

# HUMAN ONCHOCERCIASIS IN EKONG COMMUNITY AKAMKPA LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA.

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## ABSTRACT

The prevalence and intensity of onchocerciasis in Ekong Community of Akamkpa Local Government Area of Cross River State, Nigeria was investigated. A total of 316 subjects were screened for skin microfilariae (mf) and clinical manifestations, using standard parasitological and clinical methods of diagnosis. Two hundred and thirty-two (73.4%) of those examined were positive for *Onchocerca volvulus* microfilariae. Males (82.0%) were significantly ( $P < 0.05$ ) more infected than females (61.2%). Prevalence increased with age with older subjects ( $>30$ ) showing significantly ( $P < 0.001$ ) higher infection. The mean microfilariae density (MFD) was  $3.70 \text{mfmg}^{-1}$  of skin biopsy. It was significantly ( $P < 0.05$ ) higher in males ( $4.25 \text{mfmg}^{-1}$ ) than females ( $3.14 \text{mfmg}^{-1}$ ). The following clinical signs were observed; nodules (20.3%), leopard skin (15.8%), musculoskeletal pain (12.3%), pruritus (9.8%), eyes lesions (9.2%), lymphadenopathy (5.7%) and blindness (4.8%). Males had a higher (72.0%) prevalence of clinical signs than females (71.6%) but it was not statistically significant ( $P > 0.001$ ). The findings from this study will be of profound benefit in quantifying the effectiveness of the control programme going on in the state.

**Keywords.** Onchocerciasis, Epidemiology, Ekong, Cross River State, Nigeria

## INTRODUCTION

Human Onchocerciasis is a chronic parasitic disease due to infection by the filarial nematode, *Onchocerca volvulus*, whose adult cause the formation of subcutaneous nodules and shed microfilariae. In Nigeria, the disease is transmitted by blackflies of the species *Simulium damnosum* complex. It is a major public health problem and an obstacle to socio-economic development in Nigeria (Nwoke *et al.*, 1994). It has been estimated that there are currently about 7 million infected people in Nigeria, 40 million living at risk of infection in endemic areas and over 120,000 cases of blindness (WHO, 1987).

Although, some degree of endemicity and manifestations have been reported in several parts of Nigeria (Braide *et al.*, 1980; Nwoke 1986; Edungbola 1991; Akogun and Onwuleri 1991; Ufomadu *et al.*, 1992; Edungbola *et al.*, 1993; Oparachoa *et al.*, 2000). There is still paucity of data on the prevalence, geographical distribution and endemicity of the disease in most states of Nigeria. Prior to the initiation of control programme through ivermectin mass drug administration (MDA) in Cross River State, a rapid epidemiological survey for onchocerciasis was undertaken in 62 selected villages of the state (NOCP 1994). This survey relies on two major indicators, leopard skin and palpable nodules (WHO, 1995; Edungbola *et al.*, 1987). Incidentally Ekong community was not among the villages selected for this survey. Therefore, this research was carried out to enrich the baseline data on onchocerciasis infection in Cross River State. This will also evaluate as well as strengthen the ongoing Control Programme (mectizan distribution) by the National Onchocerciasis Control Programme (NOCP) and Africa Programme on Onchocerciasis Control (APOC) in Cross River State.

## MATERIALS AND METHODS

### The Study Area

Ekong is a community in Akamkpa Local government Area of Cross River State. It is located on latitude  $05^{\circ}22' \text{N}$  and longitude  $08^{\circ}37' \text{E}$  of the Equator. It belongs to the tropical rain forest zone, with an annual rainfall ranging from 1,052cm – 1,760cm. The main source of water is River Atimbo a

tributary of the Kwa falls. The river has pieces of rock which constitute the breeding sites of the *Simulium* species, the vector for onchocerciasis. The villagers which are mainly rural farmers, fishermen, hunters and palm wine tapers are continuously exposed to the bite of the blackfly.

### Data Collection

The survey was carried out between January – November 1999. The community was informed through the Local Government Chairman, Village Heads and Chiefs, about the purpose of the study. Houses to be sampled were randomly selected and numbered. Small cards bearing the house number were given to the occupants who reported with the numbers at the screening centre (Village Hall). Those that presented themselves for the study at the screening center were interviewed with a standardized questionnaire to obtain their personal data such as name, state of origin, age, occupation, sex and other information relevant to the study.

For each subject, physical examination was carried out privately for clinical signs of onchocerciasis such as characteristic onchocercal depigmentation, palpable and/or visible nodules, hanging groin, elephantiasis, pruritus and other onchodermatitis. Blindness was indicated in this study as the inability to quickly count fingers at 3 meters distance (WHO, 1995).

