

# Detection of asymptomatic malaria infection among the Afghani immigrant population in Iranshahr district of southeastern Iran

## Détection du paludisme asymptomatique chez les immigrés afghans à Iranshahr, district du sud-est de l'Iran

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**Abstract** Asymptomatic malaria infection is often associated with subpatent level of parasitaemia and normal clinical examination. Such infection becomes a greater cause for concern when involved in blood transfusion and vector transmission. This study was performed to monitor the situation of asymptomatic malaria among the Afghani immigrants and native residents in Iranshahr district, a malaria endemic area in southeastern Iran, by performing conventional light microscopy. Out of 446 samples collected from Afghani immigrant participants, seven (1.6%) thick blood smears were diagnosed as *Plasmodium vivax*. None of the individuals who tested positive had malaria symptoms and they did not remember having had any malaria signs during the past two years. Out of 496 samples collected from native resident participants, three (0.6%) thick blood smears were detected as *P. vivax* and *Plasmodium falciparum* with mild malaria symptoms. An asymptomatic Plasmodium-infected individual can be a source of malaria parasites for transmission of the agents. **To cite this journal: Bull. Soc. Pathol. Exot. 104 (2011).**

**Keywords** Asymptomatic · Symptomatic · *Plasmodium falciparum* · *Plasmodium vivax* · Afghani immigrants · Iran · Middle South Asia

**Résumé** L'infection palustre asymptomatique est souvent associée à une parasitémie inférieure au seuil de détection

et à un examen clinique normal. Cette infection devient plus préoccupante dans le cadre de la transfusion sanguine et de la transmission vectorielle. L'objectif de cette étude est de suivre, par microscopie classique, la situation du paludisme asymptomatique chez les immigrés afghans et les populations autochtones, dans le district d'Iranshahr, une zone de paludisme endémique dans le sud-est de l'Iran. Parmi les 446 échantillons récoltés chez les immigrés afghans participants, sept (1,6 %) gouttes épaisses étaient positives à *Plasmodium vivax*. Aucun des individus positifs n'avait de symptômes du paludisme et aucun ne se souvenait avoir eu des signes de paludisme lors des deux années précédentes. Parmi les 496 échantillons récoltés chez les autochtones, trois (0,6 %) gouttes épaisses étaient positives à *P. vivax* et *Plasmodium falciparum* et les individus positifs avaient des symptômes légers de paludisme. Un individu porteur asymptomatique de Plasmodium peut être une source de transmission des parasites. **Pour citer cette revue : Bull. Soc. Pathol. Exot. 104 (2011).**

**Mots clés** Asymptomatique · Symptomatique · *Plasmodium falciparum* · *Plasmodium vivax* · immigrés afghans · Iran · Moyen-Orient

## Introduction

Erythrocytic stages of malaria parasites are usually diagnosed using conventional light microscopy as a reliable detection method when patients refer to health centers because of malaria symptoms or when active malaria surveillance is performed in endemic areas [4]. The active surveillance provides an implement to detect the patients with asymptomatic malaria. Such malaria infections are often associated with low density of parasitaemia and normal clinical examination.

Asymptomatic malaria becomes a greater cause for concern when it involves blood transfusion and vector

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transmission [2]. This study was performed to monitor the situation of asymptomatic malaria among the Afghani immigrants and native residents in Iranshahr district, a malaria endemic area in southeastern Iran, by performing conventional light microscopy.

## Consideration

This study was conducted in the Iranshahr district of Sistan and Baluchistan province (the most malaria-infected province in Iran) located in southeastern Iran. Malaria parasites are transmitted mainly by *Anopheles culicifacies* and *Anopheles stephensi* with two peaks of transmission per year: during March to May and September to November. The district includes a considerable population of Afghani immigrants in the region. A total of 942 individuals (496 Iranian and 446 Afghani) from different parts of the district were enrolled and considered according to a cross-sectional surveillance method. All registered individuals were questioned about name, age, gender, nationality, symptoms of malaria, medications taken during last four weeks and travel history.

A finger-prick blood sample was collected from each participant to prepare thick and thin blood smears. The blood films were stained with Giemsa solution and examined by a skilled microscopist at 1,000 times magnification of microscope under oil immersion lens in 200 fields of each thick smear. Plasmodia-infected samples were identified up to species level and parasitaemia was determined in thick smear per 500 leukocytes and then converted to number of parasites per microliter of blood by assuming a leukocyte count of 8,000 per microliter.

Malaria-positive individuals were treated according to the malaria treatment guideline released by the Ministry of Health & Medical Education of Iran [5].

