

EXPLORATORY STUDY OF MALARIA SITUATION IN HANANG AND BABATI DISTRICTS AFTER REPORTED MALARIA EPIDEMIC: I. HEALTH FACILITY BASED INFORMATION ON MALARIA MORBIDITY AND MORTALITY

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Abstract: In April 1999, during the rainy season, it was reported to the Ministry of Health (MoH) that in Babati and Hanang Districts, Arusha Region, there were signs of a malaria epidemic. A study on the identification of possible risk factors was undertaken during May - June 1999. Review of Babati Hospital and Katesh Health Centre admission records showed a seasonal fluctuation in malaria transmission with rainfall pattern. Between January and April 1999 there was a higher malaria case-fatality rate compared to the same period in 1998 in both districts. Data on malaria cases by final diagnosis confirms the epidemic nature of malaria in Hanang where all ages seemed to be affected. In contrast, the most affected age group in Babati is children below 5 years of age. Temperature did not vary significantly throughout the year indicating that the seasonal variation of malaria may be due to rainfall. Another observation made in both districts was the lack of immediate increase in the number of malaria cases during the course of the El-Nino rains. However, this was followed by an increase in the number of deaths especially in March 1998. Our investigation confirmed that people's outcry in both districts was justified as evidenced by hospital data on mortality. Although a data recording system exists at health facilities, sometimes the quality of these data is not satisfactory. Some of the data is at times incomplete. The establishment of a sustainable malaria epidemic surveillance system at National and Regional level would assist in reducing potential mortality in future.

Introduction

Malaria is among the most important public health problem in the tropical countries, and has remained a major cause of death especially in Africa. There are many risk factors that lead to the occurrence of malaria epidemics (1). Essentially all these factors result in a situation whereby a high proportion of people who are non-immune to malaria suddenly experience intense

malaria transmission (1). Also, climatic changes (2,6,12) declining efficacy of antimalarials (3), and mass movements of population as been associated with epidemics of malaria (4,5).

In Tanzania malaria is the leading cause of mortality and morbidity and is responsible for the majority of hospital attendances, admissions and deaths. Children under five years of age and pregnant women in endemic

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areas are the groups at high risk of adverse effects of malaria (7). The world malaria incidence is estimated at 300 to 500 million clinical cases with 1.5 to 2.7 million deaths each year. Malaria kills 3000 children under five years of age per day (8). Over 90% of the total malaria incidence occur in Sub-Saharan Africa. Malaria epidemics have been reported in various districts of Tanzania. Babati and Hanang districts have been experiencing the disease epidemics since malaria became established in the area in the early 1940s (9). In the 1997/1998 rainy season, there was a remarkably higher rainfall due to the effect of El-niño. In 1997 the maximum rainfall in Hanang district was 627mm in December compared with only 43.6mm for the same month in 1996. The 1998 maximum temperature range for Babati was between 20.1°C and 25.1°C. There were no relative humidity records in either district. In April 1999, during the rainy season, it was reported to the Ministry of Health (MoH) that in Babati and Hanang

Districts, Arusha Region, there were signs of a malaria epidemic. The epidemic was reported as being characterised by an increased number of unconscious people being brought to hospital and failing to respond to the standard treatment for severe and complicated malaria and eventually dying. An investigation into the epidemic was therefore carried out by the National Institute for Medical Research. The main objective of our study was to assess the malaria situation in Babati and Hanang districts in order to establish the magnitude of the reported malaria epidemic.

Materials and Methods

The study was conducted in Babati and Hanang Districts, in Arusha Region at an altitude of 800-2500m above sea level (Figures 1, 2 & 3). Health facility based studies were conducted at Babati District hospital in Babati District and at Katesh Health Centre and Bassotu dispensary. In Babati district, government health

