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EPIDEMIOLOGY OF ONCHOCERCIASIS IN SUDAN AND ITS PREVENTION
AND CONTROL, WITH SPECIAL REFERENCE TO ORGANIZATIONAL
SET-UP AT CENTRAL AND REGIONAL LEVELS

by

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A. INTRODUCTION

The Sudan is the largest country in Africa with an area of one million square miles. It lies within the African belt of onchocerciasis, which extends from Mali to Ethiopia in the North and from Angola to Tanzania in the South. It lies between latitudes 4° and 22° North. The total population of the country was estimated as 15 million (1973 census). The Sudan, being one of the developing countries with limited financial resources, depends mainly on agriculture. In spite of the present financial constraints, a great deal of effort has been made during the last few years to improve the health services.

B. THE MAGNITUDE OF THE PROBLEM

Onchocerciasis in the Sudan is considered by the health authorities as a serious public health problem, with a well-known socioeconomic impact on the affected communities and on the country as a whole. The total population suffering from the disease has been estimated at 1.5 million. The prevalence rate reaches 100% in certain areas, e.g. Raga and Radom areas in the south-western area of the country near the borders with Central African Republic (Fig. 1).

The disease was first discovered by Bryant in 1939 in Bahr El Ghazal Province in the Southern Region and was then called "Jur Blindness" after the River Jur along which it was discovered. Morgan in 1954 discovered a focus at Abu Hamad in the Northern Region, which is the northernmost focus in the world. Since then, other equally important foci were continuously discovered in other parts of the country (Fig.1). Due to the recent improvement of transportation and the establishment of different developmental schemes in the country, there has been marked and continuous migration from rural to urban areas. The wide spread of the vector's foci is

therefore considered as potentially dangerous as the disease may crop up wherever the vector is present. However, the health authorities are aware of this danger and the disease is kept under surveillance.

C. GEOGRAPHICAL DISTRIBUTION OF THE DISEASE

The disease distribution in the country is shown in Fig. 1.

1. The Northern Region

In the area around Abu Hamad about 30% of the population are suffering from the disease. Both mild eye complications and severe skin manifestations are known to exist in this focus.

2. The Eastern Region

This focus is situated along the Atbara and Setit Rivers near Gedaref Town extending eastwards to the Ethiopian borders.

3. The Central Region

This focus extends along Khor Yabus and continues into Ethiopian territory. According to the findings of a recent survey undertaken by our Department, about 61% of the population living in this area are suffering from the disease.

4. The Darfur Region

The focus here involves Radom area which is located on the Bahr El Arab River. The focus extends into Central African Republic. A survey carried out in the area showed that the prevalence rate is 80 - 100%.

5. The Southern Region

Bahr El Ghazal Province is the area most heavily affected. The disease prevalence reaches 100% in the western parts of the Province. This focus also extends into Central African Republic.

Onchocerciasis affects other provinces in the Southern Region. The disease is endemic in Western Equatoria and there is high prevalence in areas around Maridi Town and in the Lakes Province. In Upper Nile there is a continuation of the Khor Yabus focus which also extends into Ethiopia.

D. DESCRIPTION OF THE DISEASE

The clinical manifestations of onchocerciasis in the Sudan are not particularly different from those found in other affected parts of Africa. Severe itching, the presence of nodules, hyperpigmentation, hypopigmentation and hyperkeratosis are common findings. However, the ocular manifestations, e.g. keratitis, iritis, glaucoma, cataract, chorioido-retinitis, optic atrophy and blindness are the most serious complications.

It is interesting to note that the skin manifestations are almost the same in the Savannah as well as in the desert foci in the Sudan. This has been recently established, in spite of the fact that the microfilarial load, as demonstrated by skin snip, is far less in the Abu Hamad area (2-4 M.F./skin snip) as compared with findings in the Southern and Western Regions (500 - 100 M.F./skin snip).

E. MODE OF TRANSMISSION AND VECTOR(S) INVOLVED

The mode of transmission of onchocerciasis in the Sudan is the same as in other African countries where Simulium damnosum is the vector.

It has been known to the local health authorities that, as in the case of findings in other parts of the world, the nearer the population settlements are to breeding sites, the higher the prevalence of the disease. This has been recently confirmed by studies

undertaken by the Michigan State University Mission, in collaboration with the Sudan Ministry of Health (Table 1). It is worth mentioning that the vector distribution in the Sudan is far more extensive than the present known disease distribution (Fig.1). Hence there is a potential danger of the disease extending into new areas and of new disease foci being established.

