifestations of the disease that are common in patients such as papules, pruritus, ocular lesions, lizard skin and leopard skin. These variations depend on the intensity of infection (microfilariae load in the skin), the immune responses of the human host to the parasite, the duration of the infection and also to inherited factors [1-3]. The symptoms are produced by the microfilarial stage of *Onchocerca volvulus* with inflammation and tissue damage mostly seen when the parasite is dying or being destroyed by drug and/or host responses [4]. The time from invasion by infective larvae to the development of clinical signs (incubation period) is usually longer than the prepatent period (7months-2years) and may last for many years; it is longer for the manifestation of the ocular disease than the dermal presentations [5, 6]. A papular eruption in the skin leads to varying degrees of dermal and epidermal pathology, which is complicated by self-inflicted trauma due to the intense pruritic nature of the infection [7]. Onchocercal nodules are usually painless unless press on a vital organ, mobile and 0.5-1.0cm in diameter. They are mostly seen over bony prominences of trunk, thighs, shoulders, arms and cranium [8]. Another potential factor that could play a role in the development of the disease pathology

and clinical symptoms is the obligatory endosymbiotic bacterium *Wolbachia*, which is abundant in all developmental stages of the parasite [9-11]. The locations of clinical signs also vary from one geographic region to another. The locations at times informed areas where snips are taken for laboratory diagnosis. In patients in Africa, the nodules tend to be found on the lower torso, pelvis and lower extremities, whereas in patients in Central and South America, the nodules more often are located on the upper body (the head and trunk) but may occur on the extremities. The epidemiologic patterns of infection also differ between savannah and forest regions. In West African savannah areas, ocular onchocerciasis is common; it particularly affects the anterior segment of the eye, though the posterior eye segment can also be affected. The risks of visual impairment increase, in part, as the prevalence and intensity of infection in a community rises [12]. The prevalence of infection can vary between villages and historically as high as 80 to 100 percent by the age of 20 years in some areas, with blindness peaking at 40 to 50 years of age. In African forest areas with a comparable intensity of onchocerciasis as savannah areas, onchocercal skin disease predominates, with much less blindness. Furthermore, ocular lesions, when present, usually involve the posterior eye segment. Greater morbidity with age is the result of cumulative exposure in endemic areas. Blindness tends to occur in adulthood after many years of infection. This study was intended to study the prevalence of the clinical manifestations of onchocerciasis in Imeri community of Ondo State.

## 2.0 Materials and Methods

**2.1.** The study was conducted from January to December 2013 in Imeri; an endemic community for onchocerciasis in Ose local government area of Ondo State, Nigeria. Imeri community has a land area of 1,465km<sup>2</sup> and a population of 144,901 [13]. The community predominantly consists of Yoruba ethnic group; other ethnic groups include: Igbira, Hausa, Igbo and Fulani. The major economic activities in the

community are farming, hunting, trading, artisans and civil services. The community also consists of two main seasons: rainy season (April-October) and dry season (November-March).

## **2.2 Ethical Clearance and Informed Consent**

Prior to the commencement of the research, approvals for the study were obtained from the disease control of the Ondo State Ministry of Health, Primary Health Coordinator in Ose Local Government Areas and community head. Similarly, informed consent of the respondents was obtained after focus group discussion in a native language where the subjects were made to know the advantages and disadvantages of their participation in the study.

## **2.3 Physical Examination**

The history of infection from individuals included in the study was obtained by the administration of structured questionnaire. Also, respondents were palpated and examined clinically from head to the ankles for dermal and ocular symptoms of onchocerciasis such as leopard and lizard skin, darkened skin, scratch marks, papular skin rash signs of acute onchodermatitis [14]. A slit-lamp was used to examine ocular symptoms such as eye lesion and cataract.

