



A Seroepidemiological Study on vivax Malaria in Children of Less than 9 Years Old Using Indirect Fluorescent Antibody Test in Southeastern Iran

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(Received 16 Oct 2019; accepted 24 Oct 2019)

Dear Editor-in-Chief

Malaria is being one of the endemic diseases in Iran since ancient times (1). From a few years ago the national elimination program is implemented successfully with a few local transmission in southeastern areas (2).

The control of local malaria transmission especially in areas where have been affected by imported cases with single strategy mostly is not possible. Therefore implementation of eliminating program requires a systematic and comprehensive plan for success (3).

Since Iran is under the program of malaria eliminating, intensive efforts are needed to investigate either the factors those facilitate implementing the program or those delay the employment. Therefore, finding asymptomatic cases as considerable obstacles in the pathway of elimination program and administrating proper treatment can interrupt the transmission cycle. For this purpose, besides the different techniques, Indirect Fluorescent Antibody method of serological technique also is recommended as a reliable and sensitive tools to survey malaria epidemiology.

This study was performed among the children with nine years old or lower ages with a view to determining the situation of malaria transmission

at southern districts of Sistan & Baluchistan Province in Iran, where the areas are under the national malaria elimination program.

Overall, 240 samples were collected from Iranshahr (179 samples) and Sarbaz (62 samples) districts in 2017 among children 1 to 9 years old that randomly were selected from houses, schools and health centers including 170 males and 70 females after obtaining an informed consent from parents or guardians.

Blood samples were prepared from recruited individuals via finger prick in order to thin and thick slides for microscopic examination based on the WHO guideline (4), a double non heparinized capillary tube containing whole blood and a small blood smear spotted on DNA Banking Card for serological survey and molecular detection, respectively. The collected samples were tested using IFA method and then the seropositive cases were examined by means of semi-nested multiplex PCR technique according to previous study (5).

Out of 240 tested samples fifteen of them showed positive reaction in connecting with relevant antigen samples including seven (3.9%) and eight (12.9%) serums from Iranshahr and Sarbaz



districts respectively. None of them (Fig. 1) showed any active infection of malaria when the relevant blood smears were examined with conventional microscope. Correlations between seropositive cases and gender and age have been

tabulated in Table 1. The seropositive cases were examined by semi-nested multiplex PCR method but there has not been detected any active positive case.

Table 1: Correlations between seropositive samples and gender and age of the studied areas in Iranshahr and Sarbaz districts, Southern Iran

Study area	Sero-negative cases IFA<1:20						Sero-positive cases IFA≥1:20					
	Previous travel to endemic area	Gender		Age(yr)			Previous travel to endemic area	Gender		Age(yr)		
		Female	Male	>6	3-6	<3		Female	Male	>6	3-6	<3
Iranshahr	27	60	113	134	39	0	6	3	4	6	0	1
Sarbaz	14	7	45	48	4	0	6	0	8	8	0	0
Total	41	67	158	182	43	0	12	3	12	14	0	1

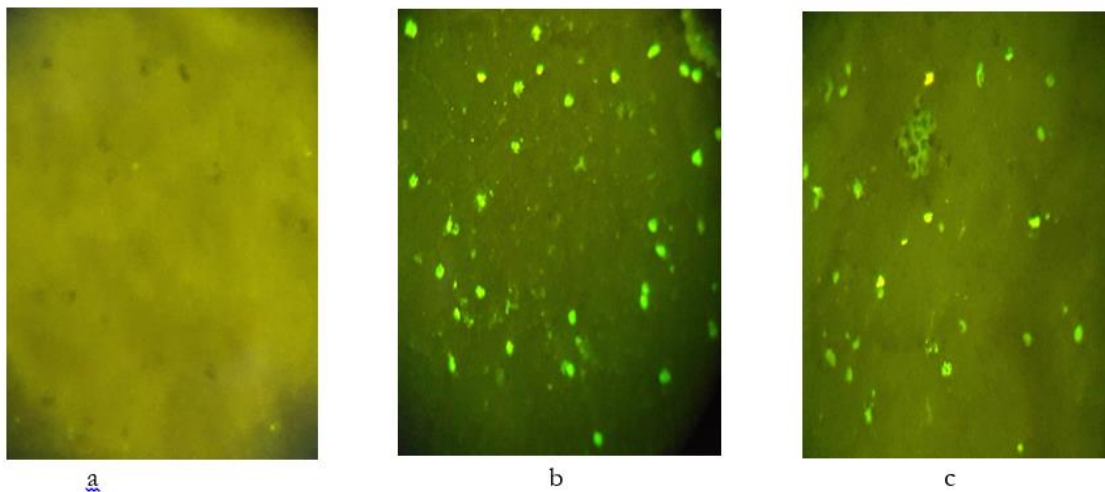


Fig.1: Illustration of seropositive and seronegative pattern of samples:
a: seronegative, b: seropositive (1/20), c:seropositive(1/40)

The regular monitoring of local malaria transmission can provide useful information for planning control strategies and management of the transmission cycle.

Serologic studies in children 9 years old and below is a trustable indicator for understanding the status of human malaria parasites cycle within the population of a region. Indeed, low seroprevalence of malaria antibodies in children below ten years old indicates that less malaria transmission events have happened in the recent years (6).

Results of this study showed that 6.25% of 240 cases revealed detectable antibody against Plasmodium vivax. Case history of those antibody positive participants indicated their travel to Pakistan and Afghanistan countries. Neither parasitological nor molecular tests showed any active infection. Although judgment about where the mentioned children have been infected is not easy, there was not detected any antibody in samples of those participants that did not travel outside of the districts.

Results of the seroepidemiological consideration in this study indicated that there was not any evidence of malaria transmission among the children with 9 years old or lower in Iranshahr and Sarbaz districts of Sistan & Baluchistan Province. Although few cases revealed low titer of antibodies against *P. vivax* that none of them was accounted as active malaria infection using malaria microscopy and PCR techniques. Results of this study hint that the national malaria elimination program is running successfully.

Conflict of interest

The authors declare that there is no conflict of interest.

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