

HUMAN ONCHOCERCIASIS IN IMO RIVER BASIN: A PREVALENCE SURVEY

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ABSTRACT

In a two year study of ten communities in Imo River Basin, Nigeria, 1126 (49.4%) of 2278 persons examined were positive for microfilariae of *Onchocerca volvulus*. Of the 1442 females examined by skin snip, 642 (44.7%) were infected while 484 (57.9%) of the 836 males were positive for onchocercal microfilariae. Male subjects had significantly ($P < 0.001$) higher infection rate than their female counterparts. Prevalence of human onchocerciasis was found to increase with advancing host age and reduced annual income level and occupations which expose subjects to vectors. Fishermen (62.7%), and Farmers (57.7%), were the most affected occupational groups. The epidemiological significance of these findings in terms of a more comprehensive chemotherapy with ivermectin tablets and community awareness of the disease etiology were highlighted.

Key words: Onchocerciasis, Prevalence, survey, Imo River Basin.

INTRODUCTION

Onchocerciasis, a chronic parasitic disease is a major public health problem in most tropical and subtropical countries of the world. About 18 million people are infected with the disease and 99% of these live in Africa (WHO, 1996). As a result of the serious adverse socio-economic impact and the high morbidity rate associated with the disease, the World Health Organization in collaboration with other United Nation agencies started an active onchocerciasis control programme in 1974.

In Nigeria the Federal Ministry of Health in conjunction with some non-governmental agencies have commenced a well planned programme for the control of onchocerciasis through ivermectin treatment. In view of the wide spread and high prevalence of the disease in the country, there is need for proper, thorough and detailed epidemiological study of all endemic communities, if the control programme is to achieve its desired aim. To this end, a lot of work have already been carried out on the epidemiology of onchocerciasis in this country (Edungbola, 1982; Edungbola & Asaolu, 1984; Nwoke *et al*; 1989, 1991; Akogun & Onwuliri 1991; Anosike & Onwuliri 1994, 1995).

However, due to the vastness of the country, her huge population and the numerous river courses (breeding sites of vectors), many endemic communities are yet to be identified and/or studied and this include some communities in Imo River Basin, Nigeria. This study was aimed at making a

detailed survey of the prevalence and distribution of onchocerciasis in these communities. The data will be of immense benefit in the evaluation of the control intervention already going on in the country. Ways through which the distribution of ivermectin will be enhanced will also be highlighted.

MATERIALS AND METHODS

The study area: The study was conducted in the rainforest zone of the Imo River Basin lying approximately between latitude $50^{\circ} 30' - 50^{\circ} 47'N$, and longitude $7^{\circ} 15' - 70^{\circ} 35'E$. The study area has an estimated area coverage of about 175sqkm. Two thickly populated local government areas were surveyed. These were - Ihitte Uboma Local Government Area of Imo State and Umuahia North Local Government Area of Abia State, Nigeria. The Imo River formed both the state and local government boundaries for these two areas. Together with its tributaries like Acha River to the West, and Eme River to the East, adequate water supply is maintained for the inhabitants who are mostly farmers. Local crops cultivated include yam, rice, melon, maize, cassava, okro, groundnut and fluted pimplkins.

The vegetational structure varies from tropical rain forest at the River Bank to derived savanna at the hinter land. The climate is tropical with temperature range of $19^{\circ}C - 38^{\circ}C$, and mean annual rainfall of approximately 2500mm. The average relative

humidity is about 80% and may reach up to 85% during the rains. Most part of the area is hilly.

Parasitological Examination

Two thousand, two hundred and seventy-eight subjects from 7 communities in Ihitte-Uboma L. G. A. and 3 communities in Umuahia North L. G. A. were examined. All the ten communities were located at distance of 1km-6Km from fast flowing rivers and streams. Name, sex, age, occupation and distance of residence from the nearest infection foci for each subject were recorded. Subjects were equally asked to give an estimate of their annual income judging from sales of farm products or/and salaries. Thereafter the sites to be snipped were thoroughly swabbed with methylated spirit. Two bloodless snips were taken from the left and right iliac crest of each subject with a Cornea-scleral punch with a 2mm bite. The scleral punch was completely sterilized through flaming before using it on another person to avoid transmission of infectious disease agents from one person to another. Each skin snip was placed in microtitre plate containing three drops of 0.85% physiological saline. Filled wells were later covered with adhesive tape to prevent evaporation and spillage. These were incubated at room temperature for 24 hours after which they were fixed with formalin solution (40% formal-dehyde solution) by addition of a drop of solution per micro-titre well. The biopsies were examined using dissection microscope and positive ones were identified, recorded and microfilariae counted. Some of the biopsies were later randomly collected, dried, fixed in methylalcohol and finally stained with Giemsa stain. These were observed under oil immersion objectives to confirm the species of microfilaria morphologically.

