# EYE LESIONS AND ONCHOCERCIASIS IN A RURAL FARM SETTLEMENT IN DELTA STATE, NIGERIA

OPG Nmorsi[1], IAA Oladokun[2], OA Egwunyenga[3] and E Oseha[4]

[1]Zoology Department, Ambrose Alli University, Ekpoma, Nigeria; [2]Zoology Department, Ambrose Alli University, Ekpoma, Nigeria; [3]Zoology Department, Delta State University, Abraka, Nigeria; [4]Total Eye Care Clinic, Agbor, Nigeria

**Abstract.** A study of 326 volunteers from a rural farm settlement in Aniocha North, Delta State, Nigeria, was conducted between December 1999 and September 2000. Volunteers were screened for eye lesions and onchocerciasis. Microfilariae were found in the skin tissues of 134 (41.1%) inhabitants; of these, males had greater microfiladermia (49.9%) than females (33.3%). The percentage prevalence of the clinical signs of onchocerciasis in the farm settlement were: hanging groin 14.1%, onchocercal nodules 25.1%, onchocercal dermatitis 27.6%, scrotal enlargement 3.7%. The percentage prevalence of the eye lesions among those with onchocerciasis were: cataract 24 (7.4%), glaucoma 12 (3.7%), optic atrophy 2 (0.6%) and uveitis 18 (5.5%). Impaired vision was found in 80 (24.5%) inhabitants and blindness was suffered by 2(0.6%) inhabitants.

## INTRODUCTION

Onchocerciasis is a serious health problem in the tropics. Much has been published about the prevalence of this parasitic infections in Nigeria (Gemade and Dipeolu, 1983; Abbey and Abbey, 1992; Nmorsi and Obiamiwe, 1992a,b; Ufomadu *et al*, 1992; Nmorsi and Kio, 1994; Nmorsi *et al*, 1994; Nwoke *et al*, 1998; Abanobi *et al*, 1999; Akogun, 1999; Nwaorgu and Okeibunor, 1999). These studies produced data regarding the morbidity of onchocerciasis and described the diverse clinical manifestations in infected patients. In Africa, there are a number programs, such as the African Program for Onchocerciasis Control, the National Onchocerciasis Control Program (Nigeria) and the Onchocerciasis Control Program, that aim to control infection by distributing ivermectin to the inhabitants of those areas that are the foci of outbreaks of infection. Ivermectin is contraindicated in the treatment of very young children (0-4 years old).

Onchocerciasis may culminate in blindness. Certain eye lesions and causes of visual impairment are associated with onchocerciasis and contribute to the overall morbidity of the disease (Berghout, 1973; Anderson *et al*, 1976, Stilma *et al*, 1983; Marshall *et al*, 1986; Dadzie *et al*, 1990; Newland *et al*, 1991; Botto *et al*, 1997). Knowledge of eye lesions and the causes of visual impairment is imperative if control measures are to achieve the effective reduction of the overall morbidity and mortality associated with onchocerciasis. This paper aims to provide imformation on: (i) the prevalence of onchocerciasis among individuals of all age; the paper focuses on children of pre-primary school age in a farm settlement in Nigeria; (ii) the eye lesions that are associated with onchocerciasis; the paper highlights the causes of visual impairment in the area investigated.

Correspondence: Dr OPG Nmorsi, PO Box 902, Ekpoma, Edo State, Nigeria.

## MATERIALS AND METHODS

### Study area

The study was carried out in Philips Camp, a rural farm settlement situated on the banks of the Nigbiligba river in the Aniocha North area of Delta State, Nigeria. The settlement is located some 15 km from Asaba, the capital of Delta State, and lies at latitude 6ºN and

longitude 8ºE. The community lies within the rain forest belt of Southern Nigeria.