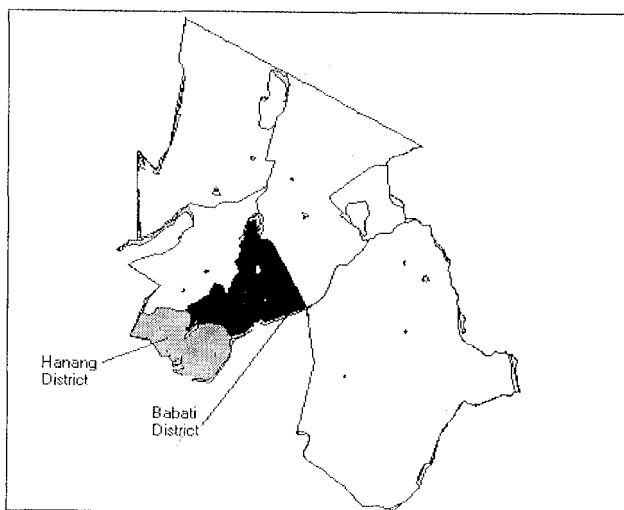


Fig.1: Map of Arusha Region

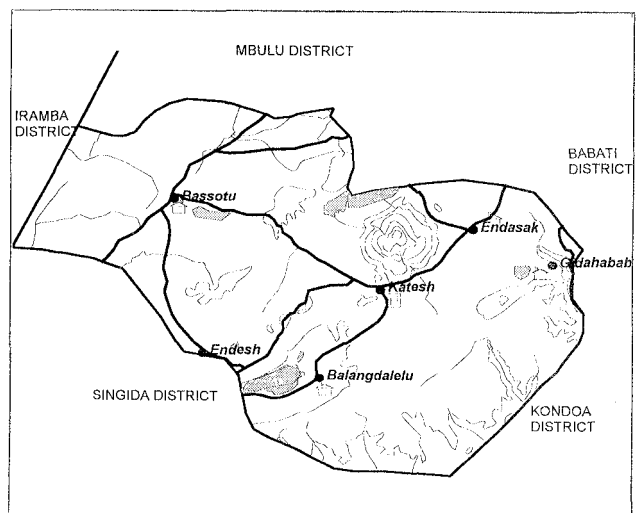


Fig. 2: Hanang District

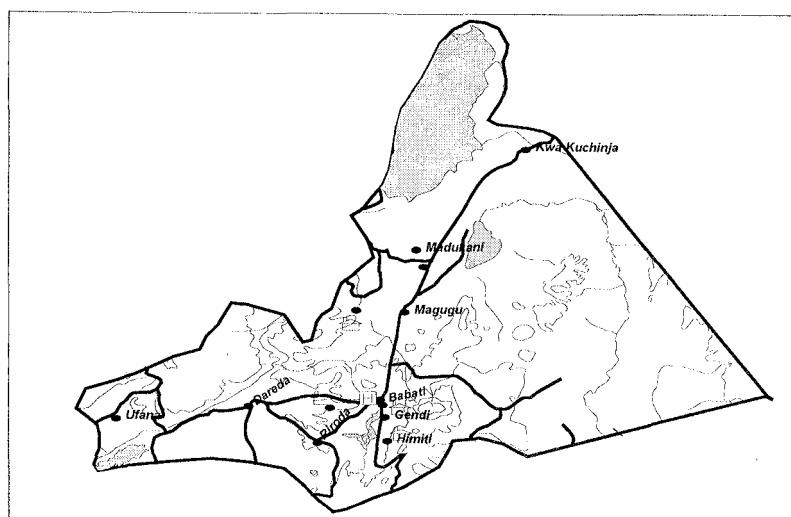


Fig. 3: Babati District

facilities include one hospital, one health centre, and 16 dispensaries. The voluntary and private health facilities include one hospital, which is designated as a district hospital for Hanang, and 17 dispensaries. Hanang district has a designated district hospital, Dareda Hospital, located in Babati District, three health centres of which one is government and two are private, and 24 dispensaries including 10 government ones.

Ethnically, the people in the two districts are mainly Wairaqw, Wagorowa, Wambugwe and Wabarbaig. Demographic characteristics indicate that Babati district had a 1998 projected population of 288,429 people, 3.3% annual rate of increase, and 49,321 (17.1%) children under five years of age. Similar figures for Hanang district are a 1998 population projection of 157,577 people, 3.3% annual rate of increase, and 29,949 (19.0%) children under five years (MoH, 1997).