RESULTS

Prevalence of Human Onchocerciasis By Communities:

Ten communities were surveyed in Imo River Basin (Table 1). Of the 2278 persons examined, 1226 (49.4%) were infected. Highest infection rates of 65.8% and 62.2% were recorded in Okata and Uzinomi communities respectively, while Umule (35.1%), had the least. Prevalence varied significantly ($P < 0.05$) among the communities.

Sex-Related Prevalence of Human Onchocerciasis:

The Sex-related prevalence of human onchocerciasis (Table 2), shows that of the 835 males examined, 484 (57.9%) were infected. The highest prevalence was recorded in Abueke (85.3%), followed by Uzinomi (68.7%) and Okata (66.6%), while the least was in Umuoma (28.5%). On the other hand, 642 (44.7%) of the 1442 females examined were infected. Okata (65.3%), recorded the highest, followed by Uzinomi (58.7%) and Abueke (50.4%) with Nkwogwu having the least (30.0%). More males (57.7%), were infected than

Table 1: Prevalence of Human Onchocerciasis by Communities in Imo River Basin.

Community	No. Examined	No. Infected	Prevalence (%)
Onicha	140	64	45.7
Ezimba	384	102	50.0
Okata	164	108	65.8
Uzinomi	198	122	62.2
Awuchinuno	346	138	39.9
Umuoma	248	92	37.0
Abueke	328	204	62.1
Ofeme	188	94	50.0
Umuhu	96	46	47.9
Nkwogwu (Umule)	188	66	35.1
Total	2278	1126	49.4

Table 2: Prevalence of Human Onchocerciasis by Sex in Communities in Imo River Basin.

Community	Males		Females		Total	
	No Examined	No (%) Infected	No Examined	No (%) Infected	No. Examined	No. (%) Infected
Onicha	60	34 (56.6)	80	30 (37.5)	140	64 (45.7)
Ezimba	160	104 (65.0)	224	88 (39.2)	384	102 (50.0)
Okata	60	40 (66.6)	104	68 (65.3)	164	108 (65.8)
Uzinomi	70	48 (68.5)	128	74 (58.7)	198	122 (62.2)
Awuchinuno	122	52 (42.6)	224	88 (38.4)	346	138 (39.9)
Umuoma	56	16 (28.5)	192	76 (39.5)	248	92 (37.0)
Abueke	82	70 (85.3)	246	134 (54.5)	328	204 (62.1)
Ofeme	82	54 (67.4)	106	40 (42.5)	188	94 (50.0)
Umuhu	56	30 (53.5)	40	16 (40.0)	96	46 (47.9)
Nkwogwu (Umule)	88	36 (40.9)	100	30 (30.0)	188	66 (35.1)
Total	836	484 (57.9)	1442	642 (44.5)	2278	1126 (49.4)

Table 3: Overall Prevalence of Human Onchocerciasis in relation to Age in the Study Area.

Age Group	Number Examined	Number Infected	% Infection
10-19	412	156	37.8
20-29	200	64	32.0
30-39	378	176	46.5
40-49	516	286	55.4
50+	772	444	56.9
Total	2278	1126	49.4

Table 4: Prevalence of Human Onchocerciasis in Relation to Occupation in the Study Area.

Occupation	Number Examined	Number Infected	% Infection
Farmers	1376	792	57.6
Traders	170	62	36.4
Students	460	168	36.5
Civil Servants	240	84	35.0
Fishermen/White Sand Diggers	32	20	62.5
Total	2278	1126	49.4

females (44.7%) ($X^2 = 37.9$; $P < 0.001$) in the study area.

Age-Related Prevalence of Human Onchocerciasis:

Table 3 illustrated the prevalence and distribution of human onchocerciasis among the different age groups. Subjects within the age group of 50 and above had the highest prevalence (56.9%) while those of 20-29 years of age had the least (32.9%). There was a fairly steady increase of prevalence rate with advancing host age (Table 3). A 2-way ANOVA revealed that prevalence varied significantly ($P < 0.05$) among the age groups.

