

Infant and child mortality and malaria in the Congo.

The trend in the suburbs of Brazzaville between 1981 and 1988

B. Carne^{1,2}, H. Guillo du Bodan³, M. Lallemand⁴

¹ Faculté de Médecine et CHRU d'Amiens, Hôpital Sud, Amiens, France; ² Centre Hospitalier et Universitaire de Brazzaville, Congo;

³ Centre Hospitalier de Linzolo, Congo; ⁴ ORSTOM, Bondy, France

Abstract

This survey was carried out on a cohort of children born between 1st January 1981 and 30th June 1987 in the maternity department of the hospital in Linzolo, a village situated 25 km south-west of Brazzaville, the capital of the Congo. The mothers of the children resided in the suburbs of Brazzaville at the time of delivery. In this region, the rate of transmission of *Plasmodium falciparum* malaria is high without marked seasonal variations. The mothers and children were traced in the second quarter of 1989 in order to assess the rates and, where possible, the causes of mortality. Information on 75% of the recorded births (2424 children) was obtained directly by interviewing the mothers in the home. Between 1981 and 1988, the infant mortality rate varied overall between 33 and 52 per thousand, and in the 1-2 year age group, between 7 and 25 per thousand (1981 to 1987). The number of deaths attributable to malaria was relatively low although resistance to amino-4-quinolone is well established since 1985. During this period, no particular trend was observed in the mortality at 0-2 years, or at 0-5 years.

Introduction

The rates of infant mortality found in several surveys conducted in the Brazzaville region (Congo) between 1980 and 1984 were low for a region of sub-Saharan Africa (Carne et al., 1984). Although this region is highly endemic for *Plasmodium falciparum*, malaria is seldom the cause of death (Trape et al., 1987b).

Drug resistance of malaria has been observed since 1985 in the Congo, as in the other Central African countries. The frequency and level of resistance to amino-4-quinolones rapidly reached those observed in East Africa (Carne et al., 1990). An increase in the occurrence of malaria was then expected, and was indeed observed in Kinshasa, Zaïre, by 1986 (Greenberg et al., 1988). A less marked increase was also apparent in Brazzaville, although at a later date (Carne et al., 1992). The situation in rural and suburban areas of the Congo has not been documented. In order to determine the

situation in suburban areas, we carried out a retrospective study on a cohort of children residing in the south-west suburbs of Brazzaville.

Methods

Study region

The survey was conducted in an area along the River Congo, extending from the western outskirts of Brazzaville (after the River Djoué) to the village of Gangalingolo (15 km from Brazzaville) which marks the limit of the city of Brazzaville (Fig. 1). The village of Linzolo, linked to Brazzaville by an all-weather road is situated 10 km further south. The maternity department of the Linzolo hospital has a good reputation which accounts for the fact that half the women who give birth there live in the south-west suburb of Brazzaville. In this region, although the housing is relatively dense, the dwellings are not of urban construction. The density of the malaria vectors, mainly *Anopheles gambiae*, is high. The rates of transmission are also high, varying from 200 to 1,000 infective bites per person-year, without marked seasonal variations (Carnevale, 1979; Trape et al., 1987a). No concerted measures of vector control or systematic chemoprophylaxis have been carried out for over twenty years. As in the whole of the Congo, presumptive treatment of fever is recommended.

Study population

The study was conducted on children; 1) whose birth was recorded between 1st January 1981 and 30th June 1987 in the maternity department of the Linzolo hospital; 2) whose mothers resided in the suburbs of Brazzaville (as described above) at the time of delivery.

Survey methods

The mothers were traced and interviewed in the home during the second quarter of 1989 in order to assess the rates, and where possible, the causes of mortality. A total of 2,424 interviews were carried out by two experienced health-care workers from the area who were specially trained for this survey. This corresponds to over 75% of the births recorded in the region. The questionnaire was deliberately simplified and enabled the deaths to be recorded with the age of the child and the circumstances of the death.

A questionnaire was completed for each child (Table 1). It comprises two parts. Part 1 included information about the family and the birth of the child: name of the mother, the father and the child; village of origin; data and time of birth. Part 2 includes data to determine the age and circumstances of death. The deaths considered to be related to malaria were those for which the mother had observed fever and/or neurological disorders without mention of respiratory disorders, diarrhoea or signs suggestive of measles. Since it was not possible to check the accuracy of the mothers' statements, the details of the cause of deaths will not be given here. Indeed, the objective of the study is to assess the trend between 1981 and 1988.