The vector responsible for transmission of the disease in the Sudan is the known Simulium damnosum complex. The focus at Abu Hamad has the densest population of S.damnsum, as shown by the fly catch/hour/man at the peak of the season (December - February), yet no microfilariae have ever been detected in parous female flies in the area. Continuous efforts are being made to clarify this phenomenon.

F. METHODS OF CONTROL

At present we have no vector control programme activities in the Sudan. Limited experimental trials have been carried out at certain breeding sites to test the effectivity of Abate as a larvicide.

There are numerous water courses in the Sudan which are not shown on the available maps. This makes it difficult to launch a vector control programme, as a huge budget as well as sophisticated technical expertise would be required to undertake such a task.

Meanwhile, base-line data as regards the vector, its behaviour and the extent of its distribution, are being collected in preparation for a national control programme - if the financial resources permit. The health authorities in the Sudan are fully aware that it is vital for a successful implementation of our future control

programme to undertake collaborative efforts with the neighbouring countries similarly affected. We hope that an East African control programme, similar to the West African control programme, will be considered.

Treatment of onchocerciasis patients who report to the onchocerciasis clinics or hospitals is the only control activity carried out at present. The Sudan regimen of treatment established by Dr M. Sharif Dawood still continues and proves to be effective. Using this regimen of treatment about 23, 289 cases have been treated.

