

High altitude epidemic malaria in Bamian province, central Afghanistan

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ملاريا وبائية على ارتفاع عال في ولاية باميان في وسط أفغانستان

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الخلاصة: تسجّل هذه الدراسة وباء الملاريا الناجم عن المتصورات المنجلية في واد ناء في باميان يقع على ارتفاع 2250 - 2400 متراً عن سطح البحر في وسط مرتفعات أفغانستان. وقد قام بالدراسة فريق من الخبراء بالملاريا من منظمة الصحة العالمية ومن مؤسسة الشبكة الصحية العالمية. وقد تم الحصول على 215 من عينات الدم من 63 حالة إصابة بالملاريا، وأكدت إصابة 90% منهم بالمتصورات المنجلية والبقية بالمتصورات البيضوية. وقد أوضحت الدراسة أن المناطق المعرضة للإصابة بالملاريا في أفغانستان أوسع انتشاراً مما كان معروفاً سابقاً. وقد كانت تلك المناطق خالية من الملاريا حتى وقت قريب، إذ ظهرت الملاريا بعد دخولها كأحد عواقب الصراع المرير ونزوح السكان، وأخذت بالسرارية محلياً أثناء شهور الصيف القصير. وقد أدت هذه الفاشية إلى مرضة شديدة الوطأة، ومعدلات مرتفعة للوفيات، في الولاية التي لا تمتلك سوى مرافق سينة التجهيز وقليلة العدد للرعاية الصحية.

ABSTRACT We report an epidemic of *Plasmodium falciparum* malaria in the remote valley of Bamian (altitude 2250 m–2400 m) in the central highlands of Afghanistan. A team of malaria experts from the World Health Organization and HealthNet International carried out the investigation. A total of 215 peripheral blood smears were obtained and 63 cases of malaria (90.5% *P. falciparum*, the remainder *P. vivax*) were confirmed. The study revealed that areas vulnerable to malaria in Afghanistan are more widespread than previously recognized. The area had been malaria-free until recently, when the disease appears to have been introduced as a consequence of protracted conflict and resultant population movement, and transmitted locally during the short summer months. The outbreak led to severe morbidity and high mortality in a province having only a few poorly-provisioned health care facilities.

Le paludisme épidémique à haute altitude dans la province de Bamian (centre de l'Afghanistan)

RESUME Nous rapportons une épidémie de paludisme à *Plasmodium falciparum* qui s'est produite dans la vallée reculée de Bamian (altitude 2250-2400 m) dans les régions montagneuses du centre de l'Afghanistan. Une équipe d'experts du paludisme de l'Organisation mondiale de la Santé et de HealthNet International a effectué une investigation. Au total, 215 frottis de sang périphérique ont été obtenus et 63 cas de paludisme (90,5 % *P. falciparum*, le reste *P. vivax*) ont été confirmés. L'étude a révélé que les zones vulnérables au paludisme en Afghanistan étaient plus nombreuses que l'on ne le reconnaissait auparavant. La région avait été exempte de paludisme jusqu'à une période récente où il semble que la maladie ait été introduite suite au conflit prolongé et aux mouvements de population qui en résultent, et transmise localement durant les courts mois d'été. La flambée épidémique a entraîné une sévère morbidité et une forte mortalité dans une province qui ne dispose que de quelques installations de soins de santé mal équipées.

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Introduction

The breakdown of health delivery systems in Afghanistan during the course of two decades of conflict has severely affected the people's health status and life expectancy, which are the worst in the region [1]. Malaria has become endemic to many parts of the country with the majority of cases (80%–85%) due to *Plasmodium vivax*, and the remainder to *P. falciparum* [2–4]. A significant increase in malaria has been reported in recent years [2,3], partly due to the increasing number of health facilities operated by nongovernmental organizations, but also to the spread of *P. falciparum*-resistant to chloroquine [5–7]. The distribution of malaria is focal, showing marked differences in prevalence between provinces, districts and even adjacent villages. Much of the disease occurs in low-lying rice growing valleys, where environmental and climatic conditions are favourable for vector breeding.

