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HUMAN FILARIASIS IN TWO FOREST VILLAGES IN MANIEMA (KIVU, ZAIRE)

by

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Summary — Human filariasis was studied in two typical miners' village in the forest zone of Maniema, Kivu, Zaïre. *Onchocerca volvulus* was present in 67 per cent of 465 people over age 15, *Dipetalonema perstans* in 42 per cent of 818 individuals of all ages and *Loa Loa* in 11 per cent. *D. streptocerca* was not found. *Wuchereria bancrofti* was not searched for, but probably does not exist in the area. The prevalences of *O. volvulus* and *D. perstans* increase gradually with age; for *L. loa* there is a sharp increase in prevalence after the age of 30. *O. volvulus* and *L. loa* are more frequent in men than in women. The morbidity of *O. volvulus* is limited to few and small nodules, which are only frequent in males older than 50. Eosinophilia was high in all age groups (overall mean : 15 per cent), but shows no relationship to any filarial infection.

KEYWORDS : Filariasis, Epidemiology; *Onchocerca volvulus*; *Loa loa*; *Dipetalonema perstans*; Maniema, Zaïre.

Introduction

The occurrence of *Onchocerca volvulus* and *Loa loa* and, to a lesser extent, *Dipetalonema perstans, D. streptocerca* and *Wuchereria bancrofti* has been described or reported in many parts of Zaire (4, 5, 7, 8, 13).

The Kivu province and the vast forest area of Maniema in particular, however, have largely remained virgin spaces on the distribution maps. We studied the presence of human filariae in two typical miners' villages in the Maniema forest, while performing a more general parasitological and clinical survey focused on schistosomiasis (Gryseels & Polderman, *in preparation*).

Area and population

The northern part of Maniema is a hilly region (altitude 800-1,000 m), covered by the south-eastern part of the Central African primary forest. Tin mining is the main economic activity; company settlements are scattered throughout the forest. In these villages, company workers live with

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their families close to the open exploitation fields. Adult males work for the company, most of them as labourers; women and children work on fields in the forest and do some fishing. The study was carried out in Makundju and Massimelo, two similar villages (except for the endemicity of schistosomiasis), separated by about 30 km of forest (11). Allmost all inhabitants belong to the local Warega tribe and have always lived in the area. All families on the company roll participated in the study, which took place in August and September 1980.

Methods

Of all persons older than 15, a $\pm$ 1 mm^2 skin snip, taken with a scalpel at the right iliac crest, was examined. Results were expressed in semi-quantitative terms (0; +:1 to 10 worms; ++:11 to 30 worms; +++:more than 30 worms). A random sample of about 25 per cent of the slides and all +++ slides were afterwards stained with Giemsa and re-examined.

Of all individuals (all ages), two Giemsa-stained thick blood smears and a May-Grunwald-stained thin blood smear, taken at daytime, were examined at 100, 400 and 1,000$\times$ magnification.

(Relative) eosinophilia was determined by counting eosinophiles in 100 leucocytes in the thin smear.

Nodules were searched for by palpating all susceptible regions of the body of people over 15 years of age.

As part of the general morbidity survey, each individual was submitted to an « open » case history and a clinical examination.

Results

No significantly different results for filariases were obtained in the two villages; therefore, the results will be presented as a whole.

The prevalences of detected filariae and their distribution by age and sex are presented in figures 1-3.

Onchocerca volvulus (Fig. 1) was present in 67 per cent (310/465) of the individuals older than 15. The prevalence and the intensity of infection increase with age (up to 90 per cent in the older than 50), and are higher in men (80 per cent) than in women (50 per cent).

No *Dipetalonema streptocerca* were discovered, neither in the fresh nor in the stained skin snip slides.

Dipetalonema perstans (Fig. 2) was present in 42 per cent (342/818) of the population. The prevalence and intensity of infection increase gradually with age, from 8 per cent in the under 5 to 77 per cent in the older than 50.

Loa loa (Fig. 3) was found in 11 per cent (89/818) of the population. The prevalence is low in people younger than 30, but increases sharply in older adults. Men (12 per cent) are more frequently infected than women (7 per cent).

