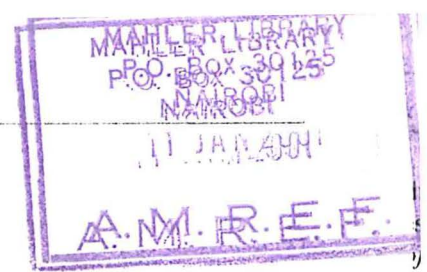


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Prevalence of malaria in southern Sudan

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SUMMARY

The prevalence of malaria in the human population of southern Sudan was studied during March to April, 1996. A total of 330 people including adults and children were screened for malaria by microscopic examination of Giemsa stained thick and thin blood smears prepared from a finger prick sample. *Plasmodium falciparum* was the only malaria parasite detected in blood smears in the present study, even though hospital records indicated presence of *P. vivax*. About 24.5% of those examined were infected.

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Introduction

Malaria is endemic in 91 countries with about 40% of the world's population at risk. Each year, there are 300-500 million clinical cases of malaria, 90% of them occurring in Africa, and between 1.5 million to 2.7 million deaths [1]. Malaria is a febrile disease caused by four distinct species of *Plasmodium*: *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale*.

In falciparum malaria, infected red blood cells can obstruct the blood vessels of the brain, causing cerebral malaria, which is often lethal. Those at greatest risk of dying from the disease in malaria endemic areas are children under the age of 5 years, pregnant females, people moving from non-malarious zones for reasons of work, migration, war or tourism. Each year at least one million children under 14 years of age die from malaria, complicated by nutritional and other health problems [1].

World wide it causes 2 million deaths each year [5]. However, epidemiological data in many endemic countries are not so reliable due to incomplete reporting [6], and unreliability of clinical diagnosis [7]. In West and Central Africa *P. falciparum* accounts for 96% of malarial infections, the remainder being due to *P. malariae*. In Eastern parts of Africa, *P. vivax* is also present [3,4]. In the Juba area of the Sudan, *P. falciparum* accounts for 84.5% of malarial infections, followed by *P. malariae* 8.5% and *P. vivax* 6.8%. Malaria prevalence rate was estimated at 62.5%, and splenomegaly in primary school children 36.3% [8].

The economic and social crises that still affect southern Sudan, has prevented establishment of proper primary health care services, and, in most areas of the region it is totally lacking. Migration and the mass movement of thousands of refugees or displaced persons in this area, as a result of war and

civil turmoil, also, makes provision of basic primary health services or identification of existing health problems extremely difficult.

The present study was conducted to determine the prevalence of malaria in southern Sudan.

Materials and Methods

Study area

This study was conducted between March and April 1996 in Eastern Equatorial region of southern Sudan (Figure 1). The population of Eastern Equatorial is approximately 300,000 people [9]. Some of the tribes are semi-nomads, and others are settled agriculturalist. At the time of the survey many people were living in displaced peoples camps. The camps we visited lacked the very essential basic items such as salt, soap, food and medicines.

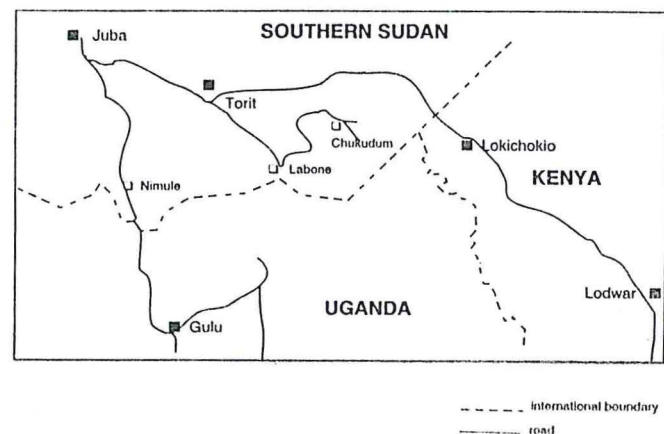


Figure 1: Map showing malaria survey areas in southern Sudan.

Blood sample examination for malaria parasites

A total of 330 individuals were examined for malaria parasites. For each case, thick and thin blood films, prepared from a finger prick sample were stained with Giemsa, and examined for presence of malaria parasites under a microscope.

Review of hospital records

The Norwegian Peoples Aid runs referral hospitals at Chukudum, Labone and Nimule (Figure 1). The laboratory records of these hospitals, from January to April 1996, were examined to determine the prevalence of malaria, and species of malaria parasites involved. Chukudum Hospital has a 100 bed capacity and provides full surgical, and medical services. Labone Hospital has a 100 bed capacity and is providing secondary health services for the displaced and indigenous populations. Nimule is close to the Uganda border. It serves the Nimule town residents and the displaced Sudanese and Ugandan refugees.