## **2.4 Skin Snip Test**

Bloodless skin snips were aseptically collected from the iliac crests of the respondents who presented with palpable nodules using sterile blood lancet and razor. The snips were immediately placed in 0.5ml normal saline in a microtitre plates and left for 4 hours to allow the microfilariae to migrate out of the tissues. The solution was centrifuged at 2000rpm for 15mins, the sediment was smeared on sterile slides and stained with Giemsa at pH 6.8. The smears were examined for microfilariae under X40 objective lens of a microscope. The number of snips positive for the microfilariae was noted among the age groups and genders.

## **2.5 Data Analysis**

Data obtained from the questionnaires, physical examination and laboratory diagnosis were subjected to Chi-square analysis using Statistical Package for Social Sciences (SPSS) version 20.0.

### 3.0 Results

#### 3.1 Prevalence of Onchocerciasis among the Respondents with Clinical Symptoms

Of the 194 examined for onchocerciasis, 116 (59.8%) showed the clinical symptoms ranging from cataract to self-inflicted injury while 78 (40.2%) respondents showed no clinical symptoms (Table 1). Out of the 116 respondents that were positive for clinical symptoms, only 62 were positive for *Onchocerca volvulus*. This showed that clinical symptoms might not be enough to confirm the presence of parasite in the subjects but only give the history of infection on the subjects as some patients that possessed the clinical symptoms may be negative to laboratory test of the parasite. It was observed that the skin snips from the respondents with partial blindness showed 100% prevalence while the skin snips from respondents with cataract, dermatitis and ocular lesion showed 50%. Similarly, 62.5% and 78.6% prevalence were observed in the skin snips of respondents with leopard skin and lizard skin respectively. However, lower prevalence of 33.3% was recorded in the skin snips of respondents with pruritus and self-inflicted injury.

#### 3.2 Distribution of Clinical Symptoms among Age Groups

Distribution of the clinical symptoms among the age groups as presented in Table 2 reveals that pruritus was prevalent among all the age groups while papules were found in all except age group 71-80. Self-inflicted injury caused by mechanical damage of the skin through scratching of the papules was observed in age group 41-70 as shown in Table 2. Cataract and ocular lesion which are the ocular manifestations of the disease were found in age group 41-60. Two cases of partial blindness were found in age group 51-70 throughout the study. This suggests that ocular manifestations including blindness in onchocerciasis patients resulted after a prolong exposure to the parasite without treatment. Generally, the clinical symptoms were more among the older age groups than the younger age groups (Table 2).

### 3.3 Distribution of Clinical Symptoms among Gender

Distribution of the clinical symptoms among the respondents showed that dermatitis (1.7%) and partial blindness (1.7%) were prevalent among the male gender while these were absent in the female gender (Table 3). Cataract, leopard skin and lizard skin (5.2%, 8.6%, 8.6%) were more frequent among the male gender than the female gender (1.7%, 5.0%, 3.4%). Generally, the percentage of clinical symptoms were more among the males (55.2%) than the females (44.8%) with the exception of pruritus and self inflicted injury which were higher in female (PRU: 20.7%; SII: 3.5%) than the male (PRU:15.5%; SII:1.7%). The two respondents with partial blindness were among the male folks. Other clinical symptoms were not significantly different ( $p>0.05$ ) between the genders.

**Table 1: Prevalence of Onchocerciasis among the Respondents with Clinical Symptoms in Imeri Community**

Clinical Symptom	Respondents with Clinical Symptoms	Skin Snips Positive to <i>O. volvulus</i> microfilariae	Prevalence (%)
Cataract	8	4	50
Dermatitis	2	1	50
Leopard Skin	16	10	62.5
Lizard skin	14	11	78.6
Ocular Lesion	4	2	50
Partial Blindness	2	2	100
Papules	22	16	72.7
Pruritus	42	14	33.3
Self-inflicted Injury	6	2	33.3
No clinical symptom	78	0	0
Total	194	62	32