### Skin Biopsis

After physical examination of each subject, two skin snips were taken from the left and right iliac crest using sterilized 2.0 Holt-type Corneo scleral punch. Between sampling of each patient, the punch was sterilized through washing in a one in nine parts dilution of household bleach in distilled water and rinsed in the distilled water. It was further immersed in methylated spirit for one minute and thereafter allowed few second to dry before using it on another person. The skin snips were each placed in micro-litre plates containing 0.2ml of 0.85% normal saline solution and incubated for 18-24 hours to allow for maximum emergence of microfilariae. The positive biopsies were randomly selected and teased. Microfilariae per skin snip was then determined and counted.

### DATA ANALYSIS

Differences between proportion were tested using the

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Table 1: Overall Prevalence of onchocerciasis by Age and Sex in Ekong Community

Age years	MALE		FEMALE		M + F	
	No. Examined	No. (%) Positive	No. Examined	No. (%) Positive	No. Examined	No. (%) Positive
1-10	14	10 (71.4)	2	0 (0)	16	10 (62.5)
11-20	12	8 (66.7)	12	4 (33.3)	24	12 (50.0)
21-30	42	38 (90.5)	24	8 (33.3)	66	46 (69.7)
31-40	28	24 (85.7)	18	6 (33.3)	46	30 (65.2)
41-50	24	20 (83.3)	4	4 (100.0)	28	24 (85.7)
51-60	22	18 (81.8)	14	12 (85.7)	36	30 (83.3)
61-70	16	12 (75.0)	10	10 (100.0)	50	22 (84.6)
70+	24	20 (83.3)	50	38 (76)	74	56 (83.3)
TOTAL	182	150 (82.4)	134	82 (61.2)	316	232 (73.4)

Table 2: Intensity of infection among the 232 patients with microfilariae

Age Years	Mean Microfilariae Density (Mf/Mg) ± Standard Deviation		
	Male	Female	Total
1-10	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
11-20	2.25 ± 1.41	3.25 ± 0.32	2.75 ± 0.87
21-30	2.50 ± 2.31	3.63 ± 4.10	3.07 ± 3.21
31-40	4.25 ± 1.30	4.50 ± 1.01	4.38 ± 1.20
41-50	7.00 ± 3.11	4.13 ± 2.01	5.57 ± 2.56
51-60	7.75 ± 1.11	3.63 ± 1.01	5.69 ± 1.06
61-70	4.75 ± 0.22	3.50 ± 2.03	4.13 ± 1.13
71+	5.50 ± 1.24	2.50 ± 1.32	4.00 ± 1.28
Total Mean	4.25 ± 1.53	3.14 ± 1.69	3.70 ± 1.62

chi-square test ( $\chi^2$ ). Mean microfilarial density was determined as the arithmetic mean of the microfilarial counts among those infected.

## RESULTS

### Overall Prevalence

Of the 316 subjects examined by skin snipping, 232 (73.4%) were positive for *Onchocerca volvulus* microfilariae. Males 150 (82.0%), were significantly ( $P < 0.05$ ) more infected

than females 82 (61.2%). (Table 1). Infection rate increased significantly ( $P < 0.001$ ) with age.

### Intensity of Infection

The parasite load in this community was low. The overall intensity of onchocerciasis was 3.70mf per skin snip. Intensity was significantly ( $P < 0.05$ ) higher in males (4.25mf/skin snip) than females (3.14mf/skin snip). This increased significantly ( $P < 0.001$ ) with age (Table 2).

### DISTRIBUTION OF CLINICAL SYMPTOMS BY AGE AND SEX

The age related distribution of onchocercal skin lesions is shown in table 3. The clinical symptoms increased with advancing age. Leopard skin, lymphadenopathy and blindness were not recorded in the age groups 1-10 years and 11-20 years. The most frequent clinical sign was nodules (20.3%), followed by leopard skin (15.8%), eye lesions (9.2%), lymphadenopathy (5.7%) and blindness (4.8%). Out of the 226 clinical cases recorded, male subject had 131 (72.0%) and female subjects had 96 (71.6%). The sex related pathognomonic symptoms was not significant ( $P > 0.001$ ), Table 4.

## DISCUSSION

The result of this survey has established the presence of human onchocerciasis in Ekong Community of