Health facility based information on malaria morbidity and mortality was obtained by reviewing the Babati government hospital and Katesh Health Centre outpatient and inpatient records for January to December 1998 and January to April 1999. Some information was initially extracted from these records, after which the entire raw data was entered into the computer for detailed data analysis. The trend of malaria morbidity and mortality was subsequently compared with the pattern of rainfall and temperature in Babati and Hanang districts for the mentioned periods. The rainfall and temperature data for Babati district were obtained from the district Land Management Programme (LAMP) Support Office (LSO) under the District Development Director. In Hanang district, the only rainfall data

collected was obtained from the District Agricultural Office, Katesh. In both districts there is generally one rainy season between October and May. An indeth interviews for health providers was conducted at health facilities.

All data were recorded in pre-coded forms and entered in the computer and then validated by using EPI-Info 6.04b. Data analysis was carried out using the same program and further analysis and graphics was done using SPSS for Windows ver. 9 and Excel after the data had been exported.

Results

The number of malaria cases and deaths, obtained from inpatient registers at Babati District Hospital and Katesh Health Centre were plotted against rainfall for 1998 and 1999 (Figures 4 and 5). In Babati malaria cases are high throughout the year with a peak during the rainy season while in Hanang cases are concentrated during the rainy season. However, it was observed that during the *El-Nino* rains (Jan-Feb, 1998), despite the heavy rains the number of malaria cases were quite low. Soon after the *El-Nino* rains the number of malaria cases showed a peak (March-April 1998). Most malaria deaths occurred during the rainy season. Table 1 shows that there was a higher but non significant difference in malaria case-fatality rate between January and April 1999 compared to the same period in 1998 in both districts ($P\text{-value} > 0.05$). It can also be seen that during January/April 1999 period, the number of malaria cases admitted at Babati Hospital (1230) was about half as much as that seen in the whole of 1998 (2448).

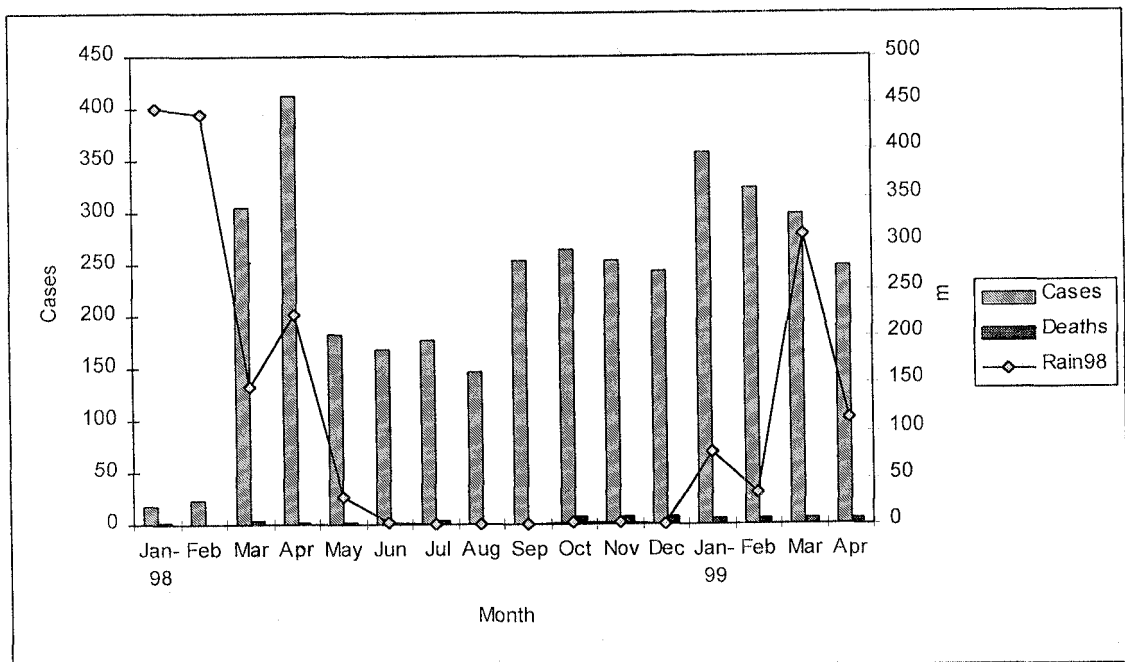


Fig. 4: Monthly In-patient Malaria cases and deaths correlated in relation with rainfall: Data from Babati Hospital for Jan.1998-Apr. 1999