**Survey methods**

The study was carried out between December 1999 and September 2000. The investigation began with a community mobilization campaign; at the end of the campaign, 326 volunteers (158 males and 168 females) from the farm settlements were enrolled. Pre-designed questionnaires, indentifying age, sex, and occupation, were given to the volunteers; the information gained was then analysed. The male inhabitants were mainly subsistence farmers; some of the female adults were engaged in petty trading in addition to their farming activities. A general physical examination was conducted; a careful search for palpable nodules and skin lesions was made. Skin biopsies were taken from the suprailiac region using a Holth sclerocorneal punch. Biopsy material was transported to the Model Medical Diagnostic Laboratory, Agbor, Nigeria, for processing. The skin snips were weighed and incubated in buffered saline for 18-24 hours; the emerging microfilariae were counted and recorded as indicating onchocerciasis.

Ocular investigations were undertaken. Blindness and visual impairment were classified according to the WHO standard (1973).

The data obtained were subjected to statistical analysis using a chi-squared test and a correlation test.

RESULTS

The prevalence of microfilariae and the microfilarial skin tissues loading of the 326 inhabitants are presented in Table 1. One hundred and thirty-four (41.1%) of the study sample had microfilariae in their skin snips. There was an increase in both the prevalence of onchocerciasis and the microfilarial load that appeared to be age-related. The prevalence ranged from 28%-80% and the microfilarial load ranged from 4.9 mff/mg-40 mff/mg. The relationship between the mean prevalence rate and the microfilarial load was not significantly correlated ($r = 0.701 < 0.755$; $p < 0.05$).

More males than females harbored microfilariae (78/158 or 49.4% males; 56/168 or 33.3% females). This difference was statistically significant using the chi-squared test ($\chi^2 = 0.75 > 0.0039$, $p < 0.05$). The precentage prevalence of the clinical signs of onchocerciasis observed in this study were: hanging groin (14.1%), leopard skin (27.6%), onchocercal dermatitis (27.6%), onchocercal nodules (22.4%) and scrotal enlargement (3.7%) (Table 2). In all, the adults were more infected than the children and this difference was statistically significant using the chi-squared test ($\chi^2 = 26.973 > 1.15$; $p < 0.05$).

The prevalence rates of impaired vision and eye lesions among the onchocerciasis infected inhabitants are presented in Table 3. The percentage prevalence of the eye lesions

Table 1
The prevalence of microfilariae in the skin snips of the inhabitants according to age group.

| Age group in years | No. examined | Microfiladermia No. (%) | Microfilarial load (mf/mg) |
|---|---|---|---|
| ≤ 4 | 25 | 7 (28.0) | 4.9 |
| 5 - 15 | 33 | 7 (21.2) | 5.6 |
| 16 - 26 | 86 | 24 (27.9) | 12.3 |
| 27 - 37 | 74 | 28 (37.8) | 25.6 |
| 38 - 48 | 34 | 18 (52.9) | 36.0 |
| 49 - 59 | 54 | 40 (74.1) | 38.5 |
| ≥ 60 | 20 | 16 (80.0) | 41.3 |
| Total | 326 | 134 (41.1) | 165.1 |

Table 2
The prevalence of clinical manifestations in onchocerciasis among inhabitants.

| | Children | | Adult | | Total |
|---|---|---|---|---|---|
| | Male | Female | Male | Female | Both sex |
| No. examined | 40 | 48 | 118 | 120 | 326 |
| **Clinical parameter** | | | | | |
| Microfilarial prevalence | 8 (20.0) | 10 (20.8) | 70 (59.3) | 46 (38.3) | 134 (41.1) |
| Hanging groin | 4 (10.0) | 4 (8.3) | 24 (20.4) | 14 (11.7) | 46 (14.1) |
| Leopard skin | 0 (0) | 2 (4.2) | 56 (47.5) | 32 (26.7) | 90 (27.6) |
| Onchocercal nodules | 6 (15.0) | 5 (10.4) | 36 (30.5) | 26 (21.7) | 73 (22.4) |
| Onchocercal dermatitis | 6 (15.0) | 6 (12.5) | 56 (47.5) | 22 (18.3) | 90 (27.6) |
| Scrotal enlargement | 0 (0) | 0 (0) | 12 (10.2) | 0 (0) | 12 (3.7) |

Table 3
The prevalence of eye lesions and visual impairment among inhabitants with onchocerciasis.