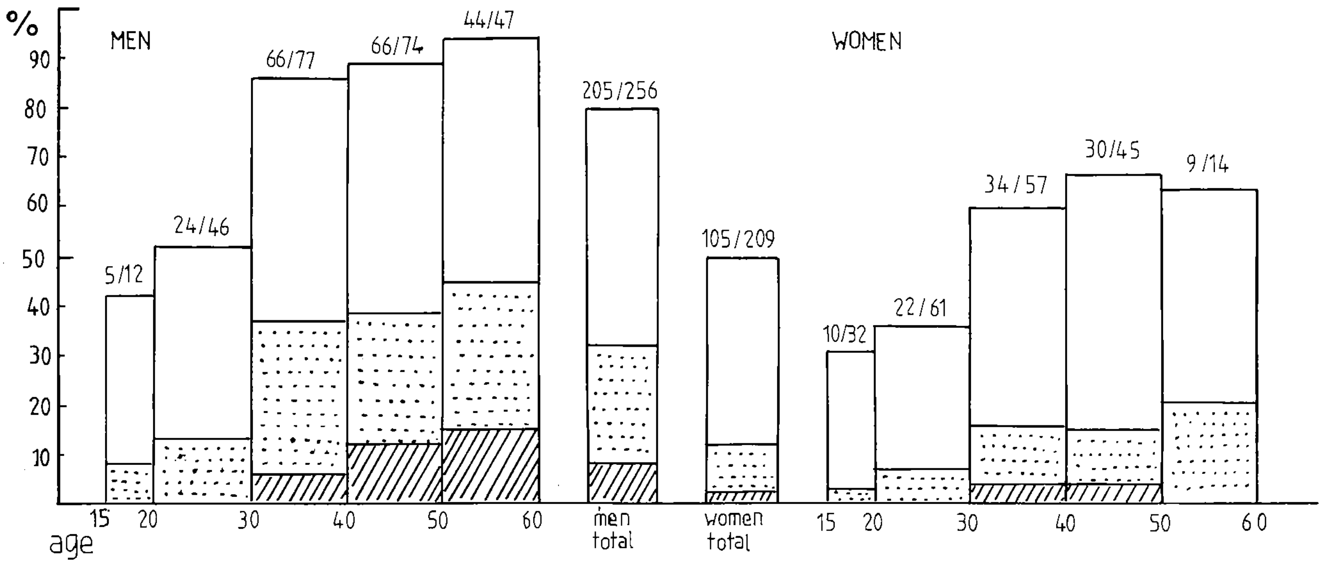

Figure 1.
Prevalence and intensity of infection with *Onchocerca volvulus*, according to age and sex.

