

## Update Assessment of Prevalence of Onchocerciasis in Imeri, an Endemic Village in Ondo State, Southwest Nigeria.

\*O.J. Afolabi<sup>1</sup>, C.E. Okaka<sup>2</sup>, I.A.Simon-Oke<sup>1</sup>, M.O. Oniya<sup>1</sup>

<sup>1</sup> Department of Biology, Federal University of Technology Akure, Nigeria.

<sup>2</sup> Department of Animal and Environmental Biology, University of Benin, Benin City, Nigeria.

[jideaf77@gmail.com](mailto:jideaf77@gmail.com)

**Abstract:** Onchocerciasis is a chronic parasitic disease caused by the filarial nematode *Onchocerca volvulus* and transmitted by female blackfly, *Simulium* spp. The disease is most prevalent in Africa, where over 99% of the cases occur. 40% of all cases occur in Nigeria. This study assessed the prevalence of onchocerciasis among different age groups and gender in Imeri, an endemic Community in Ondo State, Nigeria. 194 participants of both sexes and not below 10years of age who attended the community clinic were selected for the study. Structured questionnaire was administered to obtain useful epidemiological information from the respondents. Bloodless skin snips were aseptically collected from the iliac crests of the respondents who presented with palpable nodules using sterile blood lancet and razor into saline solution. The solution was centrifuged at 2000rpm and residues examined for microfilariae under X40 objective lens of a microscope. The highest prevalence of 66.7% was found in age group 71-80years while the least prevalence (22.7%) was found in age group 10-20years. Total prevalence in the community was 32% (n=62). Prevalence among the male (33.3%) was slightly higher than that of the female (30.0%). Occupation such as farming (41.1%) and hunting (37.5%) were found to predispose the respondents to infection in the study area. The results are suggestive of need to increase intensive public enlightenment programmes, especially in local dialect, to educate the community about the aetiology of the disease, and also correct the myth about the drug (ivermectin) in order to eradicate the disease in the community.

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### 1. Introduction

Onchocerciasis is a skin and an eye infection caused by the filarial nematode *Onchocerca volvulus* and transmitted through the bites of haematophagous *Simulium* blackflies which breed in fast-flowing rivers and streams, increasing the risk of infection to people living near the water bodies. The disease is endemic in large areas of Africa especially isolated and remote communities closed to the flowing rivers and streams. It is estimated that 18-37million people are infected, 1-2 million people are visually impaired and 270,000 people are rendered completely blind by the disease, over 99% of the cases occur in Africa (McLeod, 2008; Richards *et al.*, 2001). Of the 37 endemic countries, 30 are in Africa and 6 are in Latin America (Cupp *et al.*, 2011; Diemert, 2011). In West Africa, blindness is more commonly reported in the savannah and woodland areas, whereas depigmented skin disorders are more frequent in the forests. 40% of all cases occur in Nigeria with more than 32 million Nigerians estimated to be at risk for onchocerciasis (Njepuome, 2009). Areas with the highest prevalence of blinding onchocerciasis in Nigeria are found mainly in parts of nine northern and middle savannah states: Adamawa, Bauchi, Benue, Southern Borno, Kogi, Kwara, Niger, Plateau and Taraba. States with lowest prevalence are

Jigawa, Kano, Katsina, Lagos, Ogun, Ondo and Rivers (NOCP, 1995). Blindness is caused by the passing of microfilariae through the cornea, or more rarely the retina. The prevalence of infection can vary between villages and was 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 (NOCP, 1995).

The disease is the second leading cause of blindness due to infection in the world (Dent and Kazura, 2011). The risk of onchocercal blindness used to be very high along the rivers in focal areas where the vector breeds, and blindness could affect up to 50% of adults in the most endemic communities. The impact of blindness on a community is reflected in an increased mortality rate, mortality among blind people being four times higher than that of non-blind persons of the same age in a community (WHO, 1994). The fear of blindness resulted in depopulation of the fertile river valleys, and this made onchocerciasis a major obstacle to socio-economic development in West African savannah regions. The disease does not only hinder socioeconomic development but also affect both mental health and social acceptability leading to negative impact on quality of life (Vlassoff *et al.*, 2000).