Table 1: Malaria Cases and Deaths at Babati Hospital, and Katesh Rural Health Centre (Hanang District)

Period	CASES		DEATHS		CASE FATALITY RATE (%)	
	Babati	Katesh	Babati	Katesh	Babati	Katesh
Jan '98-Dec '98	2448	1189	32	20	1.3 %	1.7%
Jan '98-Apr '98	760	490	6	9	0.8%	1.8%
Jan '99-Apr '99	1230	387	22	11	1.8%	2.8%

Figures 6 and 7 show monthly malaria cases stratified by age groups at Babati and Hanang. In Babati most of the malaria cases were found in children aged below 5 years particularly during the rainy season. On the other hand, in Hanang children as well as adults were more or less equally affected. The increasing tendency of malaria cases over the reported period was also expressed by the majority, 68.2% (15/22) of the health facility staff at Babati and Katesh during the indepth interviews. The rest said that it had declined. When the health facility staff were further asked what the reasons for such increase in malaria cases might have been, 8/

21 (38.0%) attributed it to lack of control measures, 7/ 21 (33.3%) to delay in reporting to hospital, 3/21 (14.3%) to drug misuse and 3/21 (14.3%) to other factors including drug resistance.

The pattern of malaria as from hospital diagnosis stratified by age for Babati hospital (Babati district) and Katesh health centre (Hanang district) is shown in Figure 8. This figure confirms the difference in malaria endemicity for the two districts; stable malaria in Babati and unstable malaria in Hanang.