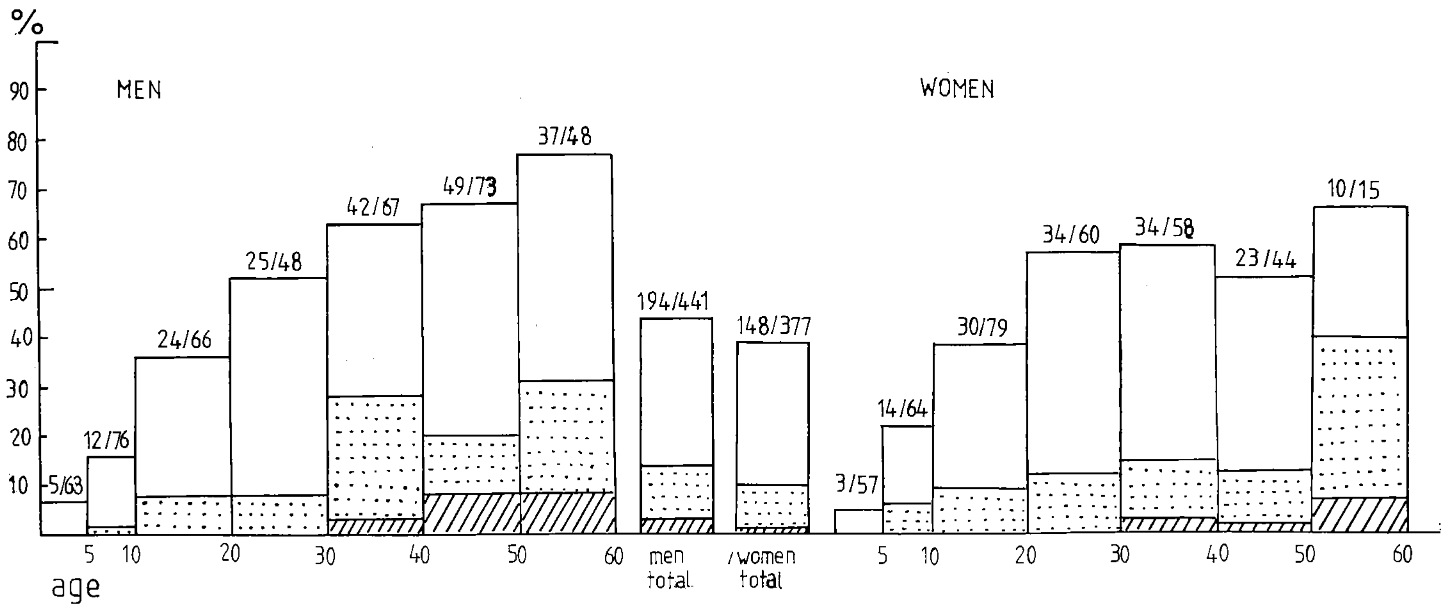

Figure 2.
Prevalence and intensity of infection with *Dipetalonema perstans*, according to age and sex.

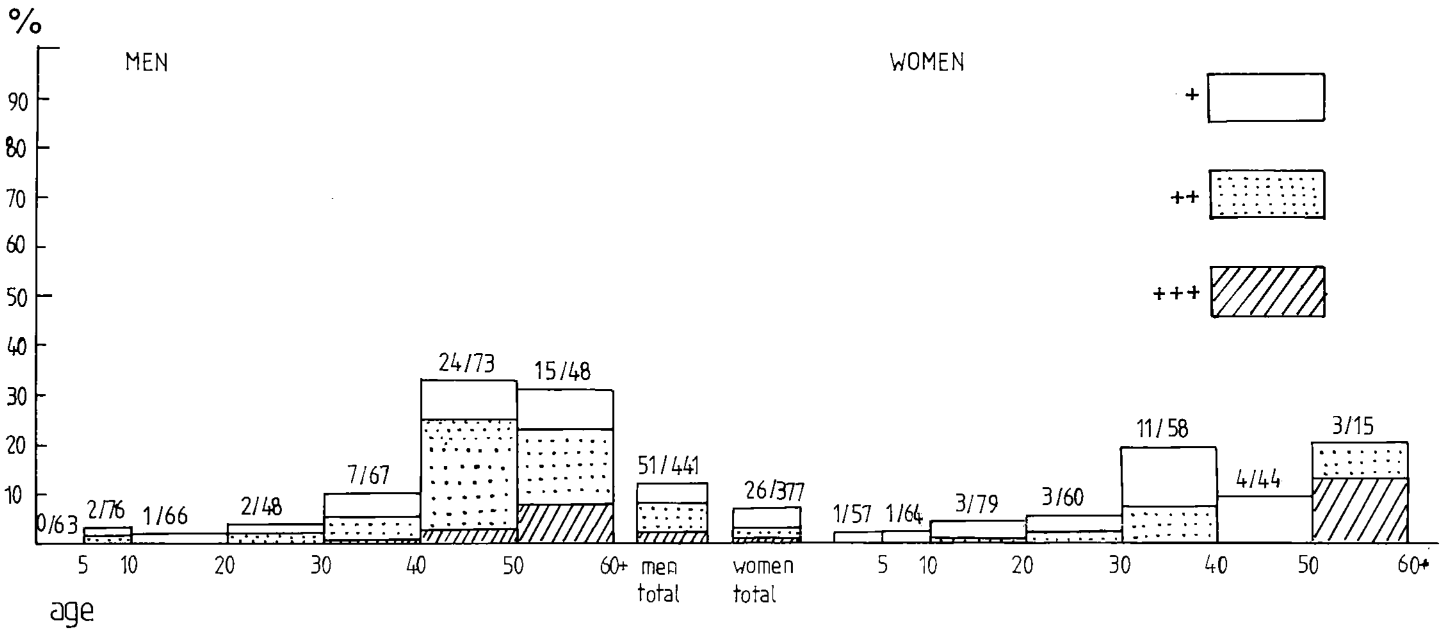

Figure 3.
Prevalence and intensity of infection with *Loa loa*, according to age and sex.

