Malaria in Koraput District of Orissa

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Incidence and prevalence of malaria was studied in the predominantly tribal district of Koraput, Orissa state. In the mass blood surveys in 61 malarious villages, a total of 12,122 persons were examined and 1,604 (13%) were found positive for malaria. Infant parasite rate was 23% and young children 2-4 years old were the worst affected (parasite rate 27.2%). *P. falciparum*, *P. vivax*, and *P. malariae* accounted for 80, 10 and 3% respectively of all infections. A sample of 2,554 children below 10 years age were examined for splenomegaly. The spleen rate in 2-9 years old children was 22% and the average enlarged spleen (AES) was 2.06. There was no association between size of the spleen and species of parasite. Fever survey was done for a year in 22 villages and 5,511 blood samples were collected of which 24.8% were positive for malaria parasite. The annual parasite incidence (API) was 32.4 per 1000 infants and 89.5 per 1000 population. Children, 2-4 years old recorded the highest incidence (457/1000). The age pattern of prevalence and incidence indicate high level of acquired immunity in the population. Prevalence and incidence varied among different tribal communities. Prevalence of infection and splenomegaly was higher among children of Bonda, Kondh and Poroja tribes. The role of genetic factors in malaria is discussed.

**Key Words** : Malaria; Children; Tribals; Koraput.

Koraput is the southern most district of Orissa bordering Andhra Pradesh and Madhya Pradesh. This hilly district, with a predominant tribal population (over 55%) has been the endemic for malaria since many decades. During the period 1981-1986, annual parasite incidence (API) ranged between 14.8 to 27.9 and over 85% of the cases were due to *P. falciparum* infection [National Malaria Eradication Programme (NMEP), unpublished data]. A total of 80 deaths due to malaria were also recorded during the six year period.

Earlier studies had shown that this district is hyperendemic for malaria and the disease pattern varied among different tribal communities. Since 1950 no scientific studies have been carried out on the epidemiology of persistent malaria in this district. The Vector Control Research
Centre (VCRC) established a permanent station in Koraput district, to study the reasons for persistence of malaria and to develop appropriate control strategies. In this communication the epidemiological features of malaria among tribal children are presented and discussed.

**Study Area:** Koraput district (17° 50' and 20° 30' N and 81° 27' and 84° 10'E) covers an area of 26,961 sq. kms and a population of 2,484,005 (1981 census). The district is covered with hills, valleys and forests, with several rivers and small mountainous streams criss crossing the area. These streams are highly conducive for the breeding of malaria vectors. The climate is characterized by a hot summer (March-June), heavy rains (July-September) and a cold winter (October-February). The mean annual rainfall is 1,353 mm. The mean maximum temperature ranges between 30.5°C and 44°C. May being the hottest month, and the mean minimum temperature ranges between 6.5°C and 25°C, December being the coldest month.

More than 55% of the population are tribal aborigines. Out of 61 tribal communities of Orissa, 51 inhabit this district. The important aboriginal tribes in the district include the Porojas, Kondhs, Bondas, Gadabas, Koyas, Bhumias, Omanathios and Gonds. Apart from these primitive tribes, the other communities in the area are Paiks, Tantis, Malis and Dombs. Paiks are descendants of warriors, Tantis are weavers and Malis are cultivators. Dombs are backward class people living in separate or isolated areas. All the aborigine tribes have their own dialects and maintain separate cultural identity. While the Porojas are most predominant in number living among other people in villages in the plains and foothills, Bondas and Kondhs live in isolated villages on hill tops.

The major occupation of the people is agriculture and also collection of forest products. The tribals practice slash and burn type of cultivation by clearing forests to grow paddy and millets. Paddy cultivation is also done by terracing stream beds. The district is economically highly backward and the literacy rate is only about 15%.

**Material and Methods**

Mass blood surveys were conducted in 61 villages (34 villages in Borigumma primary health centre (PHC), 24 in Khairput PHC and 3 in Malkangiri PHC) situated in different physiographic zones of the district at different altitudes (36 tophill, 6 foot hill and 19 plain villages). Teams consisting of a physician and other staff made door to door visit and blood smears were collected from all available persons from each village. All children below 10 years were examined for spleen enlargement by Hackett's method. Fortnightly fever survey were carried out only in 22 village in Borigumma PHC area, surveillance could not be carried out in all the 61 study villages due to logistic problems.

Thick and thin smear slides were collected, stained with Giemsa and examined following standard procedure. The density of parasites in thick smears were graded as 1+ to 4+ as per Bruce-Chawtt. The study was carried out between September 1986 and February 1988. The data were fed to a computer database at VCRC and analyzed. The age analysis was done according to Bruce Chawtt. Results of both children and adults are presented for comparison purposes.

**Results**

**Mass Blood Survey**

From 61 villages 12,122 persons were examined. Malaria parasites were detected in 1,604 (13%) persons. *P. falciparum* was the major species accounting for 80% (1,282) of the infections, *P. vivax* and *P. malariae* accounting for 10% (168) and 3%