## Results and discussion

The age range of participants was seven months to 100 years. The biodata forms showed that 445 (312 Iranian and 133 Afghani) and 497 (184 Iranian and 313 Afghani) of the individuals were male and female respectively. About one percent (10/942) of the samples were found to be malaria-positive films. Among the ten positive films, nine films had *Plasmodium vivax* and one film had *Plasmodium falciparum*; more details are tabulated in Table 1. Out of 446 samples collected from the Afghani immigrant participants, seven (1.6%) thick films were diagnosed as having *P. vivax*, with a parasitaemia range of 400 to 6,000 (mean = 2,409 ± 2,274) parasites per microliter of blood, and the smears contained both asexual and sexual parasites. None of the individuals who tested positive had malaria symptoms and they did not remember having had any malaria signs during the past two years. All of the individuals had immigrated to Iranshahr district three years before the collection of samples without anyone traveling outside of the district (Table 2).

Out of 496 samples collected from the native resident participants, three (0.6%) two thick blood smears had *P. vivax* and one thick blood smear had *P. falciparum*. The parasitaemia for *P. vivax* was calculated with a range of 2,700 to 3,250 (mean = 3,264 ± 571), and for *P. falciparum*, 3,842 parasites per microliter of blood. All of the three infected individuals had mild malaria symptoms, with morena earlier malaria infection experience during the last couple of months in two of the cases.

The data of this study highlights the importance of asymptomatic malaria among the individuals who immigrated from high or moderate malaria-infested areas to either low malaria transmission regions or non-endemic areas. In spite of a natural immunity derived from a long-time exposure to malaria parasites, such immunity, it seems, cannot

**Table 1** Asymptomatic and symptomatic Plasmodium-infected cases according to the nationality / *Porteurs asymptotiques et symptomatiques du Plasmodium en fonction de la nationalité*

Nationality	Subject data							
	Total No. of subjects	Number of subjects		Total No. of positive cases (%)	<i>P. falciparum</i>		<i>P. vivax</i>	
		(%)	Female (%)		Male (%)	Female (%)	Male (%)	Female (%)
Afghani	446 (47.35)	313 (70.18)	133 (29.82)	7 (1.57)	0	0	2 <sup>a</sup> (0.45)	5 <sup>a</sup> (1.12)
Iranian	496 (52.65)	184 (37.09)	312 (62.91)	3 (0.60)	1 <sup>b</sup> (0.20)	0	1 <sup>b</sup> (0.20)	1 <sup>b</sup> (0.20)
Total	942 (100)	—	—	10 (1.06)	1 (0.11)	0	3 (0.32)	6 (0.64)

<sup>a</sup> Asymptomatic Plasmodium-infected cases.  
<sup>b</sup> Symptomatic Plasmodium-infected cases.

**Table 2** The positive cases with relevant density of parasites per microliter according to the nationality / *Cas positifs avec densité correspondante de parasites par microlitre en fonction de la nationalité*

Positive cases	Nationality			
	Iranian		Afghani	
	D	P	D	P
1	2,700	Pv	2,144	Pv
2	3,250	Pv	2,224	Pv
3	3,842	Pf	5,040	Pv
4			400	Pv
5			6,000	Pv
6			592	Pv
7			464	Pv

P : Species of parasites ; D : Density of parasites per microliter (Parasitaemia) ; Pv : *Plasmodium vivax* ; Pf : *Plasmodium falciparum*.

afford protection for a long time in the infected people [6]. Therefore, reinfection or prolonged infection may occur among the individuals but with low parasitaemia and without any apparent symptoms in the infected cases. Results obtained in this study showed that 1.6% (7/446) of those considered Afghani immigrants were Plasmodium-positive without any malaria symptoms. According to our knowledge, Afghanistan is classified among the moderate to high malaria transmission areas [3] and it is commonly accepted that individuals living in malaria-endemic regions may carry asymptomatic malaria parasites [1]. Although the Plasmodium-positive cases had immigrated to Iranshahr district three years before the consideration period, the proof is not clear when and where they acquired the malaria parasites. Interestingly, one of the positive cases was a five-year-old girl without any previous declared infection of malaria. Moreover, there is no more information on whether the above-mentioned asymptomatic malaria infections are either because of reinfection or prolonged malaria. The results of this study also indicated that 0.6% (3/496) of the Iranian individuals considered, who were native residents of Iranshahr district, had symptomatic malaria infections of *P. vivax* and *P. falciparum*, with once-treated infection about one month earlier to the present infection of falciparum malaria infected and in one of the

*P. vivax* infected patients, but none of them were severely ill and the symptoms were non-specific. Comparing these two groups of cases stimulates us to pay more attention to the probable role of subclinical carriers of malaria parasites. Some authors believe that the possibility of transmission by means of asymptomatic Plasmodium carriers increases with the rising density of gametocytaemia in the blood if Anopheles vectors are still present.

## Conclusion

An asymptomatic Plasmodium-infected individual can be a source of malaria parasites by which the parasites may be transmitted via the vectors to persons who are living at the same location. Moreover, this study showed that those individuals who immigrate from either moderate or high transmission regions to low transmission or non-endemic areas must be screened for asymptomatic malaria if Anopheles mosquitoes are still present.

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