

Original article

Assessment of the infection rate of onchocerciasis in the resettled and indigenous communities of Asossa, Western Ethiopia

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Abstract: An attempt was made to determine the infection rate of onchocerciasis in the resettled and indigenous communities of Asossa. A total of 931 persons consisting of 548 settlers and 383 indigenous population, aged five years and over were examined parasitologically for the presence of *Onchocerca microfilaria* in a skin snip, and 11.1% of the resettled population and 31.3% of the indigenous population were found infected with the parasite. The total mean number of microfilariae per mg of skin snip at the buttock was 15.3. The clinical manifestations recorded include skin atrophy, skin depigmentation, pruritus and presence of nodules at a rate of 15.5%, 20.4%, 44.8%, and 1.7%, respectively, among the positives. No visual impairment difference between the positives and negatives was seen and blindness due to onchocerciasis was not detected. Blackfly collection and identification around the near-by rivers indicated the presence of the anthropophilic vector *Simulium damnosum* s.l. The results recorded for the resettled communities clearly indicated disease propagation in the resettled population who came from areas of the country non-endemic for onchocerciasis in 1984. [Ethiop. I. Health Dev. 1996;10(2):89-95]

Introduction

Studies done in Ethiopia have shown the endemicity of onchocerciasis which is caused by the filarial worm *Onchocerca volvulus*(1-4). The distribution of the disease covers savannah and forest ecology of the southern, south-western, northern and north-western Ethiopia extending from the Omo valley in the south to Atbara and Taccaze drainage systems in the north bordering the Sudan(5). It covers about one fifth of the country , affecting an estimated over one million people(6-8). Up to now, 29 *Simulium* species are recorded in the country and *Simulium damnosum* s.l., and *Simulium ethiopiense* are said to be the vectors of onchocerciasis(9).

Principal publications on onchocerciasis in Ethiopia are all dealing with the south-western and southern focus. Point prevalence studies have been made in the south-western (10-12), western(13) and north-western(14) parts of the country .However, as to the western side of the boarder, the potential endemic areas of the western lowland parts of Ethiopia, such as in Asossa, there were no reported cases or prevalence studies. From the point of view of an active migrant labour force movement to and from for construction and development projects and resettlement population movements to Asossa from non-endemic and endemic neighbouring areas, back-ground information on endemicity and transmission studies of onchocerciasis becomes necessary . Therefore , in this study an attempt was made to determine the endemicity of the disease and to compare the infection rates in the indigenous and resettled population around Asossa, western Ethiopia.

Methods

Study area. Asossa is 750km from Addis Ababa, with an average altitudes of 1400 mts above sea level. It is situated on the western side within the onchocerciasis belt of Ethiopia (Fig.1). It borders

the Sudan on the eastern side and its vegetation is typically to that of Sudan-savannah semi-arid acacia vegetation. As in most

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of the country, there is rain during the two rainy seasons. Two fast-flowing rivers, Dabus and Hoha, also flow through this area.

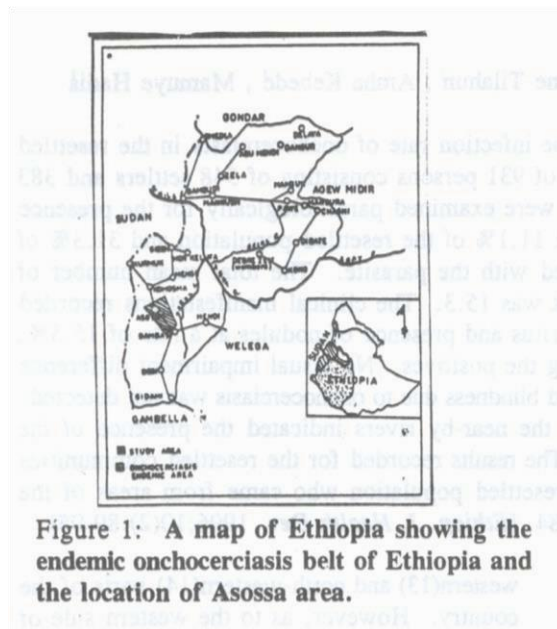


Figure 1: A map of Ethiopia showing the endemic onchocerciasis belt of Ethiopia and the location of Asossa area.

The indigenous population includes the native Beneshangul ethnic group residing in small patchily distributed villages. The resettled Amhara and Tigre nationalities who came in 1984 from famine-stricken regions of Wollo and Tigray resettled in 56 resettlement villages (Menders), constitute an estimated population of over 55000 people (Relief and Rehabilitation Commission, 1993 personal communication). The main occupation of the population is subsistence agriculture and trade.

Sampling. All resettlement Menders and previously existing villages with the indigenous population around Asossa were surveyed for their accessibility and nearness to the river banks. Ten villages, five from the resettlement and five from the indigenous, were randomly selected. After obtaining an oral consent from the community leaders and the study subjects, a randomly selected sample population, aged five years and over from the different age group and sexes was chosen (15). Name, sex, age, locality, birth place and duration of stay at the present address (to differentiate from the indigenous population) were recorded on a personal recording sheet.