Results*Prevalence of malaria*

Eighty one of the 330 people examined were infected with *Plasmodium falciparum* as shown by microscopy of stained blood smears (Table 1). Of those infected with *P. falciparum*, 48 (14.5% of total) were children, and 23 (7%) were females. Among the children, 8.2% of those showing parasitaemia were males, and 6.4% were females.

Table 1: Prevalence of falciparum malaria in southern Sudan

	Adults		Children		Total
	Males	Females	Males	Females	
Number examined	120	129	43	38	330
No. infected	10	23	27	21	81
Prevalence(%)	3	7	8.2	6.4	24.5

Prevalence of malaria in southern Sudan appeared to decline with increase in age. This pattern is common in malaria endemic areas, and it reflects increased immunity in older people.

The hospital records showed that both *P. falciparum* and *P. vivax* are endemic in this area. *P. falciparum* however, accounts for the majority of cases. Overall, malaria prevalence in this region, based on hospital records, was 25% (see Table 2).

Table 2: Cases of malaria seen at Chukudum, Labone and Nimule Hospitals in southern Sudan, January - April, 1996.

Hospital	No. Examined	No. +ve for malaria parasites (%)			Total
		Adult Males	Adults Females	Children	
Chukudum	2276	255 (11)	225(10)	177 (8)	657(29)
Labone	1592	36 (2)	112 (7)	160 (10)	308 (19)
Nimule	2200	185 (8.4)	183 (8.3)	185 (8.4)	553 (25)
Total	6068	476 (7.8)	520 (8.6)	522 (8.6)	1518 (25)

Discussion

The results of the present survey confirm that malaria is endemic in southern Sudan. Parasitological survey (Table 1) shows a prevalence rate of 24.5%, whereas the hospital records (Table 2) shows a prevalence rate of 25%.

P. falciparum was the only species recorded in the blood samples performed by us. However, the hospital records revealed the presence of both *P. falciparum* and *P. vivax*. It has also been reported that in the Juba area of the Sudan, *P. falciparum* accounts for 84.5% of malarial infections, followed by *P. malariae* 8.5%, and *P. vivax* 6.8% [8]. One of us (Zeyhle, unpublished report) has recorded the occurrence of the three malaria parasites in the Turkana District of Kenya, an area just south of southern Sudan. In areas of high endemicity such as the Congo, falciparum malaria prevalence reaches about 60% in the adults [10]. In the Juba area, malaria prevalence was reported to be 62.5% in school children [8]. In the Labone area, the prevalence in children is about 18%, whereas for the Chukudum hospital catchment area it is about 14.5% (Table 1).

The results of the present study indicate that in southern Sudan malaria is more prevalent in females than in males. The incidence of malaria is the same in both sexes although females suffer more serious manifestations. Many countries in the tropics and developing areas of the world rely on hospital records for information on health and disease status in their countries [11]. The hospital records we reviewed, and, the blood sample surveys confirm that malaria is wide spread in the area. The degree to which each individual community is affected by malaria at any time and in any one year may vary. Further studies are therefore required to establish, the distribution and species of the mosquito vector and the transmission season.

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REFERENCES

1. World Malaria Situation 1992, parts 1, 11, and 111 *Weekly Epidemiological Record*, 1992; 69(42): 309-314, 69(43): 317-321 and 69(44): 325-330 respectively.
2. WHO, 1990. World Malaria Situation 1990. *WHO Statistics*.

RESEARCH ARTICLES

- Quarterly*. 1990, **43**: 69.
3. Sturchler D. How much malaria is there world wide? *Parasitology Today*. 1989, **5**: 39-40.
 4. The World Health Report 1996. *Fighting Disease Fostering Development*. WHO, Geneva, 1996.
 5. Gilles HM and Warrell DA. (Bruce - Chwatt's) *Essential Malariology* third edition. Heinemann. London. 1993. 354p.
 6. Brinkmann U. and Brinkmann A. Malaria and Health in Africa: The present situation and epidemiological trends. *Tropical Medical Parasitology*. 1991; **42**:204-213.
 7. Carne B, Ndoungma M and Chandenier J. Can *in vivo* surveys on the chemosensitivity of *P. falciparum* still be done in tropical Africa? *Journal of Infectious Diseases*. 1991; **164**:828.
 8. Taha TET, and Broadhead RL. Malaria in primary school children in Juba, Southern Sudan. *East African Medical Journal*. 1986; **63**: 546-550
 9. Norwegian People's Aid, 1995 *Project Report* 117540, 117541 and 117542.
 10. Trape JF, & Zoulani A. etudes sur le paludisme d'une zone de mosaïque forêt - savane d'Afrique centrale, la région de Brazzaville II Densité parasitaire. *Bulletin de la Société de Pathologie Exotique et de Ses Filiales (Paris)*. 1987; **80**: 84-99.
 11. Van Ginneken JK and Muller AS (Eds). *Maternal and Child Health in Rural Kenya*. Groom Helm. London. 1984. 378p.

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