Table 3: Age distribution of pathognomonic signs of onchocerciasis

Age Years	Nodules	Leopard Skin	Pruritus	Lympha-Denopathy	Musculo-Skeletal Pain	Eye Lesions	Blindness	Total
1-10	0 (0.0)	0 (0.0)	2 (12.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2
11-20	2 (8.3)	0 (0.0)	4 (16.7)	0 (0.0)	2 (8.3)	3 (12.5)	0 (0.0)	11
21-30	8 (12.1)	4 (6.1)	2 (3.0)	2 (3.0)	2 (3.0)	2 (3.0)	1 (1.5)	21
31-40	7 (15.1)	5 (10.9)	3 (6.5)	3 (6.5)	5 (10.9)	4 (8.7)	1 (2.2)	28
41-50	9 (32.1)	9 (32.1)	4 (14.3)	3 (10.7)	6 (21.4)	4 (14.3)	2 (7.1)	37
51-60	9 (25.0)	9 (25.0)	4 (11.1)	4 (11.1)	8 (22.2)	6 (16.7)	3 (8.3)	43
61-70	4 (15.4)	10 (38.5)	5 (19.2)	4 (15.4)	7 (26.9)	5 (19.2)	4 (15.4)	39
71+	5 (6.8)	13 (17.6)	7 (9.5)	2 (2.7)	9 (12.2)	5 (6.8)	4 (5.4)	45
TOTAL	64 (20.3)	50 (15.8)	31 (9.8)	18 (5.7)	39 (12.3)	29 (9.2)	15 (4.8)	226 (71.5)

Table 4: Sex distribution of pathognomonic signs of onchocerciasis

Sex	Nodules	Leopard Skin	Pruritus	Lympha-Denopathy	Musculo-Skeletal Pain	Eye Lesions	Blindness	Total
Male	28 (15.4)	31 (17.0)	21 (11.5)	11 (6.0)	15 (8.2)	16 (8.8)	9 (4.9)	131 (72.0)
Female	16 (11.9)	19 (14.2)	10 (7.5)	8 (6.0)	24 (17.9)	13 (9.7)	6 (4.5)	96 (71.6)

Cross River State, Nigeria, with an overall prevalence of 73.4% showing that the area is hyperendemic for the disease, hence the need to prioritize the targeting of this community for large scale Meclizan treatment. Similar results have been obtained by Nmorsi and Obiamiwe (1992), Akpan and Ngwu (2002) in Ondo and Cross River States respectively.

Males had a significantly higher infection rate than females. This result is similar to the findings of Nmorsi and Obiamiwe (1992), and Anosike and Onwuliri (1995). This contradicts the report of Onwuliri *et al.* (1987), Ufomadu *et al.* (1994) and Akogun *et al.* (1994), who reported equal prevalence of infection in both sexes in Savanna region of Nigeria. The reason they gave was that the activities (mainly fishing and farming) which expose the population to infection in these Savanna villages are carried out by both sexes. Whereas in the forest zone of Nigeria, our area of study, farming is performed by both sexes, but hunting, fishing, grazing of livestock and forest guards are exclusively performed by the men, which consequently increase their rate of exposure to blackly bites than their female counterparts.

It has been observed that onchocercal dermatitis, leopard skin, lizard skin, onchocercomata (nodules), lymphadenopathy and blindness are some of the clinical features of the disease, (Nelson, 1970; Buck, 1974). These onchocercal manifestations increased with advancing age with the older age group (30 years and above) showing obvious signs than the younger ones. This result agrees with the report of Buck (1974), Onwuliri *et al.* (1987), Nwoke *et al.* (1987) and Ufomadu *et al.* (1994) who worked at different parts of this country. Edungbola (1991) had reported that onchocercal lesions are usually associated with cases of long standing onchocerciasis. A high prevalence was recorded in children below 20 years. Most of the children interviewed claim that instead of going to school they farm, fish and hunt with their parents thereby exposing them to early bite of the fly vector.

There was a low mean microfilarial density. This very low intensity may be due to the mass treatment with ivermectin already going on in the village. It has been shown by Whitworth *et al.* (1996) and WHO (2001) that the effect of mass treatment is more significant on intensity of skin infection than on prevalence. Intensity was higher in males than females, an observation that is in consonance with the work of Brabin (1990) and Oparaocha *et al.* (2000). The degree and duration of exposure to infective blackfly bite might have accounted for this. The intensity also increased with age, but decreased after the age of 60 years. This may indicate the development of some acquired immunity which tends to limit the infection in older patients.

Total blindness the most serious clinical manifestation of onchocerciasis was seemingly low. Fifteen (4.8%) of the examined population were blind. The low blindness rate observed in this community might be due to the fact that forest strain of *Onchocerca volvulus* seldom causes blindness (Duke 1981).

Although all the subjects considered blind in this survey carried microfilariae of *Onchocerca volvulus* in their skin biopsies, other causes of blindness concurrent with onchocerciasis may be responsible. Therefore, there is need for indepth ophtamological survey to give the actual level of ocular involvement due to onchocerciasis in Cross River State especially in Ekong Community.

During this study, information received suggested that the villages in the study area, are aware of the nuisance of blackflies ("Mbotu-mbotu", local name) through intense biting especially during farming session. However, they did not indicate any knowledge of association between blackfly bites and onchocerciasis infection. Most elderly patients attributed the characteristics onchocercal depigmentation and dermatitis to old age while some implicated their enemies and gods of the land as causes of their ailment.

In view of the high endemicity of the disease in this community, there is an urgent need to prioritize this community for large-scale Ivermectin distribution to arrest the transmission of the disease and reduce its socio-economic burden on the people.

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