| | Children | | Adult | | Total |
|---|---|---|---|---|---|
| | Male | Female | Male | Female | Both sex |
| No. examined | 40 | 48 | 118 | 120 | 326 |
| **Eye lesions and impaired vision** | | | | | |
| Impaired vision | 4 (10.0) | 2 (4.2) | 46 (38.9) | 28 (23.3) | 80 (24.5) |
| Glaucoma | 0 (0) | 0 (0) | 6 (5.1) | 6 (5.0) | 12 (3.7) |
| Cataract | 0 (0) | 0 (0) | 20 (16.9) | 4 (3.3) | 24 (7.4) |
| Optic atrophy | 0 (0) | 0 (0) | 0 (0) | 2 (1.7) | 2 (0.6) |
| Uveitis | 0 (0) | 0 (0) | 10 (8.5) | 8 (6.7) | 18 (5.5) |
| Blindness | 0 (0) | 0 (0) | 2 (1.7) | 0 (0) | 2 (0.6) |

were: cataract (7.4%), glaucoma (3.7%), optic atrophy (0.6%) and uveitis (5.5%). Impaired vision was reported in 80 (24.5%) inhabitants; two (0.6%) of the volunteers were blind.

## DISCUSSION

The prevalence of microfilariae among 41.1% of the volunteers amounted to that consistent with mesoendemic onchocerciasis as classified by the WHO (1985). Similar mesoendemic rates had been documented earlier (Edungbola *et al*, 1987; Nmorsi *et al*, 1994); these studies, in the same zoogeographical zone as that of our study, reported prevalence rates of 54.6% and 35.1% respectively. An important observation made in our study is the increase in both the prevalence rate of microfilariae and the microfilarial load with increasing age, a finding contrary to that reported in earlier work (Anderson and May, 1991; Nmorsi and Obiamiwe, 1992a,b; Nmorsi and Kio, 1994; Nmorsi *et al*, 1994; Hudson and Dobson, 1995) in which it was found that increasing age was associated with stablising (plateau) onchocerciasis, possibly as the result of enhanced immunity and reduced exposure. The increase in onchocerciasis with age reported in this study has also been documented in Venezuela (Botto, 1997). Exposure factors can be held largely responsible for this pattern of infection because the majority of the individuals in the settlement studied were farmers. Farming exposes people to an ongoing risk of *Simulium* bites and *Onchocerca volvulus* transmission

throughout their lives, irrespective of their age. Adult and male inhabitants, with greater exposure as a result of greater engagement in farming activities, have higher disease prevalence and greater microfilarial load.

Of epidemiological significance is the occurrence of onchocerciasis among the children of pre-primary school age (0-4 years) in the farm settlement. Because the use of ivermectin is contraindicated in children of this age, these patients will continue to contribute to an escalating community microfilarial load. The net effect is the continuation of this parasitic infection in an endemic zone. Every inhabitant in an onchocerciasis area is at risk – which is no doubt an important justification for the control programs which use ivermectin for the control of onchocerciasis. Previous reports (Anosike and Onwuliri, 1993; Nwaorgu and Okeibunor, 1999) support this assertion.

The association of the eye lesions and onchocerciasis reported in this study reflects that noted in studies conducted in other endemic zones in Africa (Berghout, 1973; Marshall *et al*, 1986; Newland *et al*, 1991; Potter, 1991; Umeh, 1999). The low level of occurrence of these eye lesions, blindness, and even some chronic clinical manifestations of onchocerciasis like scrotal enlargement and hanging groin, reported in this present study should be considered to be of public health significance because the socio-economic repercussions of these manifestations of onchocerciasis are considerable: infected farmers will not be as productive as they were and their income will decline.

Cataract, glaucoma and uveitis were relatively highly prevalent aside from onchocerciasis and can be considered as the major causes of visual impairment and loss of vision in the community that were studied. There is a need to incorporate the screening and treatment of eye lesions into the various onchocerciasis control programs in order to achieve an adequate reduction in the morbidity and mortality of onchocerciasis as soon as possible. Problems associated with the use of ivermectin, notably the contraindication to use in children of pre-school age, makes the search for an alternative drug more urgent. The search for new treatments should be regarded as a matter of priority because of the likely economic advantages of treating every inhabitant of a community at the same time.

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