The clinical symptoms associated with the diseases include papules, pruritus, ocular lesion, cataract, lizard and leopard skins among others. The nodules or papules are produced when the worms are immobilized in bony prominence long enough for them to be trapped by host cellular defence mechanisms. Reactions to dead microfilariae around these nodules may lead to several unpleasant conditions such as itching and skin depigmentation. Onchocerciasis does not directly cause death, but social and economic consequences can be devastating. According to WHO (2002) report, onchocerciasis has not caused a single death, but its global burden is 987,000 disability adjusted life years (DALYs). The severe pruritus alone accounts for 60% of the DALYs. Infection reduces the host's immunity and resistance to other diseases, which results in an estimated reduction in life expectancy of 13 years (Allen *et al.* 2008).

As a result of the pathology, epidemiology and socioeconomic impacts of onchocerciasis, several organizations such as National Onchocerciasis Control Program (NOCP), African Program for Onchocerciasis Control (APOC) in conjunction with World Health Organization (WHO) have adopted a control strategy for combating onchocerciasis, which relies mainly upon ivermectin (mectizan) treatment. This drug has an effective microfilaricidal action that could clear microfilariae from skin with minimum side effects (WHO, 1987; Campbell, 1991). The drug has been distributed massively on a single dose in endemic areas in Nigeria including the study area. Therefore, this study is undertaken to determine the prevalence of the disease in Imeri, an endemic community in Ondo State, Nigeria. Consequently, it evaluates the efficacy of the drug in the community.

## 2. Materials and Methods

The research was undertaken in Imeri Community, Ose Local Government Areas of Ondo State, an endemic community for onchocerciasis due to the presence of River Ose (breeding site for blackfly) that transverse the community. Prior to the survey, approvals for the study were obtained at the Ondo State Ministry of Health, Ose Local Government Area and community head. Similarly, informed consent of the respondents was obtained after focal group discussion in local language, where they were made to know the benefits and discomfort of their participation in the study.

194 participants of both sexes and not below 10 years of age who attended the community clinic were randomly selected for the study. Structured questionnaire was administered to obtain useful epidemiological information from the respondents. 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 placed immediately in 0.5ml normal saline in a microtitre plate and left for 4 hours to allow the microfilariae to migrate out of the tissues. The solution was centrifuged at 2000rpm, 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.

## 3. Results

Prevalence of onchocerciasis was expressed as the ratio of infected people to the total number of people examined in the community/group. The highest prevalence (66.7%) was found among the age group 71-80 years while no prevalence (0.0%) was recorded in the age group 81-90 (Table 1). The high prevalence recorded among the higher age groups (71-80 years) might be as a result of their frequent exposure to the vector (blackfly) as these age groups actively participate in activities such as farming, hunting, fishing and swimming more than other groups. These activities predisposed them to the disease. Prevalence of infection was low in retirees, artisans and students because they frequently visit the river compared to other groups. Most of the age group (71-80 years) where the highest prevalence (41.1 and 37.5%) was recorded during the study were adults who engaged in farming and hunting; activities which predispose them to infection. Some of the respondents in the age groups where the low prevalence was recorded actually testified to have been taking the drug (mectizan) for at least three years. Hence, they might formerly have been infected but the consistency and prolonged effect of the drugs might have reduced the load of the microfilariae in their bodies, although few of them still showed the clinical symptoms.

Of the 194 respondents examined for *Onchocerca volvulus*, 62 (32%) were positive while 132 (68%) were negative. Prevalence of onchocerciasis among the genders showed that the prevalence is slightly higher in the male gender (33.3%) more than the female gender (30.0%). This may be because the male genders engaged more in activities such as farming, fishing and lumbering which predisposed them to onchocerciasis. In addition, the female formed large percentage of the trader, housewives, and artisans, occupations that reduced their exposure to the disease. The provision of well water sited in the community might actually reduce the frequency of exposure of the female folk to the river to fetch water. This might also explain why the prevalence is a little bit lower among the female.