Nodules were palpated in 11 per cent (51/465) of the individuals older than 15 (Table 1). All of them were carriers of *O. volvulus,* but only 17 per cent of skin snip-positive individuals showed nodules. Most of the nodules were small (up to 3 cm in diameter) and few (up to 5 per individual), and situated on the lower part of the body. They were much more frequent in men (17 per cent) than in women (4 per cent), and especially frequent in males older than 50. In this group, the relation with intensity of infection is also the most apparent.

TABLE 1
Nodules and onchocerciasis

Men		Age 15-30	31-40	41-50	+ 50	Total	
Skin snip	0	0/29	0/11	0/ 8	0/ 3	0/ 51	(0 %)
	+	0/21	4/37	8/33	6/23	18/114	(16 %)
	++	0/ 8	4/24	5/20	8/14	17/ 66	(32 %)
	+++	0/ 0	1/ 5	1/13	6/ 7	8/ 25	(32 %)
	total	0/58	9/77	14/74	20/47	43/256	
		(0 %)	(12 %)	(19 %)	(43 %)	(17 %)	

Women		Age 15-30	31-40	41-50	+ 50	Total	
Skin snip	0	0/61	0/23	0/15	5/ 5	0/104	(0 %)
	+	2/27	3/25	2/23	1/ 6	8/ 81	(10 %)
	++	0/ 5	0/ 7	0/ 5	0/ 3	0/ 20	(0 %)
	+++	0/ 0	0/ 2	0/ 2	0/ 0	0/ 4	(0 %)
	total	2/93	3/57	2/45	1/14	8/209	
		(2 %)	(5 %)	(4 %)	(7 %)	(4 %)	

Chronic itching (Table 2), sometimes with noticeable skin alterations, was mentioned by 9 per cent of the population. No relationship with the presence and intensity of infection with *O. volvulus* could be demonstrated.

TABLE 2
Chronic itching and onchocerciasis

Result of the skin snip	Subjects examined	Subjects mentioning itching	% mentioning itching
0	135	12	9
+	200	20	10
++	84	8	10
+++	26	2	8
Total	445	42	9

Sight impairment was mentioned by only one 60 year old man, with corneal lesions not compatible with onchocerciasis. Hospital records and experience gathered over the years (J.P.M.) give no evidence of serious ocular onchocerciasis in the area.

Elephantiasis and *lymfoedema* have not been observed.

Eosinophilia was generally high in all age groups (Table 3), with an overall mean of 15 per cent. Of 757 people examined for eosinophilia, 452 (60 per cent) had an eosinophilia of more than 10 per cent, 204 (27 per cent) of more than 20 per cent and 40 (5 per cent) of more than 40 per cent. No relationship to the presence of filarial infections can be shown (Table 4); further analysis by age and sex, and for the different combinations of filarial infections yielded no other results.

TABLE 3
Mean values of relative eosinophilia

	Age						
	1-20	11-20	21-30	31-40	41-50	+ 50	Total
M.E.	11.0	15.5	18.6	18.2	17.3	17.1	15.1
n	245	127	101	121	105	58	757

M.E = mean eosinophilia; n = number of people examined.

TABLE 4
Eosinophilia in relation to presence of filarial infection

	Absence/presence of					
	O. volvulus		*D. perstans*		*L. loa*	
	0	+	0	+	0	+
M.E.	17,3	17,9	14,6	15,2	16,8	17,9
n	150	189	441	316	216	52
(Age)	(over 15 years)		(all ages)		(over 30 years)	

Discussion

Onchocerca volvulus is endemic in many savanna and forest areas in Zaire (1, 4, 5, 6, 8, 9, 12, 14). In Maniema, a focus has been described in the southern savanna part (Kasongo) (2) but little or nothing is known about the occurrence of onchocerciasis in the vast forest covering the greater part of eastern Zaire. In our study population, *O. volvulus* is highly endemic; given the insensitivity of one single skin snip, virtually all adults may be considered as infected. Undoubtedly, a similar situation exists in many other villages in the area.

Although the prevalences found in this study rank among highest recorded in Zaire, the pathological consequences of the infection seem much less important than in other foci : not only the savanna focus of the Kasai (14), as could be expected (10), but also the forest foci of the Cuvette Centrale (1, 5). However, more active ophtalmological research is needed to confirm this observation.