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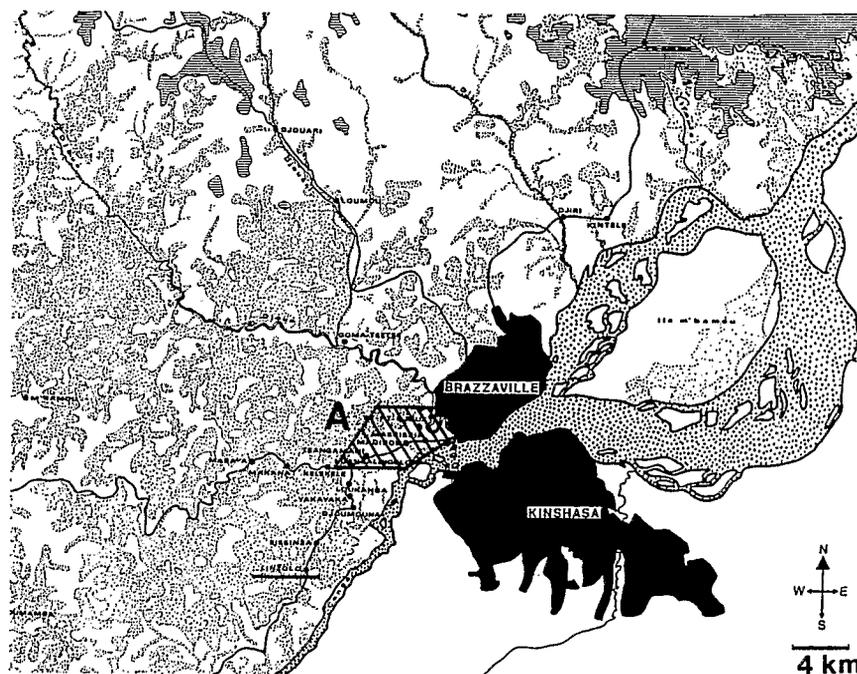


Fig. 1 Map of the region of Brazzaville showing the study area (A).

The families who were not found had either emigrated or their address was incorrect. The proportion of such families do not vary significantly from year to year (21 to 29%). No objective factor suggested that the mortality of this population was different from that of the children whose families were interviewed.

Data analysis

The data were analyzed on a micro-computer with the 1988 version of Epidémo Software (B. Duflo).

Results

The rates of infant mortality (Fig. 2) were relatively low, varying with no particular trend between 33 and 52 per thousand for children born between 1981 and 1987. Similar rates were observed for the mortality at 1–2 years and in general for the child mortality (0–5 years), although for this age range the results apply to children born before 1985 (Fig. 3). Given the method used, it is not possible to indicate absolute or relative rates of exact causes of death.

However, the low number of deaths attributable to malaria in this study is consistent with the low mortality due to malaria in the region. In addition, for mortality at 0–2 years no particular trend was noted between 1982 and 1988. The variations in annual incidence are apparently high, but this is due to the low number of cases per year.

Discussion

In the urban area of Brazzaville, infant mortality rates were estimated at 69 and 57 per thousand in 1980 and 1984 respectively (Duboz, 1984; Merlin et al., 1984). In the rural area around Brazzaville, a mortality rate of 62 per thousand was observed in Kinkala (Duboz, 1984) and 71 per thousand in Linzolo (Carme et al., 1984). The principal causes of death were related to obstetrical diseases, prematurity, respiratory infections and measles. Malaria did not play a major role

(Carme et al., 1984). The results of the present study showing even lower rates are consistent with these data, and place the Congo, at least these urban and suburban zones, in a privileged position for a sub-Saharan African country.

In general, there is a non-linear relationship between the gross national product of a country and the rates of infant mortality (Tabutin, 1987). However, there may be a considerable differences within a given country. This is the case in Zaire, where particularly high general and malaria-related mortality rates have been reported recently in the mountainous Kivu province where the socio-economic standard is low (Delacolette et al., 1989).

Since 1984 in the Congo, besides drug resistance of malaria, two new factors with opposing effects may modify the rates of infant and child mortality. These are the emergence of paediatric AIDS (Senga et al., 1988) and the decrease in the number of measles cases due to improved vaccination cover.

The pernicious anaemic forms of malaria – less frequent and/or less well-documented than cerebral malaria in sub-Saharan Africa – cannot be assessed by the type of survey chosen. In any event, we intended to assess the trend corresponding to the period of emergence and spread of drug resistance, rather than the mortality rate attributable to malaria.

In the city of Brazzaville, two studies have shown low annual malaria mortality rates. In 1983 a rate of 0.43 per thousand was found in the 0–4 year age group, and 0.08 per thousand in the 5–9 year age group (Trape et al., 1987b). In 1984, a rate of 0.6 per thousand was found in children under 5 years (Merlin, 1984). No marked differences were observed between the districts, although transmission varies considerably from hypoendemic to holoendemic according to the district (Trape et al., 1987b). These mortality rates are much lower than those currently recognized for sub-Saharan Africa. Low mortal-

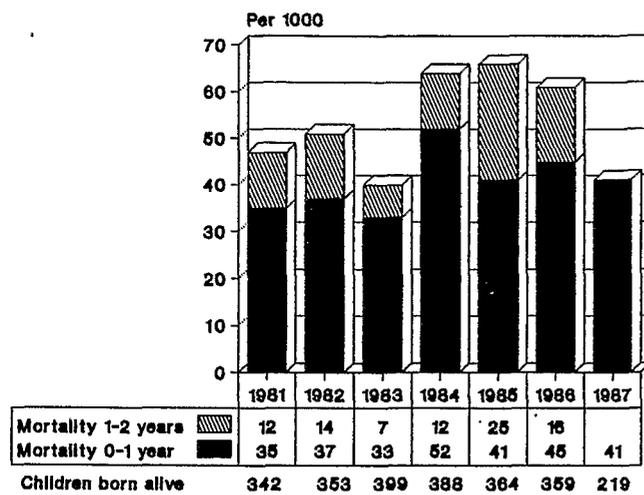


Fig. 2 Mortality at 0-2 years (children born alive between 1981 and 1987 residing in the suburbs of Brazzaville).