We report on a malaria epidemic which occurred in the high altitude valley of Band-i-Amir, Bamian province. This region of central Afghanistan had remained a last battle zone of the civil war, control alternating between the Northern Alliance and the Taliban several times with disastrous consequences for the population.

Over 80% of the region lies above 2000 m, and the area had until then been considered free of malaria.

Methods

The first notification of an epidemic was in September 2000 by a United Nations radio operator in Yakowlang who drew attention to deaths from a mysterious disease raging in the valley. Examination of a small number of blood smears at HealthNet Interna-

tional (HNI), Peshawar, Pakistan identified *P. falciparum* malaria as the cause.

Geographical location and population characteristics

The epidemic was reported in the north-east of Yakowlang district in Bamian province, central Afghanistan (Figures 1 and 2). The affected villages lie straddled along the valley of the Band-i-Amir river at an altitude of over 2000 m above sea level. The area is populated by Hazara communities, living in poor conditions. The villages have a few primary schools for both boys and girls, but no health facilities except for one doctor in Daga village and a pharmacist in Dar-i-Shast. No anti-malarial drugs were available at these places, nor in Yakowlang hospital, which had no laboratory.

Sampling

Field investigating teams from the World Health Organization (WHO) and HNI visited the area in October 2000. Data were obtained from sick individuals through structured questionnaires seeking information on symptoms, onset time, travel history and mosquito biting. In addition, informal interviews were conducted with village elders, religious leaders and the community in order to ascertain if there was a history of such illness in the village or if this was a new phenomenon.

Blood smears for malaria parasites were obtained from the residents in three locations as follows:

- parasite prevalence survey in the village of Kosam (altitude 2250 m) of family members in households with individuals having reported either a malaria-like sickness or a death preceded by malaria-like illness (characterized by sudden onset fever with rigors, severe

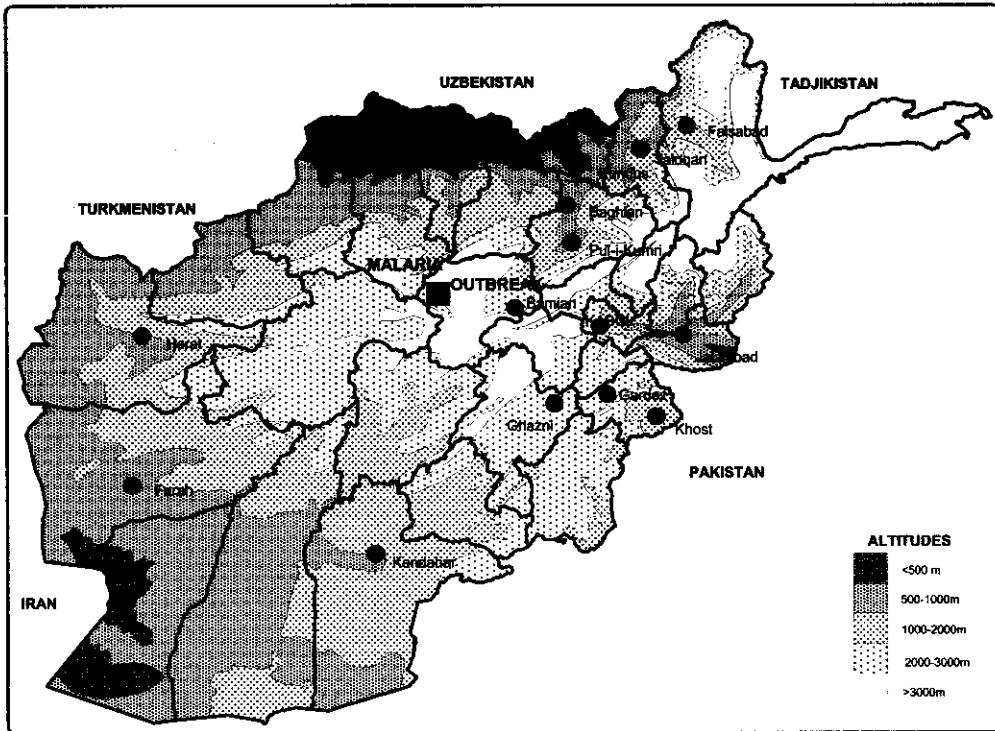


Figure 1 Map of Afghanistan

headache, myalgias, nausea, vomiting and coma) in the previous 4 months;

- a random cross-sectional survey of male and female schoolchildren (aged 5–10 years) from a primary school in Dar-i-Shast (altitude 2300 m);
- passive case detection (villagers reporting with fever to the investigating teams) obtained from Dar-i-Shast and Kiligan (altitude 2400 m) villages. Most of those who presented were men as women and children did not come for the passive case detection.