Table 1: Prevalence of Onchocerciasis among Different Age Groups in Imeri Community.

Age Group (Years)	Number Examined	Number Positive	Prevalence (%)
10-20	22	05	22.7
21-30	44	16	36.4
31-40	36	10	27.8
41-50	42	10	23.8
51-60	26	09	34.6
61-70	16	08	50.0
71-80	06	04	66.7
81-90	02	00	0.0
Total	194	62.0	32.0

Table 2: Prevalence of Onchocerciasis among Different Genders in Imeri Community.

Sex	Number Examined	Number Positive	Prevalence (%)
Male	114 (58.8%)	38	33.3
Female	80 (41.2%)	24	30.0
Total	194 (100.0%)	62.0	32.0

Table 3: Socio-economic Activities and Prevalence of Onchocerciasis in Imeri Community.

Activities	Number interviewed	Number Positive (%)	Prevalence (%)
Farmers	90	37	41.1
Traders	20	06	30.0
Retirees	08	02	25.0
Artisans	30	05	16.7
Hunters	08	03	37.5
Housewives	06	02	33.3
Students	24	05	20.8
Govt Employees	08	02	25.0
Total	194	62	32.0

#### 4.0 Discussions

River Ose, a flowing river that transverse the Ose LGA of Ondo State was identified as the source of infection in the study area as majority of the community depend on it for drinking, washing, farm irrigation and recreational activity such as swimming. Although, few wells (underground water) were encountered during the study but they are short lived which usually dried up during the dry season. Similarly, the predominant occupation in the community is farming and most farmers in the community take advantage of the lands that are closed to the river for their farming activities for ease of irrigation. This predisposed them to the disease as they were being bitten by the blackflies when farming.

It was generally observed that prevalence of the disease tends to decrease from age 21-50years while increase in prevalence was observed from age 51-80years (figure 1). Low prevalence was recorded in age 10-20 because this age group comprised mostly the school children which has little exposure to the river as they are not actively engaged in activities that can easily predispose them to the disease, although few that are positive became expose when battling in the river .slight increase in infection rate (36.4%)

recorded in age group 21-30years in this community is similar to the report by Umeh *et al.* (2010) who reported prevalence of 18.6%, 18.6% and 20.7 % as the highest age prevalence in age group 15-24years in Cross River, Taraba and Kogi respectively. Although, this finding was contrary to the reports of other authors (Adeyeba and Adegoke 2002; Wogu and Okaka, 2008), who reported that infection rates in Iwo LGA, Owan west LGA of Edo State, Cross River, Kogi and Taraba respectively increase with age. This suggests that infection rate is not necessary determined by age but by the degree of exposure to infection. Sex prevalence in the community is higher among the male than the female. This finding was in accordance with the findings of other authors (Adeyeba and Adegoke, 2002; Wogu and Okaka, 2008; Umeh et al. 2010). But contrary to the report of Ikechukwu *et al.* (2004) who reported that the sex prevalence in upper river basin in Imo State was not different among the gender. Prevalence of infection was found to be higher among the farmers (41.1%) and hunters (37.5%). This was in agreement with the finding of Ikechukwu *et al.* (2004), who reported prevalence of 46.6% among the farmers in Imo State. The total prevalence of infection (32%) in the community suggests that the community is hypo

endemic (16-39%) for the infection. Although, the community was formerly rated by Nigerian Onchocerciasis Control Programme to be meso endemic (40-59%) in 1995. This slight reduction in the prevalence might be as a result of the mass distribution of ivermectin in the community. Therefore, the results are suggestive of need to further increase intensive public enlightenment programmes, especially in local dialect, to educate the community about the aetiology of the disease, and also correct the myth about the drug (ivermectin) in order to eradicate the disease in the community.

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#### Corresponding Author's Address:

Afolabi Olajide Joseph  
Department of Biology,  
School of Sciences,  
Federal University of Technology Akure,  
P.M.B. 704 Akure, Nigeria.  
E-mail: [jideafo77@gmail.com](mailto:jideafo77@gmail.com)

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