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Epidemiology of malaria in a holoendemic area of rural Burkina Faso

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The epidemiological situation of malaria in the world remains a major threat to public health. In Africa, the global malaria eradication program of the 1950s was not implemented due to high malaria endemicity, poor infrastructure and lack of financial resources. After the failure of the global eradication approach, in 1992 WHO changed to a malaria control strategy based on early diagnosis and prompt treatment, implementation of selective, sustainable, preventive measures including vector control and strengthening local capacities for assessment of malaria situation and its determinants in the affected countries.

In 1994, the World Health Organisation estimated the global incidence of malaria at 300-500 million clinical cases annually, causing 1.5 to 2.7 million deaths each year. Today, more than 90 percent of malaria morbidity and mortality is in Sub-Saharian Africa (SSA), where malaria accounts for an estimated 25% of all childhood mortality below age of five. Recent studies suggest that this percentage might even be higher because of the contribution of malaria as an indirect cause of death. This epidemiological picture of malaria is worsening with the spread of *Plasmodium falciparum* resistance to existing first-line drugs such as chloroquine and sulphadoxine/pyrimethamine and vector resistance to insecticides.

The goal of this study was to contribute to the existing knowledge in the epidemiology of malaria in a high-transmission area of rural Burkina Faso. The study has included data from six methodological different studies conducted in the area over the period 1999-2001: (1) entomological study, (2) zinc supplementation study, (3) ITN study, (4) community factors and malaria study, (5) chloroquine efficacy study, and (6) mortality study. All data on malaria morbidity and mortality have been collected in children under the age of three years from 6 of the 41 villages of the CRSN study area. These six villages were purposely selected to represent the rural study population in its socio-cultural, demographic and geographical diversity. The main findings were:

- Malaria transmission in the study area is intense and perennial, but with marked seasonal fluctuations. *A. gambiae* complex is the predominant vector, while *A. funestus* is only of minor importance. The area is holoendemic for malaria according to spleen and parasite rates. The entomological inoculation rate varies from 100-1000 per person per year.

- The average incidence of falciparum malaria per child and per month was 0.21 over the main transmission season (July-December). *Plasmodium falciparum* parasite prevalence was 68% in the low transmission season and 83% in the high transmission season.

- Malaria transmission intensity was higher in the Bourasso subarea, which is closer to the rivers, compared to the Koro subarea. In the high transmission season the prevalence and parasite density of *P. falciparum* was significantly higher in Bourasso compared to Koro subarea. The Bourasso subarea also had the highest malaria incidence.

- Based on the verbal autopsy diagnosis, 45% of deaths in young children were attributed to malaria and the majority of children had signs of cerebral involvement before death. There were no significant differences in mortality rates between Koro and Bourasso subarea.

- Malaria was perceived as a widespread and important heath problem, putting a huge burden on families. The majority of the study population knew that mosquitoes cause malaria, but other natural and supernatural causes for malaria were also stated.

- Traditionally; the population used specific repellent plants, burning of mosquito coils and use of mosquito bednets against mosquito nuissance. Forty-nine percent of households owned at least one bednet.

- Malaria symptoms were usually first treated with traditional herbal remedies and/or available modern drugs. In case of clinical deterioration, patients visited the health centres if they had funds for transport and treatment costs.

- The chloroquine clinical failure rate was 10% in young children of the study area.

In conclusion, this study has demonstrated that malaria is the major cause of morbidity and mortality in children aged 0-3 years living in a holoendemic rural area of Burkina Faso. As chloroquine is still sufficiently effective as first-line treatment drug in falciparum malaria in Burkina Faso, malaria control efforts should concentrate on early treatment of young febrile children through their mothers in the villages and on appropriate referral to the peripheral health centers in case of non-response. In addition, protection of all young children with ITN should be promoted in the malaria endemic areas.