**Table 2: Clinical Symptoms of Onchocerciasis among the Respondents in Imeri Community**

Clinical Symptoms	CAT	DEM	LEOS	LS	OCL	PAB	PAP	PRU	SII	Total	%
10-20	0	0	0	4	0	0	6	8	0	18	16
21-30	0	2	0	0	0	0	4	6	0	12	10
31-40	0	0	2	0	0	0	2	6	0	10	9
41-50	6	0	4	0	2	0	2	6	2	22	19
51-60	2	0	2	6	2	1	4	6	2	25	22
61-70	0	0	6	2	0	1	4	8	2	23	20
71-80	0	0	2	2	0	0	0	2	0	6	5
Total	8	2	16	14	4	2	22	42	6	116	
Percentage	7	2	14	12	4	2	19	36	5	100	

CAT: Respondents with Cataract  
 LEOS: Respondents with Leopard Skin  
 OCL: Respondents with Ocular Lesion  
 PAP: Respondents with Papules  
 SII: Respondents with Self-Inflicted Injury

DEM: Respondents with Dermatitis  
 LS: Respondents with Lizard Skin  
 PAB: Respondent with Partial Blindness  
 PRU: Respondents with Pruritus

**Table 3: Clinical Symptoms of Onchocerciasis among Sex Distribution in Imeri Community**

Clinical Symptoms	CAT	DEM	LEOS	LS	OCL	PAB	PAP	PRU	SII	Total
Male	06(5.2%)	02(1.7%)	10(8.6%)	10(8.6%)	02(1.7%)	02(1.7%)	12(10.3%)	18(15.5%)	02(1.7%)	64(55.2%)
Female	02(1.7%)	0(0%)	06(5.0%)	04(3.4%)	02(1.7%)	00(0%)	10(8.6%)	24(20.7%)	04(3.5%)	52(44.8%)
Total	08(6.9%)	02(1.7%)	16(13.8%)	14(12.1%)	04(3.4%)	02(1.7%)	22(18.9%)	42(36.2%)	06(5.2%)	116(100%)

#### 4.0 Discussion

The results of the study reveal two categories of the clinical manifestations: dermal and ocular manifestations. The dermal manifestations observed in the community include dermatitis, leopard and lizard skin, papules, pruritus and self-inflicted injury while the ocular manifestations include cataract, ocular lesion and partial blindness. However, it was observed that the prevalence of onchocerciasis in the study community was higher among the respondents with partial blindness, lizard skin and papules than the respondents with pruritus and self-inflicted injury. It was also noted that partial blindness and lizard skin are clinical manifestations that are observed in subjects after a long period of exposure to the infection and consequently manifest at older age groups among the study population [15, 16]. Similarly, higher prevalence was recorded in papules which are dermal manifestations that are resulted from inflammatory response of the host to the parasite or the effect of the drug (ivermectin) on the microfilariae of *Onchocerca volvulus*. It was further observed from the study that the clinical symptoms of the disease peaked at age 51-60years this concur with the reports of Adewole and Ayeni [17] in Ise-Orun Local Government, Ekiti who observed peak prevalence of onchocerciasis among age group 56 and above. Meanwhile, the report of the study was slightly contrary to the reports of other authors [18, 19]. Both authors in their separate researches reported that the peak period of onchocerciasis is at 41-50years of age. In addition, most dermal symptoms observed among the study group manifested in the respondents with lower age groups although these symptoms persist to higher age groups. In contrary, the ocular symptoms of the disease manifest as the patients advance in age without any effective treatment. This suggests that cutaneous symptoms are dermatological changes which manifest in the patients years before the onset of ocular symptoms [15, 16]. It was further observed that the clinical symptoms of the disease were more among the male than the female gender. This implies that the males are more exposed to the blackfly bites than the females, this is because the male gender especially the older age group engages more in socio-economic activities such as farming, lumbering, fishing, hunting etc. that predispose them to the infection than the female. This result on gender was supported by the

work of Adewole and Ayeni [17]. Noteworthy in the study is the two records of partial blindness which were found among the male gender and absent in the female gender. This also buttresses the fact that partial blindness resulted in patients with high frequency of exposure to the blackfly bites and high microfilarial load (intensity) in the host.

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### Conflict of Interest

We declare that there is no conflict of interest among the authors.

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