Occupation Related Prevalence of Human Onchocerciasis

The prevalence of human onchocerciasis did not show uniformity among the various occupational

Table 5: Annual Income Level Related Rate of Infected Persons in Imo River Basin

Income Level	No. Examined	No. Infected (%)
₦50,000 - ₦10,000 P. A.	911	510 (56.0)
₦10,100 - ₦20,000 P. A.	607	310 (51.1)
₦21,000 - ₦50,000 P. A.	456	200 (43.9)
₦50,100 - P. A.	304	106 (34.9)
TOTAL	2278	1126 (49.4)

categories (Chi-squared test = 100.533; df = 4; $P < 0.001$). Fishermen/White Sand diggers and farmers were the most affected occupational groups, recording prevalence of 65.7% and 57.7%, respectively. Students (36.5%), and civil servants (35.0%) were all moderately infected (Table 4).

Annual Income Level Related Prevalence Of Human Onchocerciasis:

Annual income level-related prevalence presented in Table 5, indicated that subjects with annual income of between ₦50 - ₦10,000 had the highest infection rate (56.0%), while those earning ₦50,100 and above recorded the lowest infection rate (34.9%). Variation in prevalence rate within the different groups was significant ($X^2 = 40.12$; df = 3; $P = 0.001$).

DISCUSSION

The present investigation confirms the existence of human onchocerciasis in communities within the Imo River Basin of Ihitte Uboma and Umuahia North Local Government Areas of Imo and Abia States, respectively. Going by the accepted definition of levels of endemicity outlined by WHO (1966), the area is meso-endemic for onchocerciasis. The prevalence is higher than some of those obtained by earlier workers (Nwoke 1986; Nwoke *et al.* 1994; Anosike and Onwuliri 1994, 1995). According to Edungbola *et al.* (1993), at that level of endemicity, the communities will experience the highest risk of blindness with the highest morbidity prevalence particularly among the economically active adults. The hyperendemic levels of endemicity observed in O

Okata, Uzinomi and Abueke communities is not surprising since these areas have in common, fast flowing rivers, with majority of the people (males and females) being farmers. The farming activities carried out near the water courses expose the people to much contacts with infective flies. Thus according to De Sole *et al.* (1991); onchocerciasis is a local disease depending on the presence of specific ecology, including among others, fast flowing waters and characteristics of the vectors involved in the transmission.

The prevalence of human onchocerciasis was significantly higher in males, adults, fishermen and farmers than in females, adolescents, and those of other occupational groups respectively. This is in line with the observations of some earlier workers (Onwuliri *et al.*; Akogun & Onwuliri, 1991; Anosike, 1992). People whose daily activities expose them to

frequent visits to water bodies are more exposed to greater number of man-vector contacts. In most villages, farming activities are undertaken on a greater scale by the males subsequently they become more infected. Adults similarly have higher infection rates because farming and other activities requiring visits to water bodies, are maintained throughout life in rural communities. The rise in prevalence with increasing host age is therefore not unexpected. Thus Nwoke (1986) and Onwuliri and Anosike (1989), among others have shown that onchocerciasis infection rate increases gradually with increasing host age in various bio-climate zones in Nigeria. Annual income level related-prevalence rate was found to increase with reduced annual income level. Aside from variation in occupation, behavioural differences between the high and low income earners may have accounted for the marked differences. In rural communities-like the surveyed area, high income earners hardly spend much time in their farm lands. Most of them hire labourers to work for them. This attitude reduces contacts with the vector fly. Probably too, high income earners go for treatment earlier to check infection progression from the on-set. A study on the socio-economic impact of onchocerciasis carried out around this same time showed that most of the poor farmers neglected their plight and refused medical treatment because of lack of fund (Oparaocha, 1999).

The present result indicates a pronounced human onchocerciasis problem among the inhabitants of Ihitte-Uboma and Umuahia North Local Government Areas. Although the control programme through mass ivermectin distribution has started in these areas, more effort is needed in the area of co-ordination and/or integration of the local people so as to achieve proper coverage and sustained distribution of the tablets. Health education need to be incorporated into the programme so as to achieve a maximum success. Another survey made later in this area showed that the treatment coverage was very low (Oparaocha, 1999). The people are still very ignorant of the etiology, symptomatology and the complications of the disease. Mobilization, publicity and community co-ordinated distribution of the drug, as well as a planned health education for the masses must be emphasized.

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