Physical and parasitological examination. After removal of all clothing, each person was examined for the presence of nodules, atrophied and depigmented skin, and pruritus. A skin snip was taken from the left and right buttock using an individual disposable sterile needle and scalpel blade following the recommendations of Oomen(1) and Seyoum Tatischeff et al(11). The skin snips were weighed on a torsion balance and the specimen was then put into a drop of normal saline in wells of a microtiter plate and, 30 minutes later, the emerging microfilariae (mf) of *O. volvulus* were counted under a microscope at 40x magnification.

Infection with *O. volvulus* was diagnosed when mf of *O. volvulus* were found in the skin snips. Study subjects were treated for various minor ailments and onchocerciasis positive patients were treated with ivermectin (MectizanR) (150 ug/kg body weight).

Vision testing. An illiterate E-chart with all gradations was used and ability to see at 6 meters for visions of 6/60 and 6/18 were recorded(15). Worse visions were tested at 3 meters but ocular examination was not conducted. Blindness was defined as vision of less than 3/60 corresponding to the inability to count fingers at a distance of 3 meters(15).

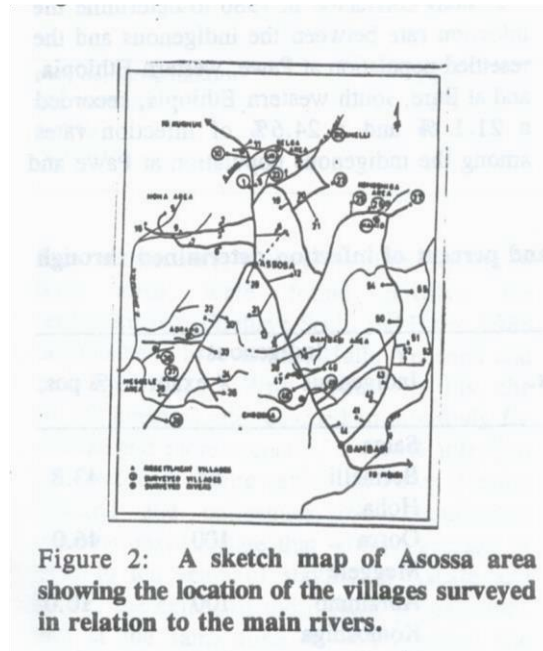
Entomological survey .Larvae of simuliids were hand-picked from stones, sticks, leaves or other substrate from the near-by running' rivers and streams of the localities studied. Adult blackflies were caught by aspiration at different sites' of those rivers by using human bait seated on a low stool with his legs below the knee bared(16).

Larvae and adult blackflies thus collected were identified into species using the taxonomic keys of Davies and Crosskey(16) and Mebratu and Mekuria(17).

Result

Ten villages consists of five indigerluus localities and five resettlement villages, were surveyed in June,1994. 'l)te localities surveyed as well as the near-by rivers from where blackfly collection was made are shown on map (Fig.2). The total infection rate by indigenous and resettled populations is presented in Table 1. Totally, 931 persons consisting of 548 settlers and 383 indigens were examined. Infection with *O. volvulus* was diagnosed in 181(19.4%) persons, of whom 120(31.3%) of the indigens and 61(11.1%) of the settlers were found positive for o. volvulus.

The difference between the indigens and settlers in infection is significant($P < 0.05$). Community microfilarial load(CMFL) was 15 .3 and this was compared between the indigenous and resettled population. The mean CMFL among the indigenous was found to be higher(19.9) than the resettles(10. 8) and this difference was found to be statistically significant($P < 0.05$).



The results of the infection rate for each village surveyed by the resettled and indigenous villages is given in Table 2. Infection rate ranged from negative finding in Choborra to 46% in Oorra, indicating levels of endemicity from hypo-endemic (< 40 % prevalence) to meso-endemic(40 60% prevalence) (17).

Table 1: The infection rate of onchocerciasis determined through skin snip by resettled and indigenous population Axoxxa.1994.

No.	Diagnosed	Infection rate
Settler	548	11.1(61)*
Indigenous	383	31.3(120)
Total	931	19.4(181)

* Infection rate by percent and number

The infection rate in the resettled and indigenous groups by sex and age is given in Table 3. Among the sex groups, in both the resettled (16.8% in males and 0.0% in females) and indigenous population (38.6% in males and 25.2% in females), males were more infected (22.5%) than females (13.2%) and this difference in rates between male and female was found to be statistically significant ($P<0.001$). The prevalence of onchocerciasis showed an increasing trend with age (Table 3). It ranges from 5.8% in the age group 5 -14 to 31.2% in the age group 45 and over, and this trend has shown significant difference ($P<0.001$).