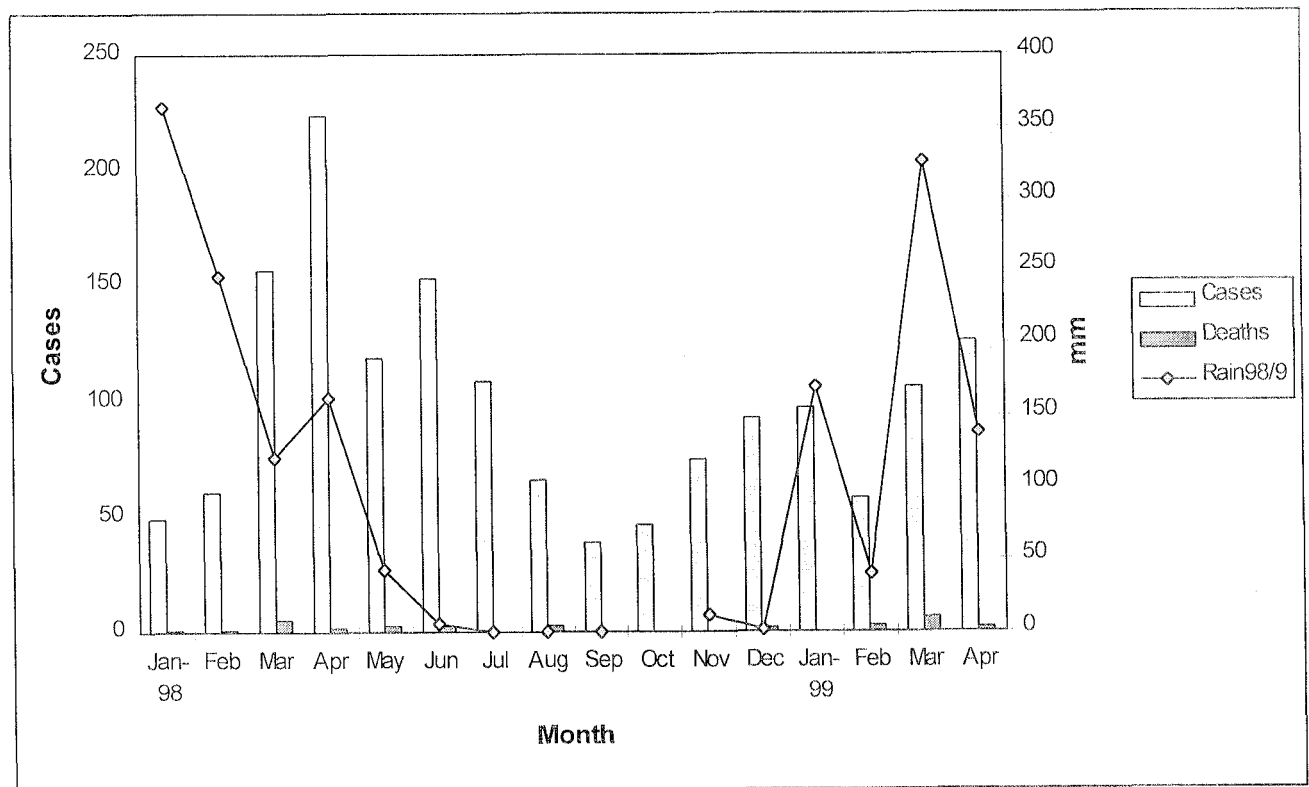


Fig. 5: Monthly In-patient malaria cases and deaths correlated in relation with rainfall: Data from Katesh Health Centre, Hanang for Jan 1998-Apr 1999

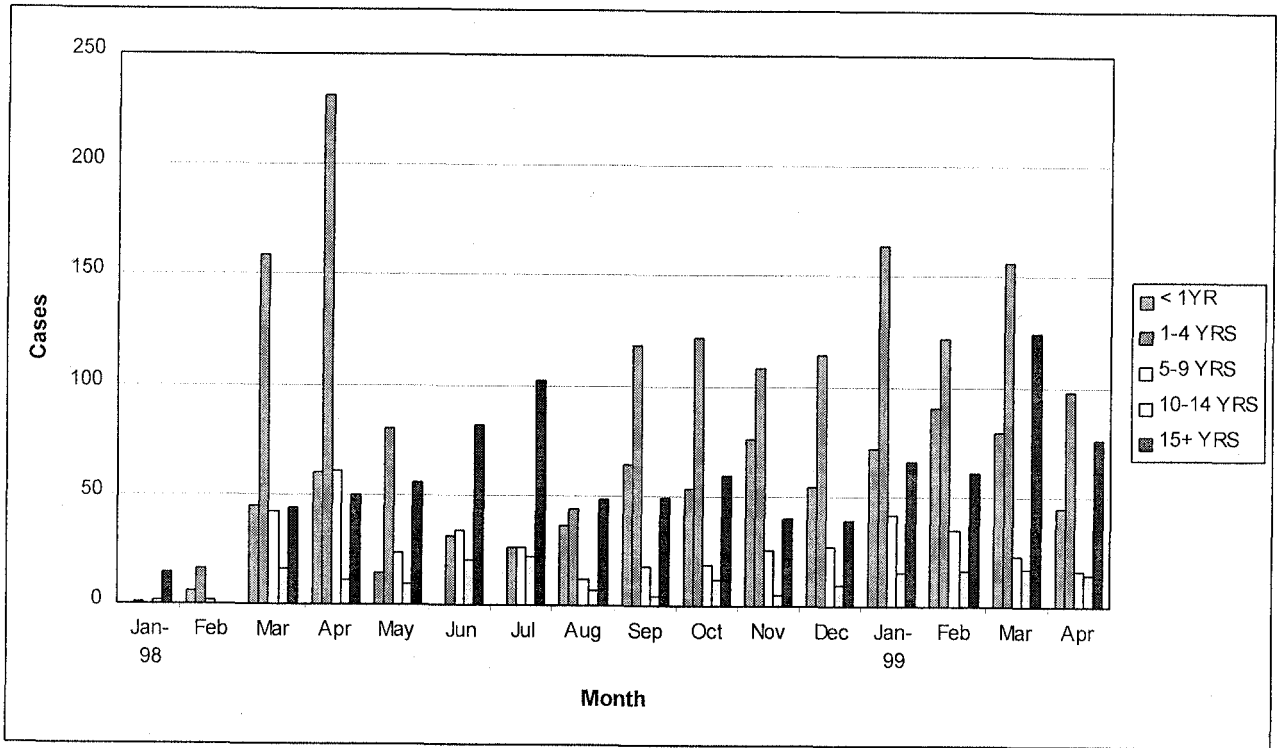


Fig. 6: Malaria cases according to groups: Data from Babati Hospital for Jan 1998-Apr 1999