Table 1 Questionnaire used for the longitudinal study.

Data of interview:	Interviewer:		
Village:			
Information for children born at the maternity ward of Linzolo Hospital			
Year or birth: 19__	Village of origin (mother):		
Name:	First name:	Sex: M:	F:
Date of birth: __/__/19__	N° birth certificate.		
Name of mother:			
Name of father:			
Information obtained			
from: mother:	father:	aunt:	autres:
Child known:	Child unknown:		
Child living:	Child dead:		
Child moved:	details:		
Information in case of deaths			
Date of death: __/__/19__	Age of death:		
< 24 hours:	1-2 yr:		
Day 1-7:	2-3 yr:		
Day 8-28:	3-4 yr:		
1-6 months:	4-5 yr:		
6 months-1 yr:	5 yr:		
Circumstances and symptoms preceding death			
Accident (trauma)?	yes:	No:	
Poisoning?	yes:	No:	
Measles?	yes:	No:	
Other:			
Symptoms			
Fever	yes:	No:	
Convulsions	yes:	No:	
Unconsciousness	yes:	No:	
Cough	yes:	No:	
Respiratory difficulties	yes:	No:	
Vomiting	yes:	No:	
Diarrhoea	yes:	No:	
Weight loss	yes:	No:	
Oedema - face	yes:	No:	
- limbs	yes:	No:	
Skin disorders	yes:	No:	
Pain	yes:	No:	
- Site of pain:			
Other symptoms:			

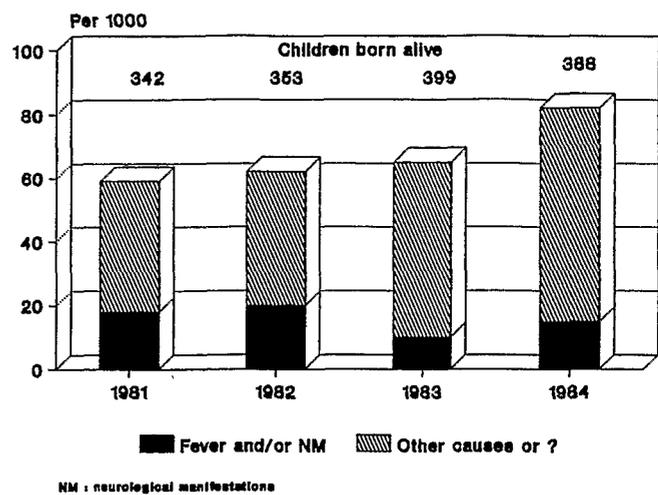


Fig. 3 Mortality at 0-5 years (children born alive between 1981 and 1984 residing in the suburbs of Brazzaville).

ity from malaria has also been observed in the rural forest region in the south of the country (Mayombe mountains) (Richard et al., 1987). This is thought to be due to the fact that parents rapidly carry out presumptive treatment in children with fever by giving an amino-4-quinoleine, since chloroquine and amodiaquine are widely available in the country (Carne et al., 1990). However, the advantage of this practice (Baudon et al., 1986) is not universally recognized (Spencer et al., 1987; Greenwood et al., 1988; Delacoclette, 1989).

A recent study in Brazzaville found a slight increase in mortality from malaria (Carne et al., 1992). This trend, although less marked, is consistent with the other side of the River Congo (Greenberg et al., 1989). It does not seem to be related to the AIDS epidemic since HIV infection has not been found to contribute to the occurrence of severe malaria (Greenberg et al., 1988), but rather to the lower drug sensitivity of local strains of *P. falciparum*.

However, type R1 R2 resistances only have a slight effect on mortality (Hoffmann et al., 1984; Sudre et al., 1990). Apyrexia and clinical cure are common in spite of the persistence of low parasitaemia (Brandling-Benett et al., 1988). These data moderate somewhat the current pessimism related to malaria, as do recent results indicating the stabilization of amino-4-quinoleine resistance (Carne et al., 1991).

In conclusion, our results show that by 1988 there had not been an obvious increase in malaria mortality in the suburban areas of Brazzaville where malaria transmission remains intense. Early treatment of fever still seems sufficiently effective to prevent the occurrence of severe malaria in this population who have a good level of malaria immunity. In regions of lower transmission such as the cities of Brazzaville or Kinshasa, however, this might not be the case.

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Prof. B. Carme

CHRU Amiens, Hôpital Sud
Service de Parasitologie et Mycologie
Avenue René Laennec
F-80054 Amiens Cédex, France