The blood smears were examined at the site and treatment was provided to all cases identified with malarial parasites. All blood

smears were later re-examined and cross-checked by HNI reference laboratory at Jalalabad, Afghanistan.

A search in the area was also made for the possible vectors. However, none was found, probably because it was October and too cold for mosquitoes to survive. A follow-up visit to search for the vector in the summer of 2001 was planned but did not take place because of the fighting that was going on and the security situation.

The climatological data for Bamian came from the Meteorological Department of Afghanistan as processed by the non-governmental organization MADERA (Mission d'aide développement économies rurales afghanes).

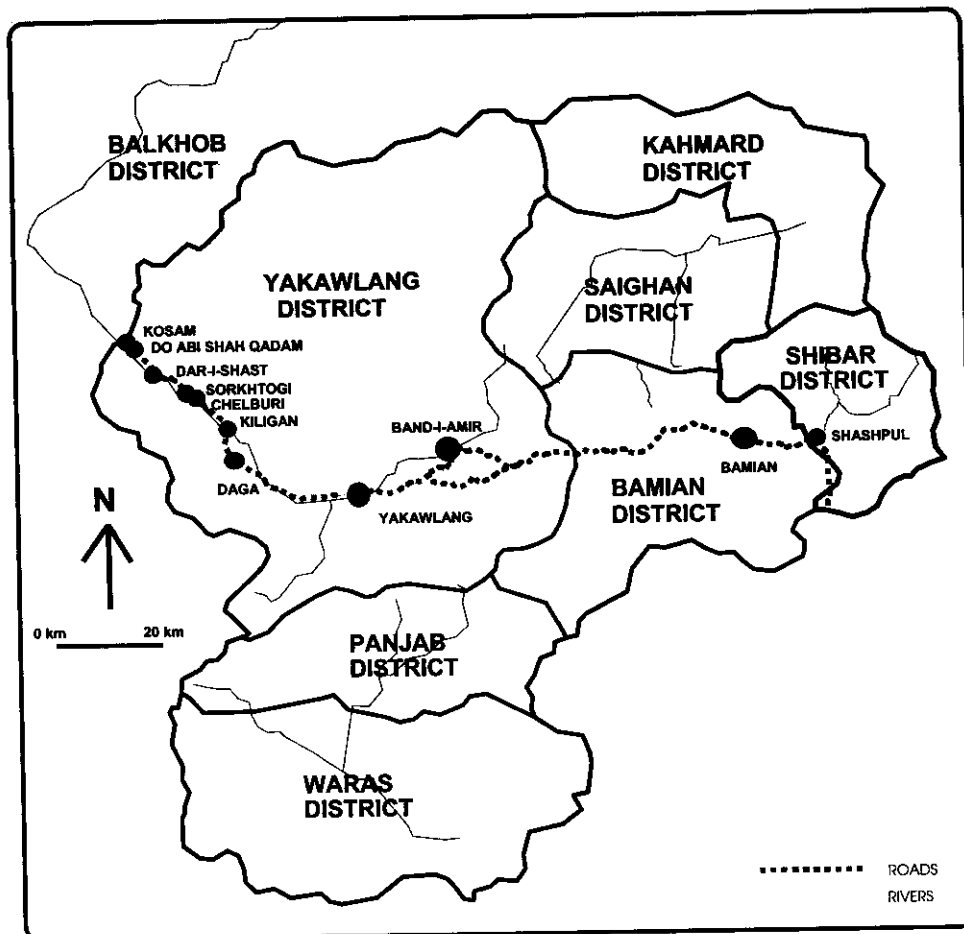


Figure 2 Map of Bamian Province, Afghanistan

Table 1 Malaria identified in the Band-i-Amir valley, Bamian

Village	Altitude (m)	Survey type	No. slides examined	<i>P. vivax</i>		<i>P. falciparum</i>	
				No.	%	No.	%
Kosam	2250	Prevalence survey of families of cases	85	3	4	35	41
Dar-i-Shast	2300	Cross-sectional survey of schoolchildren	100	2	2	11	11
Dar-i-Shast and Kiligan	2300 and 2400	Passive case detection	30	1	3	11	37
Total	—	—	215	6	3	57	27