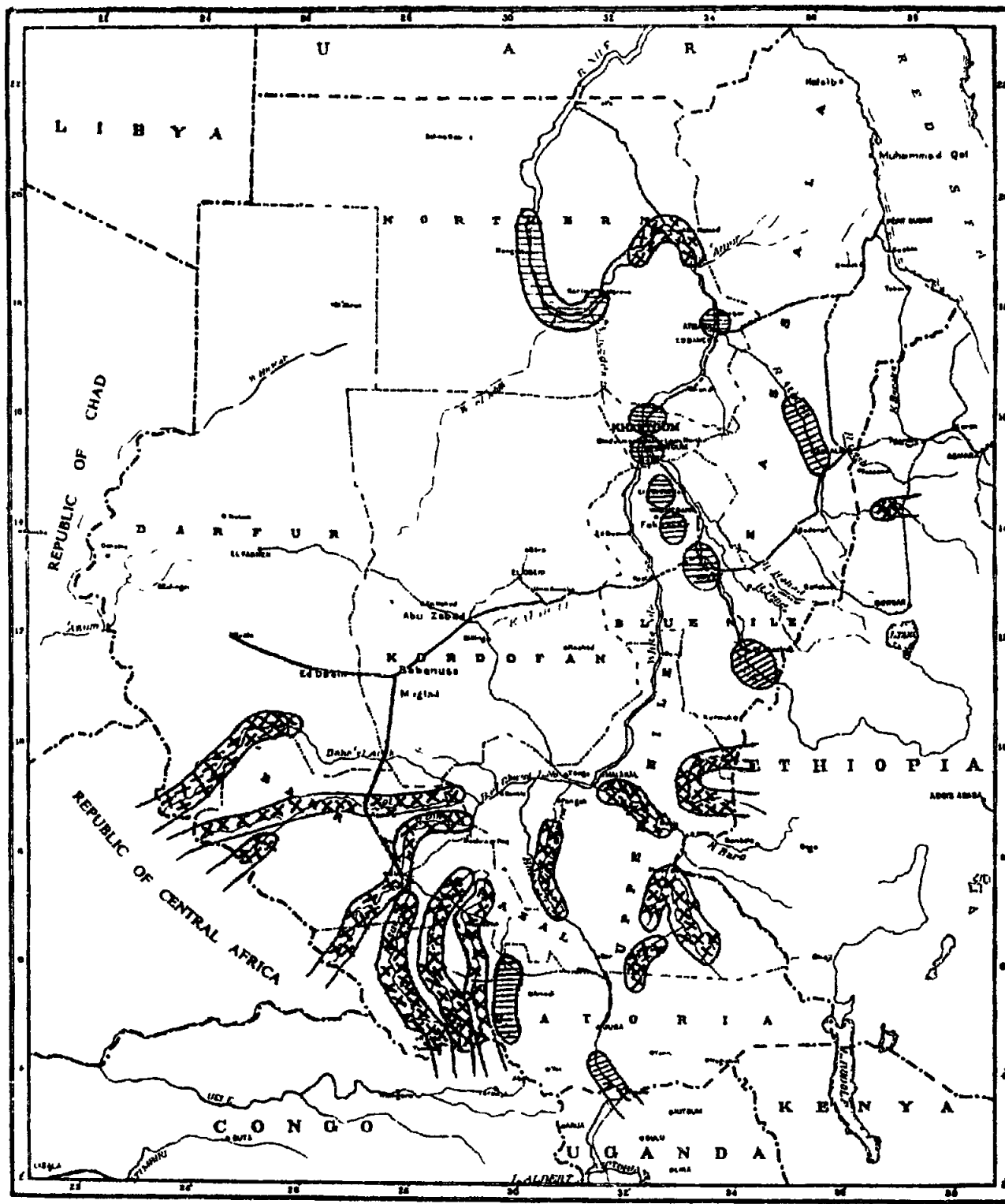
G. ORGANIZATIONAL SET-UP

The Department of Communicable Eye Diseases (CED) and River Blindness established in 1959 at the level of the Ministry of Health Headquarters is headed by a senior ophthalmologist, assisted by other physicians and a group of scientific officers. There is also a team of public health officers, technicians and other auxiliary staff. All the senior members of the staff have been specially trained in onchocerciasis control, both at home and abroad. In-service training is provided for newly recruited staff.

At the regional level there are mobile teams headed by an entomologist and a laboratory technician. These teams are responsible for collecting base-line data concerning the vector and the disease.

FIGURE 1

SUDAN



REFERENCE

- Boundaries International
- Boundaries Provincial
- Railways
- Telegraph Lines
- Roads All Season
- Roads Dry Season
- Aerodromes

	Vector
	Oncho.
	Man-made breeding foci

TABLE I

<u>Group</u>	<u>Distance from main river (miles)</u>
I	4
II	5 - 10
III	11 or more

An overall infection rate (minimal levels as determined by the presence of microfilariae in skin snips in different villages)

	Village	Village group	No. tested	No. positive	Percentage
1	Nammutina	I	106	68	64.1
2	Bussere	I	176	106	60.2
3	Bussere riverside	I	50	37	74.0
4	Madola	III	70	12	17.1
5	Awuluch	III	71	13	18.3
6	Pongo Aweil	I	212	200	94.3
7	Ngoholima	I	45	43	95.6
8	Chalcow	II	50	25	50.0
9	Nyiriyet	I	64	49	76.6
10	Pongo Nuer	I	99	91	92.0
11	Besselia	I	51	49	96.0
12	Nyinakok	I	46	39	85.0

TABLE II

SCHEDULE OF TREATMENT FOR ONCHOCERCIASIS

AFTER CONFIRMATION of diagnosis (by a positive skin snip), the urine is examined for albumen and casts before commencement of treatment; if found clear, treatment of adults is commenced as follows:-

ONE injection of "ANTRYPOL" (Suramin), intravenously as follows:

0.2 grams	1st week
0.4 grams	2nd week
0.6 grams	3rd week
0.8 grams	4th week
1.0 gram	5th week
1.0 gram	6th week
1.0 gram	7th week

The total injected Suramin =5.0 grams.

URINE IS EXAMINED BEFORE each injection and if albumen and/or granular casts are present the next injection is delayed until urine is clear again; otherwise kidney destruction may take place.

ONE WEEK AFTER the last injection a course of "BANOCIDE" (diethylcarbamazine citrate) is given as follows: ORALLY:-

25 mgm (1/2 tablet)	1st day
25 mgm (1/2 tablet)	2nd day
50 mgm (one tablet)	3rd day
50 mgm (one tablet)	4th day

75 mgm (1 1/2 tablet)	5th day
75 mgm (1 1/2 tablet)	6th day
100 mgm (two tablets)	7th day
100 mgm (two tablets)	8th day

The total = 10 tablets of diethylcarbamazine.

ONE WEEK AFTER the last dose of diethylcarbamazine, skin snipping is repeated for presence of microfilariae; if found negative, then NO MORE treatment is given, but if still positive the treatment is continued with TWO TABLETS (100 mgm) of diethylcarbamazine daily for another 10 days, and the skin snipping is repeated after this; usually NO MORE treatment is needed, but the patient is advised to come back for examination after SIX MONTHS; if still positive another course of diethylcarbamazine ONLY is given to the patient. If continues to be POSITIVE, the patient is examined after SIX month intervals and BANOCIDE TREATMENT ONLY is given. AFTER EIGHTEEN MONTHS from the commencement of the treatment, if the patient is still found positive, he is given a second course of SURAMIN, as it is probable that mother worms have not been completely killed.