The gradual increase of the prevalence with age and the higher figures for men than for women are characteristic for the infection (10).

Simulium damnosum is easily observed along the swift forest rivers. There is little doubt that the population is exposed to transmission from early childhood on, and accumulates parasites during its whole lifespan. The second observation is more difficult to explain; though it should be worthwile to investigate whether some of the exploitation canals promote the breeding of *Simulium,* it is unlikely that the adult men are exposed to transmission on the sun-baked, open mining fields. Possibly, their walk to work through the forest, at dawn and in the evening, plays a more important role.

The distribution of *Loa loa* in Zaire has been reviewed by Fain (3) and Hawking (7). The former author suggests that this parasite « probably » exists in Maniema, which is confirmed by our study. The prevalences are comparable to those in the forest area of Mayumbe in Lower Zaire (4).

The occurrence of *Dipetalonema perstans,* a supposedly harmless parasite, is seldomly explicitly described, but is believed to be widely distributed all over Zaire (7, 13). According to our results, it is indeed highly endemic in at least part of Maniema. Even more so as for *O. volvulus,* the distribution of infections in the population demonstrates a slow accumulation of parasites over the years.

The absence of *Dipetalonema streptocerca* in the skin snips was confirmed by the control of the large sample of stained slides. Fain, cited by Hawking (7), believes that this parasite is unfrequent at high altitudes as in Maniema.

As no thick smears were taken at night, we have no data on *Wuchereria bancrofti* infections. According to clinical data, this parasite seems to be at least unfrequent in the area.

Although eosinophilia is frequent in this population, no relation to the presence of filarial infection could be shown. These people are heavily polyparisitised with intestinal nematoda and *Schistosoma mansoni;* it may be difficult to relate the eosinophilia to any single factor. Its diagnostic value for filariasis in endemic areas must certainly be questioned.

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Les filarioses humaines dans deux villages forestiers au Maniéma (Kivu, Zaïre).

Résumé — Nous avons étudié les filarioses humaines dans deux villages miniers typiques dans la zone forestière du Maniéma, Kivu, Zaïre. *Onchocerca volvulus* a été trouvé chez 67 p. cent de 465 sujets de plus de 15 ans, *Dipetalonema perstans* chez 42 p. cent de 818 sujets de tout âge et *Loa loa* chez 11 p. cent. *D. streptocerca* n'a pas été trouvé; *Wuchereria bancrofti* n'a pas été recherché activement mais sa présence est peu probable. Les prévalences de *O. volvulus* et de *D. perstans* augmentent progressivement avec l'âge; pour *L. loa* il y a une augmentation brusque après l'âge de 30 ans.

La morbidité d'*O. volvulus* est limitée à des nodules peu nombreux et peu importants qui ne sont fréquents que chez les hommes de plus de 50 ans. L'éosinophilie est élevée dans tous les groupes d'âge (moyenne 15 p. cent), mais il n'y a aucune relation avec la présence d'infection filarienne.

Menselijke filiariasis in twee mijnwerkersdorpen in Maniema (Kivu, Zaïre).

Samenvatting — Menselijke filariasis werd bestudeerd in twee typische mijnwerkersdorpen in Maniema, Kivu, Zaïre. *Onchocerca volvulus* werd gevonden in 67 ten honderd van 465 personen ouder dan 15, *Dipetalomena perstans* in 42 ten honderd van 818 mensen (alle leeftijden) en *Loa loa* in 11 ten honderd. *D. streptocerca* werd niet aangetroffen; *Wuchereria bancrofti* werd niet aktief gezocht maar bestaat waarschijnlijk niet in deze streek. De prevalenties van *O. volvulus* en *D. perstans* nemen geleidelijk toe met de leeftijd; voor *L. loa* is er een plotse toename na de leeftijd van 30 jaar. *O. volvulus* en *L. loa* zijn frequenter bij mannen dan bij vrouwen.

De morbiditeit van *O. volvulus* is beperkt tot weinig talrijke, kleine noduli die enkel frequent zijn bij mannen ouder dan 50 jaar. De eosinophilie was hoog in alle leeftijdsgroepen (gemiddeld 15 ten honderd), maar toonde geen verband met de aanwezigheid van filariasis.

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