Among the total of 931 individuals examined, the clinical manifestations of the disease recorded in relation to *O. volvulus* infection is shown in Table 4. Depigmentation of the skin, atrophy of the skin and itchina were common among the *O. volvulus* positives. Pruritus (onchocerciasis associated persistent itching) was a more prominent feature and this clinical manifestation was more represented among the positives and was the cause of complaint. Only three subjects with nodules were recorded giving 1.7% of the positives. However, to dispose a patient by either one of this

clinical manifestations or both combined when compared to a skin snip at the present conditions of disease manifestations, did not show association and this difference was statistically significant ($P < 0.05$). Only nine blind persons were encountered during the study period and two (1.1 %) were positive for the parasite. No difference was, however, seen in visual impairment between the positive and negatives ($P > 0.05$).

The entomological investigations through larval and adult blackfly collections and identification indicated the presence of *S.damnosum s.l.*

Discussion

The parasitological finding showed that the indigenous population with a total infection rate of 31.3% and CMFL of 19.9, was more affected than the resettled population with an infection rate of 11.1% and CMFL of 10.8. This could be probably due to the high exposure of the indigenous population for the bite of the anthropophilic blackfly species *S.damnosum s.l.* related to their occupation; to the frequent visits of the population to the river banks around their villages for search of gold and movement of the indigenous population to and from the endemic areas of the Sudan for trade etc. The prevalence rate of onchocerciasis recorded in this study was higher in males than in females and infection increased with age. These findings are in overall agreement with those from similar comparative studies in Ethiopia (11,12,1.B) and in West Africa (19). This can be explained by occupational difference due to the frequent visits to the forest/river banks by males which puts them under a constant exposure.

The clinical manifestations and Parasitological findings between the subjects of the study and those of Seyoum Tatischeff and colleagues (11); Hailu Yeneneh and colleagues (12) and Aseffa Aga and colleagues (18) seem to be different being lower in our case. This could be probably due to differences in the ecology, variations in host response, difference in intensity and duration of transmission, wide spread and continuous man-fly contact, etc (19).

A study conducted in 1986 to determine the infection rate between the indigenous and the resettled Population at Pawe, western Ethiopia, and at Bure, south western Ethiopia, recorded a 21.1 % and a 24.6% of infection rates among the indigenous population at Pawe and

Table 2 total population examined by village and percent of infection determined through skin snip.

Resettlement	Settler		Indigenous		
	# exam.	% pos.	Indigenous	# exam	% pos.
Salga			Salga		
Mender 22&23	106	26.4	Bermelli	64	43.8
Hoha			Hoha		
Mender 1&10	80	10.0	Oorra	100	46.0
Meggele			Meggele		
Mender 36&37	100	4.0	Abrammo	100	10.0
Komoshiga			Komoshiga		

Mender 25 & 26	90	6.2	Hamid	111	30.6
Bambassi			Bambssi		
Mender 46	172	4.2	Choborra	8	0.0
Total	11.0			383	31.3

Table 3: Resettled and indigenous population examined by age, sex and percentage of infection determined through skin snip.

Age	Settlers				Indigenous				Total		
	Male		Female		Male		Female		Male	Female	Total
	#	%	#	%	#	%	#	%			
	exa	pos	exa	pos	exa	pos	exa	pos			
5-4	57	5.3	30	.	59	1.7	48	10.4	116(3.5)*	78(6.4)*	194(5.8)*
15-44	229	15:3	86	.	103	51.5	108	29.1	332(26.6)	189(15.9)	521(22.7)
44+	125	24:8	21	.	54	54.7	16	43.8	179(33.7)	37(18.9)	216(31.2)
Total	411	16.8	137	.	216	38.6	167	25.2	627(24.2)	304(13.8)	931(19.4)

Table 4: Occurrence of features among onchocerciasis positives and negatives in skin snip

N=931	Prevalence (%)		Significance of difference
	Onchocerciasis Positive	Onchocerciasis negative	
skin depigmentation	20.4	4.3	P<0.001
skin atrophy	15.5	1.7	P<0.001
itching	44.8	7.9	P<0.001
nodules	1.7	0.0	P<0.001

as a result of this, the Out Patient Department record for onchocerciasis in hospitals as well as in health centres and clinics is scarce. Since, the results of this study depicts that onchocerciasis is a public health problem of the villagers, it could make health workers aware to diagnose patients claiming continuous itching and with clinical symptoms of onchocerciasis and calls for finding ways of an appropriate intervention such as treating with ivermectin(8).

As far as duration of stay and low infection rate in the resettled population is concerned, with an average of 9 -10 years stay in the endemic area settled around the river banks would be enough to be infected with the disease but may indicate low level of transmission rate probably due to low vector efficiency. However, further studies to cytospeciate the damnosum complex and determine

the monthly transmission potential, monthly biting rate, annual transmission potential and annual biting rate of the simuliid black flies involved in transmission for assertion as well as to prioritize intervention strategies. Generally, the results of this study could serve as a base-line data for the anticipated national control strategies by either chemotherapeutic and/or vector control means.

Similar studies are highly required to understand the extent of disease propagation to cover the rest of potentially endemic areas within the onchocerciasis belt as well as mapping new foci outside the endemic zones.

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