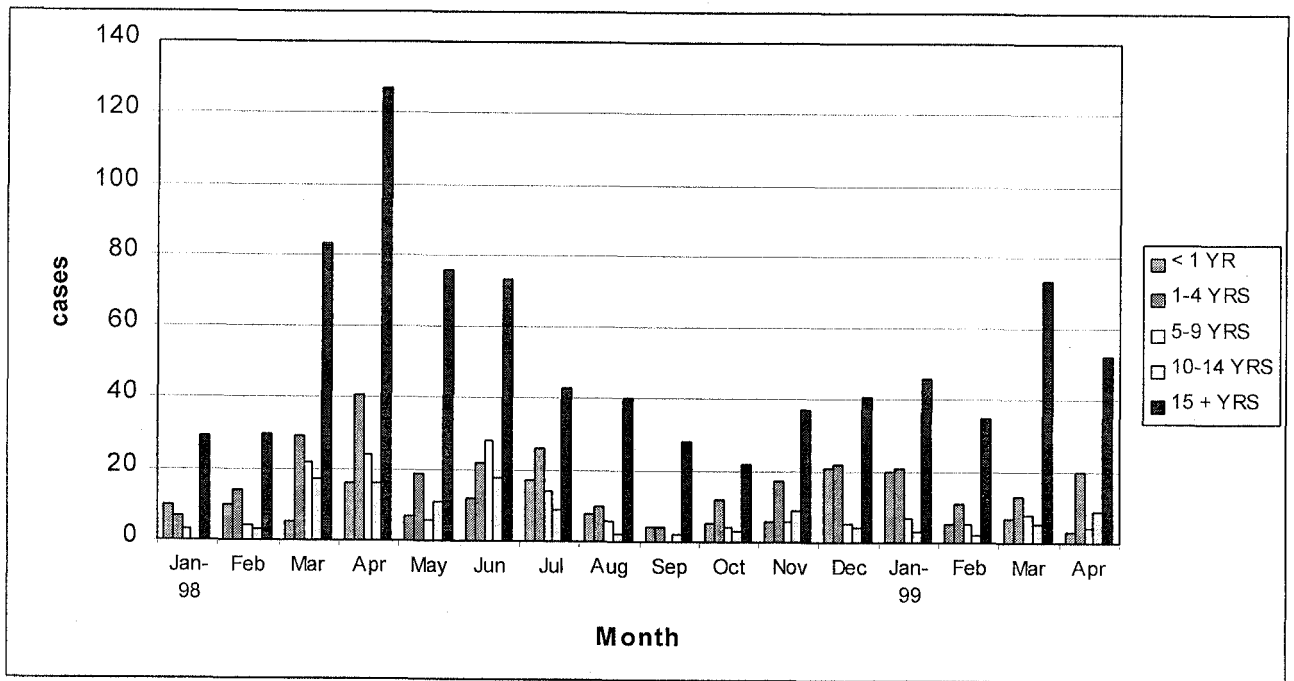


Fig. 7: Malaria Cases according to groups: Data from Katesh Hospital, Hanang for Jan 1998-Apr 1999