Table 2 Results of prevalence survey in Kosam village for malaria among the family members of affected cases

Age group (years)	Males			Females			Males + females		
	TSE	PV	PF	TSE	PV	PF	TSE	PV	PF
	No.	No. (%)	No. (%)	No.	No. (%)	No. (%)	No.	No. (%)	No. (%)
< 1	4	0 (0)	1 (25)	2	0 (0)	0 (0)	6	0 (0)	1 (17)
1-4	5	0 (0)	3 (60)	3	0 (0)	3 (100)	8	0 (0)	6 (75)
5-14	14	1 (7)	6 (43)	16	1 (6)	7 (44)	30	2 (7)	13 (43)
≥ 15	17	0 (0)	5 (29)	24	1 (4)	10 (42)	41	1 (2)	15 (37)
Total	40	1 (3)	15 (38)	45	2 (4)	20 (44)	85	3 (4)	35 (41)

TSE = total slides examined.

PV = *Plasmodium vivax*.

PF = *Plasmodium falciparum*.

Results

The commonest signs and symptoms reported by the affected individuals included fever (98%), chills (95%) and headache (92%). Others included joint pains (80%), abdominal pains (58%), dark urine (47%) and vomiting (41%). Other symptoms, such as diarrhoea, bleeding (gums, gastrointestinal and epistaxis), convulsions and coma, were reported in a small proportion of the cases.

A total of 63 out of 215 smears obtained were positive for malaria parasites, and 90.5% of all cases were due to *P. falciparum* infection (Table 1). Data from Kosam village showed that the cases were distributed among both sexes and all age groups (Table 2).

Although a few schoolchildren appeared to have mild signs or symptoms of malaria, none seemed to be seriously affected by the disease. Microscopically-proven malaria was confirmed in 13% of the schoolchildren, the majority with *P. falciparum* infections (Table 1).

All cases with confirmed malaria were local residents and gave no history of

travelling outside the valley during the previous 12 months; 94% of the cases had not travelled out of their villages during the 2 weeks prior to their illness, and only 6% claimed to have visited the neighbouring villages. Almost all confirmed the presence of mosquitoes in the area and nearly 70% claimed to have been bitten by the mosquitoes.

The elders of Kosam village reported 9 deaths during 2000 and 11 deaths were reported in another village, Do Abi Shah Qadam. Investigation by verbal autopsy of relatives of those who had died in Kosam suggested malaria as a probable cause of death. Interestingly, some of the elders reported a similar illness erupting during the same season in the previous 2 years, but with fewer cases and lower mortality.

Discussion

Historical records reveal malaria to be rare in Bamian province except in one low-altitude district, Kahmard (1475 m) [8]. Interviews with inhabitants of Band-i-Amir suggest the disease appeared 2-3 years

- Theil, at controlled temperature and humidity after one blood meal. *Bulletin of entomological research*, 1939, 30:103–301.
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Third Intercountry Meeting of National Malaria Programme Managers

The WHO Regional Office for the Eastern Mediterranean in collaboration with the Ministry of Health of Pakistan organized the above-mentioned meeting in Lahore, Pakistan from 12 to 15 May 2003. The purpose of the meeting was to: i) assess the progress made and problems encountered by the national malaria control programmes in the implementation of the Roll Back Malaria (RBM) initiative; ii) propose specific activities to accelerate the implementation of the plan of action of RBM in Member States; iii) review country experiences and issues involved in selection and implementation of antimalarial drug policies and discuss the policies for financing to ensure access to treatment; iv) review current status of insecticide resistance in malaria vectors and adopt a standardized protocol for its monitoring.