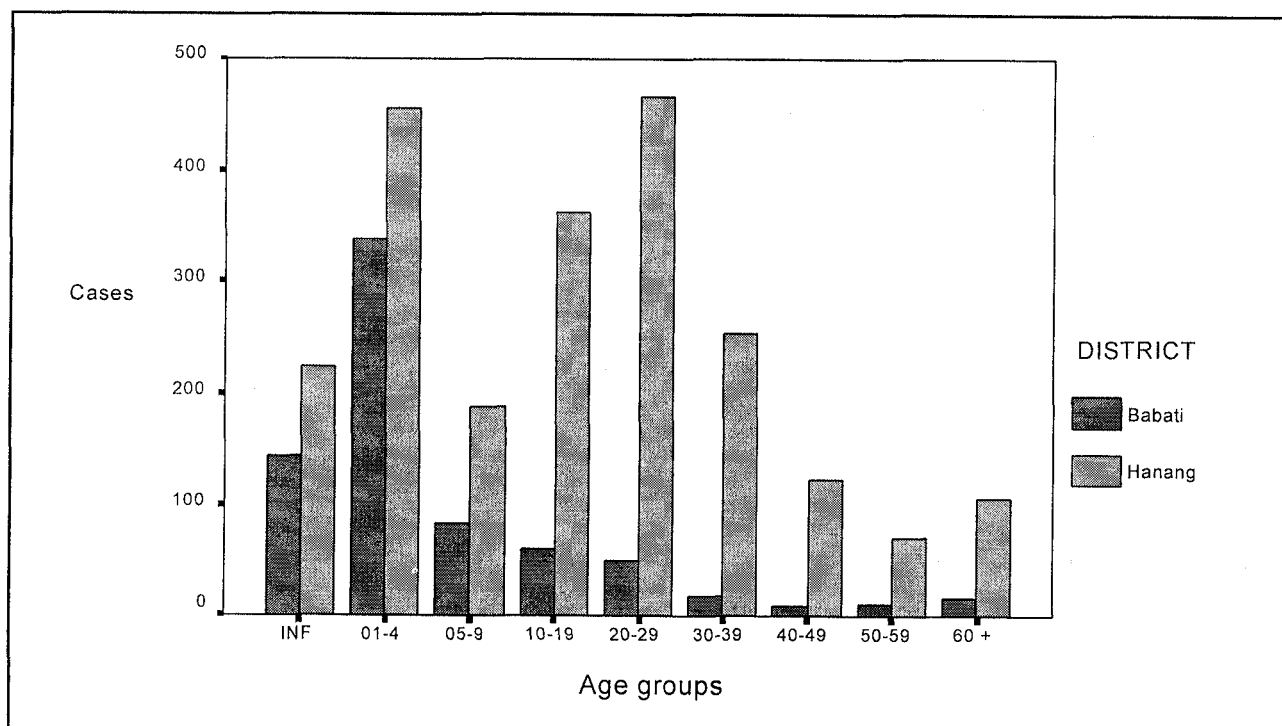


Fig. 8. Malaria Cases by Final Diagnosis in Babati and Hanang Districts

Discussion

During the October, 1998-May 1999 rainy season, there was an increase in the number of malaria deaths recorded at both the Babati District Hospital and Katesh health centre. However, this increase was found to be statistically non-significant in both districts. On the other hand, verbal autopsy results (10) indicates that there was a real increase in deaths in 1999 compared with 1997 and 1998. Whilst the number of deaths in Babati seem to be evenly distributed, those at Hanang were concentrated in the period between February to April 1999. Despite the long dry spell (June-December, 1998) experienced at Babati, the number of malaria cases showed a steady decline followed by a rise from September 1998. The situation at Hanang on the other hand, reflects a clear seasonal variation in malaria cases; most of the malaria cases were recorded during the peak of the rainy season. At Hanang, the number of malaria cases showed a steady decline during the dry season. Data on malaria cases by final diagnosis confirms the epidemic nature of malaria in Hanang where all ages seem to be affected. In contrast, the most affected age groups in Babati are children below 5 years of age.

Another observation made at both districts was the lack of immediate increase in the number of malaria cases during the course of the *El-Nino* rains. The heavy rains seen during January-February, 1998 period were not accompanied by an immediate increase in the number

of malaria cases. However, the following months of March and April, 1998 there was a sudden increase in the number of malaria cases in both districts. This was accompanied by an increase in the number of deaths especially in March, 1998. Probably this is based on the account that heavy rains are not usually associated with an immediate increase in mosquito population and transmission. It seems malaria cases and even deaths appear at a later stage when the rains have subsided. Similar situation has been seen in Wajir, Kenya¹¹.

Although a data recording system exists at health facilities, sometimes the quality of these data is not satisfactory. Some of the data is at times incomplete. There is a need, therefore, of improving the entire recording system in terms of quality and quantity. And also, establishment of a sustainable malaria epidemic surveillance system at National and Regional level would assist in reducing potential mortality in future.

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